Job Demands-Control-Support and Cognitive Failures: Role of Fatigue and Mental Toughness Among Pharmaceutical Companies' Employees

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QUAID-I-AZAM UNIVERSITY

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No part of this thesis has been submitted anywhere else for any other degree. This thesis is submitted to the Psychology (Name of Department of the University) in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Field of (Subject Name)

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Job Demand-Control-Support and Cognitive Failures: Role of Fatigue and Mental Toughness Among Pharmaceutical Companies' Employees

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Supervisor

Dedicated to

My ***Father*** who considered education a key to empower his six girls

&

My ***Mother*** whose love and understanding cannot be compensated through this dedication

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Acknowledgements

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Abstract

The present research aimed at exploring the direct and indirect effects of job demands, job control, and workplace support on cognitive failures and its dimensions (attention, memory, and execution failures) through fatigue and its dimensions (physical and mental fatigue) and mental toughness among pharmaceutical companies' employees. Demand-Control-Support Questionnaire (Theorell & Karasek, 1990), Workplace Cognitive Failures Scale (Wallace & Chen, 2005), Chalder Fatigue Scale (Chalder et al., 1993), and Mental Toughness Questionnaire-18 (Clough, Earle, & Sewell, 2002) were used to measure the study constructs. Research design of the present research included two studies. Study-I was, further, divided into three phases. Phase-I aimed at selecting and determining relevance of study constructs in local setting through two brain storming sessions with sales/marketing and production department employees. Relevant instruments were selected on basis of results of brain storming sessions. Translation and adaptation of selected instruments were undertaken in phase-II of the study, whereas phase-III was comprised of empirical evaluation of the instruments. Data for the initial empirical evaluation of the instruments was acquired through purposive sampling technique in which data was collected from pharmaceutical companies' employees (N = 196). Pharmaceutical companies, contacted for data collection, were Goodman Laboratories and Macter. Confirmation of measurement models, determining reliability, and exploration of relationship patterns of study constructs were the primary objectives of the final phase of study-I. Work-related cognitive outcomes of job demands, job control, and workplace support were determined in study-II for which a purposive sample (N = 406) of pharmaceutical companies' employees was acquired from five pharmaceutical

companies (including Macter, Medicate International, Novartis, Searle, and CCL). Furthermore, mediating role of fatigue and its dimensions (physical and mental fatigue) and moderating role of mental toughness was also explored. Results of the Hierarchical Regression Analyses indicated workplace support, physical fatigue, mental fatigue, and mental toughness as significant predictors of cognitive failures and its dimensions. Workplace support and mental toughness emerged significantly negatively predicted, whereas physical fatigue and mental fatigue significantly positively predicted cognitive failures. Findings of moderated mediation analyses indicated that mental toughness moderated the mediated relationship among workplace support, fatigue (and its dimension of physical fatigue), and cognitive failures (and its dimensions of attention and execution failures). Results also indicated that mental toughness moderated the relationship among variables only in high and medium mental toughness groups of employees in which mental toughness mitigated the effects of low level of social support and job control on cognitive failures. Furthermore, mediation analyses revealed mediation of fatigue (and its dimension of mental fatigue) between job control (and its dimension of skill discretion) and cognitive failures (and its dimension of memory failures). Significant differences were found on study variables on basis of gender (male and female) where male respondents scored higher on job demands, job control (and its dimension of decision authority), cognitive failures (and its dimension of memory failures), as well as mental toughness. Differences between managers and non-managers indicated presence of higher levels of job demands, job control (and its dimensions of skill discretion and decision authority) in managers of pharmaceutical companies. *T*-test for organization type (national and international) indicated that employees in

multinational pharmaceutical companies experienced higher levels of job demands, job control, cognitive failures and its dimensions, and mental toughness. One-Way ANOVA on basis of functional areas of the employees (sales/marketing, HR, and production) indicated that employees sales/marketing department scored highest on variables of job demands, job control, cognitive failures, and fatigue. On the other hand, employees from HR department experienced highest levels of work support in comparison to other departments. Job types (active, passive, high strain, and low strain jobs) were also analyzed using One-Way ANOVA where employees in high strain jobs scored highest on job demands, fatigue, and cognitive failures, whereas no significant differences were detected on mental toughness. Limitations and practical and theoretical implications of the study were discussed further.

INTRODUCTION

Chapter 1

Introduction

Employees are the most valuable asset at any organization. In order to keep any organization a progressive one, its employees need to be satisfied with their jobs and the working environment. Their dissatisfaction with their job can potentially affect their commitment and dedication to their work and employer, leading to deterioration of the organizational productivity. Two types of factors, primarily, determine the performance of the employees at their workplace including job characteristics and personal characteristics. Job characteristics typically refer to the skills required, efforts needed, spectrum of responsibility, work conditions (including illuination, noise, shift work etc.), and social interaction required at the work. On the other hand, personal factors generally include the demographics of the employees, their personality traits, work related motivation, emotions, and coping mechanism. Often, the two aforementioned characteristics interact in a complex manner and influence an individual's performance and organizational productivity within a given organization.

Relationship between job characteristics and the resulting well-being of the employees has been the point of attention in field of organizational psychology (Hausser, Mojzisch, Niesel, & Schulz-Hardt, 2010; Johari, Shamsudin, Yean, Yahya, & Adnan, 2019). Along with organizational psychology, the domain of occupational health psychology is already emphasizing the amalgamative role of positive and negative mechanisms at workplace where negative mechanisms lead to burnout and illness and positive mechanisms play the role of protective factors and lead to wellbeing of the employees. Both of these mechanisms bring about a holistic picture

of the relationships between the employees and their respective workplaces (Karabinski, Haun, Nübold, Wendsche, & Wegge, 2021; Schilbach, Baethge, & Rigotti, 2021).

Job Demand-Control and Job Demand-Control-Support Models

In order to gauge the effects of job characteristics on employees, various models have been developed which provide a linkage between nature of job characteristics and their physical, psychological, behavioral, and cognitive outcomes. Two of the most widely used models, providing a connection between job characteristics and employees' outcomes are Job Demand-Control (JDC) and its extended Job Demand-Control-Support (JDCS; Karasek & Theorell as cited in Ricciardelli & Carleton, 2020) model which were designed to relate the characteristics of a job to the resulting health and wellbeing of the employees. Both of the models were developed in domain of occupational stress postulating that a work environment with higher levels of demands and lower levels of job control and social support was a source of stress and related adverse effects for the employees. Thus, the roots of both of the models lie in theoretical framework of occupational stress models.

Additionally, surviving in a work environment where job demands are high and employees are largely unable to take job related decisions themselves, exercise novelty at workplace, and maintain good work relations with supervisors and colleagues may bring about adverse consequences for employees and organizations. These adverse consequences may range from employees' stress to accidents and increment in turnover rate for the organization. On the other hand, managing and coping with poor work conditions depends, partly, on the personal characteristics of the employees as well. For example, how an individual generally deals with stress

provoking situations or whether an individual is resilient or optimistic may alter an individual's dealing with prevailing circumstances at his/her workplace. Thus, in order to fully understand the organizational outcomes, understanding the work characteristics of the organization, personal characteristics of the employees, and their amalgamation is a mandatory thing.

Initially devised as job demand-control model (Karasek & Theorell, 1990), and later extended by adding the component of social support (Johnson & Hall, 1998), this model is renowned for studying the well-being and physical health related outcomes for employees (Blom, Bodin, Bergstrom, & Svedberg, 2016; Larsson, Ekblom, Kallings, Ekblom, & Blom, 2019). Job demand-control model takes job demand and job control as two major, and utmost important, determinants of job outcomes.

While developing the model, Karasek (as cited in Larrsson et al., 2019) defined job demands as job stressors which are psychological in nature and may include stress related to completion of assigned work and workload, dealing with unexpected tasks at workplace, as well as dealing with personal conflicts which are usually related with job tasks. In addition, job demands also refer to the physical, psychological, social, or organizational aspects of jobs that require physical as well as psychological effort, and are associated with physiological and psychological costs (Theorell, 2013). Job control, on the other hand, is also known as decision latitude which refers to the employee's control on job related tasks and decisions, and employees' own conduct during in working hours. Decision latitude is further comprised of two dimensions including decision authority and skill discretion. Decision authority is power of the employees to take job-related decisions; whereas

skill discretion refers to the extent of the skills which are needed and utilized at the workplace by the employee (Theorell et al., 2015).

Emergence of job demand-control-support model. The idea, while adding the component of social support, was to add another potential psychological resource along with the resource of job control. Thus, social support at workplace referred to overall extent of helpful social interactions of the employees which he experienced while interacting with his coworkers as well as supervisors (Karasek & Theorell, 1990). According to the conceptualization of these three components of the model, it was assumed that job demands will lead to poor workplace outcomes; whereas presence of job control and social support at workplace will result in positive and constructive outcomes. While taking the above mentioned conceptualization into account, the poorest kind of workplace will be the one with higher level of job demands and lower levels of job control and social support which could lead to adverse physical and psychological outcomes (Ariza-Montes, Arjona-Fuentes, Han, Law, 2018; Mather, Bergström, Blom, & Svedberg, 2015).

Interplay of demand, control, and support in the model. Research evidence suggest that these three constructs of job demands, job control, and social support can interact in different way to yield a large spectrum of consequences. Thus, inferring three ways through which the effects of these three variables can be determined for outcome variables within the scope of job demand-control-support model that is; main effects, additive effects, and interactive or multiplicative effects

In other words, these three aspects have the potential to influence the outcome variables independently as well as while interacting with one another in the form of a combined effect. Main effect simply means the effect of the single predictor variable

on the outcome variable of the study. The second method, through which effects of these variables can be studied, is the additive effects. Additive model is different from the main effect model in the sense that it studies the joint or cumulative effects of job demands, job control, and social support on the outcome variable (e.g., job demands + job control + social support). Additive effect model is carried out through hierarchical regression model in which multiple predictors are used and their additive effects involve the evaluation of the variance which every predictor variable adds to the model in presence of other predictor variables. The third way, through which this model has been studied in the past, is by looking at the interactive effects of job demands, job control, and social support (e.g., job demands x job control or job demands x social support). In such an interactive effect, one variable works as predictor; whereas the other variable works as a moderator (Fila, 2016).

Sufficient research has been conducted on all three types of effects of job demand-control-support model. For instance, Pozo-Antúnez, Ariza-Montes, Fernández-Navarro, and Molina-Sánchez (2018) investigated both main effects as well as interactive effects. The results of main effects inferred that job demands and support from superiors significantly affected the employees' health, whereas job control did not yield any effects on their health. With reference to the interactive effects, they found that only support from superiors and skills discretion domain of job control moderated the relationship between job demands and health outcomes. Garcia-Herrero et al. (2017) also employed main effect and interactive effect and concluded that social support from the workplace's supervisors influences the occupational stress of the workers by reducing it significantly in the high-demand and low-control situations which indicates the buffering effect of social support.

While looking for the main effects, Costa and Ferreira (2014) reported control and social support as the main negative predictors; whereas psychological demands and job insecurity as the main positive predictors of psychosomatic problems, depression, and job dissatisfaction among Brazilian lawyers. While exploring the main effect of the job control of the model, Edimansyah et al. (2008) did not find its effects on the stress, anxiety, and depression. The results of their study indicated that high level of job demand was associated with self-perceived depression, anxiety and stress, whereas supervisor support was associated with lower level of depression and stress. On the contrary, job control was not associated with any of the outcomes which partially confirm the main effects model. In the same research, the interactive effect of job demands and supervisor support was also found to be non-significant. Similarly, Chen, Siu, Lu, Cooper, and Phillips (2009), in their research, found that informal social support directly and inversely affects depression by decreasing depression in employees.

Research on Japanese manufacturing workers, by Higashiguchi et al. (2002), supported the main effect of job demand and control on depression. However, no interactive effect of job demands and job control was reported by the researchers. Similarly, Shimazu, Shimazu, and Odahara (2004) surveyed 867 Japanese employees and found that job demands and social support have both main and additive effects on job satisfaction.

On the other hand, the findings of Wong and Lin (2007) from a survey of 380 Taiwanese employees support the main and interactive models of the job demand control and job demand control support models. Job demands, job control and supervisor support were associated with work to leisure conflict. Job control and

social support were found to buffer the negative consequence of high job demands on employees' perception of work to leisure conflict. In this way, these researches indicate mixed findings with reference to interactive effects of job demand, control, and support.

Various researches have explored the additive effects of the model as well. For example, Negussie and Kaur (2016) deliberated that job demands and support explained significant variance (24.5 percent) in outcome variable of job satisfaction; whereas job control did not predicted job satisfaction. In order to get evidence on validity of additive and interactive models, Gonzalez-Mulé, Kim, and Ryu (2020) inferred on the basis of a meta-analysis and found few evidences for interactive model and some support for additive model. Additionally, it was found that all three constructs predicted the employee strain weakly to moderately. While exploring the impact of fluctuation in psychosocial characteristics of employees' job on their burnout symptoms, Pisanti et al. (2016) inferred from the longitudinal data that high level of social support at Time 1 significantly predicted emotional exhaustion at Time 2; high level of support and demands at Time 1 significantly predicted depersonalization and unfavorable changes in demand, control, and support; high level of demands, control, support, and their interactive terms predicted personal accomplishment of employees in Time 2 data.

Bhowmick and Mulla (2020) found that low job control and neuroticism were related with increased emotional exhaustion and a higher level of identification with their organizations was related with personal accomplishment. Additionally, Balducci, Baillien, Broeck, Toderi, and Fraccaroli (2020) studied the relationship between job demand and bullying and moderating role of job control and mental health and

reported that increase in job demands significantly predicted bullying and this relationship was strengthened by poor mental health of the employee.

While working on the additive effects of the model, Escriba-Aguir and Tenias-Burillo (2004) found that low job control and low co-worker support significantly predicted poor psychological wellbeing. Additionally, it was found that involvement in high workload and psychological job demands, low decision authority and skill discretion were related to minor psychiatric morbidity, self-reported health problems and higher absenteeism (Kivimaki, Elovainio, Vahtera, & Ferrie, 2003; Gimeno, Benavides, Amick III, Benach, & Martinez, 2004). Brough and Pears (2004) found that job demands significantly predicted lower job satisfaction and work wellbeing but addition of job control in the model increased the job satisfaction and work wellbeing of the employees.

Research also indicates that these three dimensions of the model may work differently for men and women. After reviewing empirical literature from past twenty years, Van Der Doeff and Maes (1999) concluded that males tend to score higher on job demands and job control as well as their psycho-social wellbeing affects more through these two variables. Sanne, Torp, Mykletun, and Dahl (2005) indicated that social support was higher for women in their health study and buffered the effects of anxiety and depression more strongly in sample of women.

Job Types in Job Demand-Control-Support Model

Both of the constructs of the model, job demands and job control, interact and produce four different kinds of jobs. These four different jobs include the active jobs, passive jobs, high strain jobs, and low strain jobs.

Active, passive, high strain, low strain jobs. In job demand-control-support model, jobs with high demands as well as high control are called the active jobs. High level of control nullifies the adverse effects of high demands leading to high performance and learning. Together with a high level of control, the workers have the freedom to use all available capabilities and resources. Passive jobs are opposite to the active jobs and characterized by the low job demands and low job control. The passive jobs create major psychosocial work problem as they lack in motivation and learning. Lack of job challenges in this job type can lead to negative learning or gradual loss of previously acquired skills, lower levels of work performance and motivation.

Low strain jobs in the model comprise of high degree of job control combined with few psychological job demands and challenges which ultimately create a lower than average levels of psychological strain. Low psychological strain workers have a work situation with a low stress level, and are happier and healthier than average at work when compared to employees with high strain jobs. High strain jobs in the model are comprised of low job control and high job demand which ultimately creates a higher than average levels of psychological strain. High strain workers have a work situation with a high stress level, and are unhappy, experience poor health and low performance than average at work (Karasek & Theorell as cited in Larsson et al., 2019). Authors also have clearly pointed out that the changes in job demands can be perceived as both negative and positive outcomes for an employee, since job demands can be a clear contributor to psychological strain but their presence is also necessary for effective learning/improve activity level. Job demands can be interpreted as burdens to some employees, but also represent challenges and opportunities for

growth and learning for others and their outcomes may depend largely on how they are perceived by the employees.

Empirical evidence on job types. Various studies, conducted on job demand-control-support model, have conducted analyses on the four job types provided by the model. It is important to consider that all of these job types may not exist in every organization or job. In order to explore which jobs may probably have the model's described job types, Santos, Araujo, Carvalho, and Karasek (2017) involved four distinctive samples of teachers, petroleum industry workers, primary healthcare workers, and urban workers. Through latent class analysis, all four job types were extracted for samples of petroleum industry workers and primary healthcare workers whereas, three job types (active, low strain, high strain) were evident in samples of teachers and urban workers. The percentage of job types in sample of petroleum industry workers remained 39.9%, 30.9%, 15.5%, and 13.7% for low strain job, active job, passive job, and high strain job; respectively. In the sample of teachers, the percentage of low strain, active, and high strain jobs was documented as 52.5%, 29%, and 18.5% respectively. Primary healthcare workers were primarily classified into low strain job (35.2%), followed by passive job (28.8%), and high strain job (9.1%). Furthermore, urban workers tend to fall in category of low strain job (39.1%), followed by active jobs (30.7%), and high strain job (30.2%).

Along with prevalence of these job types in varying samples, research has also indicated how these job types are linked with different outcomes for the employees. For example, research (Theorell et al., 2015) indicated that high demands, low control, and high strain were risk factors for depressive symptoms among employees in which job strain and low job control influenced the development of depressive

symptoms. A longitudinal study on job types indicated a higher tendency of development of depressive symptoms among employees in high strain and active job groups over a period of eight years after controlling for demographic variables whereas, no such association was found in low strain group (Ahlin, Westerlund, Griep, & Hanson, 2018).

An ample research has been conducted on the model which indicates a significant relationship between varying job types and the health outcomes including stroke, coronary, heart diseases, and general health and wellbeing. For example, literature connected high strain jobs with emergence of cardiovascular diseases (Kivimaki et al., 2012) and indicated presence of obesity, smoking behavior, and low physical activity as added components (Kivimaki et al., 2013). Kivimaki et al. (2012) explored the risk of coronary heart disease and stroke in men and indicated a higher risk for coronary heart disease in employees with high strain jobs over the span of their lives, whereas no risk for stroke was found in the study. Further, this risk for coronary heart disease increased with smoking habit and blue-collar job. A later research also pointed out similar patterns in which the wellbeing of flight logistic workers was inversely related to high strain job (Lecca et al., 2018). Similarly, Habibi, Poorabdian, and Shakerian (2015) conducted research on petrochemical personnel of Iran for determining the relationship between job strain and cardiovascular diseases. Results showed a positive connection between high strain job and cardiovascular diseases. Additionally, social support emerged as a protective factor; whereas physical inactivity, alcohol usage, and lower educational level emerged as risk factors for developing cardiovascular disease in the sample. Similarly, Mutambudzi and Javed (2016) inferred in their research that employees in

high strain and passive jobs are at higher risk of developing diabetes as compared to low strain jobs. Further analysis revealed that male in passive jobs are at higher risk of developing type II diabetes when compared to female workers.

Physical health outcomes of job demand-control-support model are quite evident in the previous literature, yet the cognitive outcomes of the model are an under-researched area despite of the fact that previous works hint towards it. For example; past literature indicated that highly stressful jobs lead to inaccurate memory (Morgan et al., 2004), disruptions in episodic memory, and a risk of divided attention during the process of encoding and retrieval of information among patients with chronic stress (Ohman, Nordin, Bergdahl, Birgander, & Neely, 2007). Elovainio et al. (2009) also inferred that a long exposure to high strain jobs leads to deteriorated functioning in memory, inductive reasoning, verbal meaning, phonemic fluency, and semantic fluency when adjusted for age and sex. Additionally, active jobs were significantly related to higher cognitive functioning among employees.

Job type may not only be hazardous for the employee's health but also brings disruption in other areas of an employee's life and regular processes of an organization. Choi et al. (2010) inferred that psychosocial conditions at one's workplace may even disrupt the leisure time activities of the employees. After controlling certain demographics (age, race, physical activity at workplace, alcohol consumption, income, education, and obesity), it was observed that active jobs and low strain jobs were related to active leisure time physical activity as compared to passive jobs among middle aged US workers. Additionally, job control and opportunity for learning at workplace was more related to leisure time physical

activity as compared to job demands which means that job characteristics can affect employees' personal lives indirectly. Haveraaen, Skarpaas, and Aas (2017), on the other hand, investigated the employees' tendency to return to work after long term sickness absence. The results revealed that high demands and low control independently as well as in combination (high demands and low control; high strain jobs) predicted delay in return of sick employees, whereas employees with passive and low strain jobs had tendency to return to the work earlier; results remained indecisive for active jobs. Thus, working in a certain job type may have far reaching results for the employees and organizations.

Job Demand-Control-Support Model and Cognitive Outcomes

Research has also exclusively explored occupational safety and occurrence of accidents at workplace with respect to job demand-control-support model. For instance, Stenfors, Hanson, Oxenstierna, Theorell, and Nilsson (2013) reported that quantitative demands, information and communication technology demands, perceived under-qualification, ongoing- and terminated conflicts were positively associated with cognitive complaints; while social support, good resources at work and over-qualification were negatively associated with cognitive complaints. Skill discretion and decision authority were also negatively associated with cognitive complaints. A significant gender interaction was also observed that is; the association between quantitative demands and cognitive complaints was stronger in women than in men.

Environmental factors, such as chronic psychosocial stress, might play a significant role in the development of degenerative cognitive impairment but have not

been researched sufficiently. Chronic psychosocial stress is a suspected risk factor for various neuropsychiatric ailments, and may also contribute to the disease severity as well (Gerges & Alzoubi, 2004).

A five year follow-up prospective study (Agbenyikey et al., 2015) found long working hours to be associated with decline in cognitive performance. They asserted that high job strain and low control were associated with decline in verbal learning and memory. Job strain was associated with decline in word recognition skills. Active job and passive job predicted decline in verbal learning and memory relative to low strain jobs in the younger subgroup. Active job and demands were positively associated with abstract reasoning skills. This, however, suggests that social and psychological exposure at the workplace may be associated with incidence and severity of cognitive decline. As Agbenyikey et al. (2015) have already suggested that there are few researches which have taken cognitive failures as outcomes of the stress so cognitive failures have been taken as an outcome variable in the current study to add in the literature of the cognitive outcomes of stress at workplace.

Cognitive Failures

Inability of an individual to perform a certain cognitive task, for which he/she is capable of doing otherwise, is regarded as cognitive failure (Elfferich et al., 2010). Human error typology stems from the work of Reason (1990) which provided an in-depth knowledge of cognitive functioning and possibility of errors in cognitive functioning of human beings. He postulated that the cognitive processing of any task include the processes of attention, memory, retrieval of information, and execution of the task, thus error can occur at any point during this entire process. Errors are a byproduct of individuals' capacity of information processing or their cognitive

functioning (Parker, Reason, Manstead, & Stradling, 1995). This is the reason that different individuals may exhibit different cognitive errors under same conditions.

Definition of cognitive failures, provided by Broadbent, Cooper, FitzGerald, and Parkes (1982), highlights three major components, including occurrence of a breakdown in mental functioning of the individual, emergence of error in execution of the task in hand due to that mental breakdown, and the task is the one which an individual is capable of doing otherwise but is unable to do to at that particular time due to varying reasons.

Another closest definition of cognitive failures, as per the objectives of the study, defines it as failures in perception, memory, and motor functioning which are unintentional and does not match with the actual intentions of the individual. According to this definition, failures can occur at three levels, including failure in attention, memory, and execution of a task. Attention failure is the failure which an individual commits while perceiving a piece of information; memory failure can appear while retrieving the already memorized information, and execution failure appears while an individual is executing a task which is also known as action slips (Wallace & Vodanovich, 2003). The above mentioned definitions of the cognitive failures point towards their frequent occurrence in daily life but they can lead to serious consequences under some of the specific conditions.

Etiology of Cognitive Failures at Workplace

Previous literature provided two broader paradigms of research on cognitive failures which provided support on etiology of the cognitive failures that is; whether the cognitive failures are product of some relatively permanent or diagnosed personal characteristics of the individuals or whether they are byproduct of the environmental

conditions (Batool, Afzal, Khakwani, & Khan, 2018; Voortman et al., 2019; Tirre, 2018).

At any workplace setting, also, there are primarily two types of the factors which can affect the occurrence of the cognitive failures: personality factors and environmental factors. It is, thus, important to attain insight about the triggering factors of cognitive failures because it can lead to various other adverse outcomes including injuries and unsafe work behaviors (Carrigan & Barkus, 2016).

Personal factors and cognitive failures. With reference to the personal characteristics leading to cognitive failures, Broadbent et al. (1982) argued that some individuals are more prone of committing cognitive failures along with a higher propensity of experiencing lapses in memory and attention in their daily lives. Such kind of personality tendency may be an indication of the general information processing capacity of an individual which may ultimately affect his / her performance. So, there is evidence of the individual differences in cognitive failures. Research has indicated that conscientiousness is negatively related with cognitive failure and neuroticism is positively related with cognitive failure (Payne & Schnapp, 2014). The mechanism behind associations between personality traits and cognitive failures reflects differences in coping with stressors that are also related to neuroticism and conscientiousness. Individuals who are less vulnerable to cognitive failures and who are less neurotic and higher in conscientiousness seem to cope more actively with problems than individuals that are more vulnerable to such failures.

Similarly, Hasanzadeh, Esmaeili, and Dodd (2018) explored construction workers' emotional instability (neuroticism) and its impact on their cognitive failures

when they were exposed to hazardous conditions. By studying the personalities of the workers through self-assessment questionnaires and eye movements as an indication of visual attention, which was monitored by wearable apparatus, the relationship was found to be significant. The findings reported that workers do not allocate their attention to all the hazards equally and the difference in attentional distribution is modulated by their personality characteristics (neuroticism), that is the less neurotic workers periodically looked down to check for the tripping hazards, and remained aware of their environment and surroundings overall.

A similar study by Klockner and Hicks (2015) showed that the workplace errors (including memory lapses, blunder, and distractions) were related to lower levels of mindfulness, and emotional instability. Extraversion was linked to not making blunders, while openness, agreeableness and conscientiousness were not found to be related to workplace errors.

Cognitive failures, caused by personality factors, can be significant predictors of accidents at workplaces. Rau, Liao, Guo, Zheng, and Jing (2020) found that about 60 percent of their sample of elevator workers experienced injuries in the past 6 months. Results, further, asserted that conscientiousness and agreeableness predicted compliant safety behavior; whereas trait anxiety remained significant predictor of occupational injuries.

Along with personality traits of the individuals, their emotions may play a significant role in occurrence of cognitive failures. Petitta, Tahira, Ghezzi, and Barbaranelli (2019) reported that the emotional contagion of anger positively predicted the occurrence of cognitive failures and contagion of joy predicted them

negatively. These results also predicted that the lapses in cognitive functioning can be prevented by positive emotions, and augmented by negative emotions.

Personal conditions, other than personality characteristics and emotions, may also play role in determining cognitive failures. One of such conditions is diagnosed insomnia (Batool et al., 2018) which may explain significant variance in cognitive failures, stress, and interrupted memory functioning. Similarly, another condition, known as neurosarcoidosis, may affect the occurrence of cognitive failures. Results of the study conducted by Voortman et al. (2019) indicated that 55.7% patients with neurosarcoidosis were experiencing cognitive failures.

Environmental factors and cognitive failures. On the other hand, the environmental experiences of the employees can also exacerbate or reduce the chances of cognitive failures at workplace. Job design plays a major role in determining whether the individuals would experience cognitive failures at workplace or not. For example, job variety helps in engaging the employees while enhancing their attentiveness and alleviating their boredom. Additionally, excessive physical, cognitive, or psychological demands can cause taxation on the psychological, cognitive, and physical resources of the employees, leading them to commit cognitive failures, and ultimately to accidents and injuries at workplaces. This is the reason that psychological work demands can lead to physical injuries. In-spite of the recognizable connection, the literature has discussed the issue insufficiently (Agbenyikey et al., 2015).

Job demand at an individual's workplace can be basis of cognitive failures. Kazemi, Karimpour, Shahriyari, and Hossaini (2017) observed a significant relationship between the mental and temporal workload and nominal memory error.

Additionally, with the increasing mental load, the cognitive failures and chances of accidents also increased. The study, further, suggested that reducing mental workload by providing ergonomic solutions can greatly reduce the probability of workplace accidents. A combined effect of job demands and job control can effectively elucidate the cognitive consequences of the job. Thus, Turner, Chmiel, and Walls (2005) used Karasek's job demand control model within the workplace safety domain, and findings of their study remained consistent with the job demand and control model that is; the employees in high strain jobs (characterized with high demands and low control on job) reported significantly lower levels of safety citizenship role definition as compared to other types of jobs. In their research, safety citizenship role definition was operationalized as the extent to which the employees of an organization take workplace safety as integral part of their role orientation.

Majority of the research on topic of cognitive failures is conducted in area of safety at workplace. DeJoy, Searcy, Murphy, and Gershon (2000) found that undue workload on the production employees were triggering them to forget their safety measures leading to increasing number of injuries at workplace. This relationship strengthened when there was an increase in production goals for the employees. Parker, Axtel, and Turner (2001), further, argued that such kind of workload and work demand can be compensated through job control where employees have control over their job to some extent which is meaningful for the employees. In a longitudinal study, Parker (2002) concluded that the relationship between the job control and compliance to safety measure was not direct; rather it was moderated by the organizational commitment. Furthermore, job control increased the probability of the

employees to adhere to safety measures both instrumentally and symbolically. In instrumental job control, the employees had the control to decide whether a rule was relevant or not, whereas in symbolic control, the employees were assured that their organization valued their judgment.

Similarly, Wallace and Vodanovich (2003a) found cognitive failure to be related to safety behavior and workplace accidents, even when controlling for age, gender, experience and conscientiousness. Their research also postulated cognitive failure as a moderator in the relationship of conscientiousness with resulting unsafe work behaviors and accidents that is; the negative relationship between conscientiousness and unsafe work behaviors and accidents was stronger at higher levels of cognitive failure than at lower levels. Wallace and Vodanovich (2003b), further, found in another study that cognitive failure significantly predicted automobile accidents as well as work accidents. Utilizing a sample of electrical workers, the authors collected both self-report safety data and safety data obtained from supervisors and organizational records. Wilkerson, Boals, and Taylor (2012) used the cognitive failures as a predictor in their study in which they inferred that computer users with high scores on cognitive failure were more likely to lose computer work because of a failure to save it. The error occurs when the user's attention is captured by inappropriate stimuli suggesting that people with high cognitive failures are less able to resist distraction.

Allahyari Rangi, Khalkhali, and Khosravi (2014) studied the effects of occupational cognitive failures and the workplace safety consequences and their findings showed that the occupational cognitive failures' rate significantly contributed

to safety performance measures. Thus, the people with high rate of cognitive failure had a high risk of minor injury involvement, major injuries, and near miss.

Linden, Keijsers, Eling, & Schaijk (2005) compared cognitive failures and cognitive performance test scores in three groups, including teachers with no burnout, teachers reporting burnout symptoms, and hospital patients with burnout. Scores of cognitive failures were higher in the burnout group and highest in patients. The relationship between cognitive failures and strain was investigated by Bridger, Johnsen, and Brasher (2013). They developed the construct of strain dose which combined both the amount of strain exposure and the timing of the exposure which explained little additional variance in the cognitive failures. The analysis suggested that the cognitive failure was a vulnerability factor for strain, as originally proposed by Broadbent et al. (1982). A follow-up study of the same cohort showed that the score of cognitive failures predicted psychological strain 12 months later in previously strain-free personnel (Bridger et al., 2013).

Cognitive ergonomics for cognitive failures. The ergonomic perspective is the most relevant when it comes to the objectives of the current study. Cognitive ergonomics discusses the compatibility between human beings and their environment while taking capabilities, limitations, and needs of the workers into account (Kalakoski et al., 2020). In addition to this, cognitive ergonomics highlight the factors which may affect the cognitive functioning of the employees at their workplace and aims at finding solutions which bring about better compatibility between employees and their work environment. Failing to do so may increase error occurrence and potentially challenge safety (Fuller, 2005).

Participatory ergonomic (PE) interventions are known to offer engaging work environment and significantly reduce the workplace accidents. A study by Dale et al. (2016) involved eighty six workers in a PE program, which was guided by the process evaluation of short, medium, and the long term impacts. Results indicated high worker engagement and effective training delivery which enhanced knowledge of workers and they reported changes in work practices and the tools used.

Though environmental and personal factors may lead an individual to experience cognitive failures at workplace yet, there is a personal factor which may explain the mechanism through which job characteristics lead to emergence of cognitive failures at workplace. Past research indicates the linkages between fatigue and cognitive failures such as; Attree, Arroll, Dancey, Griffith, and Bansal (2014) indicated fatigue and depression as a major cause of memory failures. Similar findings were also reported by other researchers as well (Iwasa, Yoshida, Ishii, & Yasumura, 2021; Nelson et al., 2021). Thus, fatigue was taken as mediator in the present study in order to explore the mechanism through which job characteristics (job demands, job control, and workplace support) lead to cognitive failures.

Fatigue

Fatigue is described as a decrease in physical performance associated with an increase in the real or perceived difficulty of a task or exercise (MacIntosh, Gardiner, & McComas, 2005) or it has been defined as the subjective experience of tiredness or lack of energy (Ahola & Hakanen, 2007). Normal tiredness is usually not experienced as an unpleasant state, since it can be remedied by rest and sleep. Fatigue, however, has an unpleasant quality; it is not necessarily related to exertion and is not easily or

fully restored by rest or sleep (Beutel, Hinz, Albani, & Brähler, 2006). It is proven that fatigue is a common occurrence in workers which is the inability or lack of energy to perform a certain task. Research has indicated that people do not stop working when they feel strain which makes them more susceptible to the fatigue related ailments (Barnes & Dyne, 2009).

Fatigue is categorized in two different ways. The first way is to consider the time duration of fatigue into account which results in categorization of acute, situational, and chronic fatigue. As the name depicts, acute fatigue remains for a brief period of time and a state of wellbeing can be restored with rest and sleep. Situational fatigue appears in presence of taxing situational demands on body and mind; whereas chronic fatigue is experienced for longer time periods and cannot be treated through rest and sleep (Dohrmann, Herttua, & Leppin, 2019).

Another categorization of fatigue is based upon physical and mental fatigue. Undue load or overwork can lead to physical fatigue which expresses itself in form of physical pain, cramps, or tiredness, whereas mental fatigue is the result of cognitive workload leading to inefficiency of the individuals in performing cognitive tasks (Chaudhuri & Behan, 2004). Generally, mental fatigue is identified with subjective feelings of tiredness and energy loss which results from continuously working on a cognitive task. On physical level, fatigue appears in form of bodily weakness or decrease in response of body cells and muscles under stress, exertion, effort, or over stimulation of organs, cells, or muscles (Ho et al., 2013). Another relevant way to look at fatigue, in any individual, is to evaluate his/her performance on the task in hand. Thus, research has also described fatigue in terms of the performance

parameters. For example, Tang, Li, and Huang (2016) described fatigue as decreased performance of the individual on such a task which may need some kind of manipulation, focus, or recalling or retrieving things from memory. Another definition indicates a possible decrease in attention, perception, decision making, as well as skill/motor performance which may significantly reduce the work capacity of an individual (Lee, Bardwell, Ancoli-Israel, & Dimsdale, 2010).

Over the passage of time, workplaces have evolved and placed more demands on workers for which managers need to understand and develop interventions for encountering fatigue related issues in their employees (Chow et al., 2013). With reference to job related exhaustion, a systematic review indicated that three particular cognitive functions are more likely to be disturbed by fatigue including attention, memory, and executive functions (Deligkaris, Panagopoulou, Montgomery, & Masoura, 2014). Thus, fatigue maybe a great point of concern for any functional organization. A functional workplace is that which requires the effective and continuous workers' performance in order to successfully thrive, because, if any unit (human) of this workplace fails to perform its duty, the entire operation falls apart. Despite of the addition of latest technologies in workplace environments, humans are still a crucial part of its proper functioning. Research in organizational setting also indicates that men and women may differ in experience of fatigue at their workplaces. Such as, Anitei, Chraif, and Ionita (2015) observed higher levels of work related fatigue in female workers as compared to male workers where they attributed this fatigue to work-life balance for female workers. Women tend to not only report physical fatigue, related to their work, but they also tend to report higher levels of

emotional fatigue (Purvanova & Muros, 2010). Researchers added that these differences were largely due to the traditional social roles of women at homes and society at large.

Human beings suffer various mental and physical infirmities, which can compromise their ability to perform their assigned tasks by interfering with their physical and mental health. A research by Tanaka, Ishii, and Watanabe (2015) stated that fatigue of any sort may cause error, incident or accident, when fatigued-caused lapses in attention are paired with workplace demand of a good output. This study also identified many factors that induce fatigue among workers including loss or lack of sleep, long working hours, and workload. Additionally, the study reported that organizational aspects such as safety culture, shift scheduling practices, and an absence of a proper fatigue-management risk plan may also contribute towards the fatigue among the professionals.

Mental fatigue has the potential to affect the cognitive processes of the individuals. Attention is the very first cognitive process which can be affected. A study revealed that people suffering from mental fatigue experienced trouble in sustaining concentration and reduced ability to execute vigorous tasks due to loss of motivation and tolerance to physical fatigue related signs (Chow, 2018). This study also indicates that mental fatigue reduced the vigilance of the employees which leading to attention related lapses. Along with it, goal directed attention was also compromised during fatigue in which it became difficult for the employees to focus on primary task and they were easily distracted.

A comparative study was conducted on three groups of people with varying levels of mental exhaustion that is; individuals who had stopped working due to their mental exhaustion and were seeking treatment, teachers of vocational training institute who were mentally exhausted but working, and teachers who had no symptoms of mental exhaustion (Linden et al., 2007). Results indicated a strong connection between mental exhaustion and resulting cognitive failures, inability to voluntarily control attention, as well as errors in inhibition during process of attention.

When anything is not encoded properly through process of attention, it eventually causes problems in storage and retrieval of information. Thus, mental fatigue may also interrupt the process of storage and retrieval of information along with attention. In an attempt to explore the effects of mental fatigue, Kaur, Malik, Sharma, and Jangra (2018) conducted an experimental study where fatigue was induced in experimental group participants through administration of tests which needed cognitive effort. Findings revealed a significant difference in memory and retention of both of the groups where experimental group performed poorly in both post-testing. Another study by Jain and Nataraja (2019) asserted that experts and non-experts are equally at risk of developing mental fatigue. They explored the effects of mental fatigue on auditory perception and working memory (reading span, digit span, and operations span) and concluded that working memory and auditory perception deteriorated in musicians as well as non-musicians.

Apart from attention and memory, mental fatigue may also disrupt the cognitive processes which may, in turn, affect the control on physical, intentional or deliberate behaviors (Boksem, Meijman, & Lorist, 2005). Research indicates that

prior cognitive processes of attention and memory may also contribute in disruption of executive control processes. For example, inhibiting irrelevant stimuli (Yperen & Hagedoorn, 2003), controlling attention (Tanaka, Ishii, & Watanabe, 2015), and updating working memory (Kane et al., 2007) are some of the tasks which are part of executive control and any interruption in these processes may affect the function of executive control which may disrupt the responses of the individuals. For example, Fan, Zhao, Luo, and Zhang (2019) concluded that high level of mental fatigue induced impaired performance in participants of their experimental group where mental fatigue was induced in participants through administration of cognitive games.

As mentioned above, mental fatigue may have deteriorating effects on cognitive process of the individuals; physical fatigue may also affect the cognitive processes and performance of the individuals. As far as the relationship between physical fatigue and resulting cognitive performance is concerned, this relationship is not as direct as the relationship between mental fatigue and cognitive outcomes is. Most of the research on physical fatigue uses experimental research approach in which physical exercises are used to produce physical fatigue. Researches provide mixed results and a more moderate point of view indicates that level of cognitive deterioration after physical fatigue depends on duration as well as intensity of the physical exercise (Tomporowski, 2003).

Another indication, which points towards the role of physical fatigue in determining the later cognitive performance, is that maintaining physical postures may also require some cognitive resources. Research indicates that simplest bodily posture and movement like standing and walking requires cognitive resource of

attention (Mitra & Fraizer, 2008). Thus, according to dual-task paradigm, maintaining the body posture may affect the outcome of a secondary cognitive task. Controlling posture sway during a difficult cognitive task may have more deteriorating effects on performance of the individual on that task (Redfern, Jennings, Martin, & Furman, 2001). This is the reason that Zhang, Murphy, Fang, and Caban-Martinez (2015) asserted through their research on construction workers that those workers were more prone to report difficulties in cognitive functions who felt fatigued as compared to workers who did not feel tired during their job. This suggests that a worker's physical and mental abilities are influenced by their level of physical fatigue.

Working conditions play a crucial role in determining the level of fatigue of the employees. While exploring the antecedents and effects of physical fatigue on the employees of a production line, Kołodziej and Ligarski (2017) concluded that the workers in third shift experienced the highest level of fatigue because third shift overlapped with their sleeping schedule at night and resulted in the lowest productivity and incidents of glass breakage at their workplaces. The research also pointed out that the workers in second shift showed the least signs of fatigue of any kind and daytime was the most productive time of the day for the workers. Another study indicated that working on days-off and returning back to work well before end of vacations can cause fatigue (Min, Min, & Hong, 2018). Hamid, Samuel, Borowsky, Horrey, and Fisher (2017) identified the indicators of rising stress level which may cause fatigue. These indicators included rise in blood pressure, hyperventilation, insomnia, anxiety, difficulty in concentrating, depressed mood, chest pains and palpitations. On the other hand, organization related fatigue symptoms may include

high absenteeism, increased accidents and incidents, low morale, and poor productivity of the employees at workplace.

The effects of fatigue can vary from individual to individual and depend on other factors as well including the coping mechanisms, drug abuse, eating habits, and sleeping patterns of the individuals. The generalized stress and fatigue response can result into increased blood pressure and metabolic rate, decreased protein synthesis, increased cholesterol to generate energy in the body, localized inflammation, blood clotting, production of blood sugar, rise in the quantity of stomach acids, and insomnia to name a few. Additionally, experiencing fatigue is also associated with the weakening of the immune system which increases the chance of contracting an illness or increases the chronicity of an already present illness. Oyane, Pallesen, Moen, Akerstedt, and Bjorvatn (2013) studied the relationship between fatigue (caused through working in night shifts) and insomnia and deduced a direct significant relationship between both of the constructs; whereas anxiety, depression and sleepiness were not associated with fatigue. Lock, Bonetti and Campbell (2018), further, explored the psychological and physiological impacts of fatigue which postulated that decreased sleep duration and chronodisruption causes both significant morbidity and mortality in fatigued individuals.

Another study by Ulinskas, Damasevicius, Maskeliunas, and Wozniak, (2018) identified the factors that result in fatigue in the workers which included sleep, nutrition, age, disrupted biological clock, physical activity, work schedule, monotony. The study also mentioned some signs of fatigue such as tiredness, forgetfulness, poor communication, constant yawning, nodding off, lack of alertness, drowsiness, micro

sleep, short temperament, depression and impaired decision making skills. Researchers, further, argued that workers who felt tired or exhausted were more likely to report difficulty with physical and cognitive function than workers who did not feel tired. This suggests that a worker's physical and mental abilities are related to their level of fatigue that is; workers who felt tired or exhausted were more likely to report difficulty with physical and cognitive function than workers who did not feel tired. This suggests that a worker's physical and mental abilities are related to their level of fatigue.

Despite of the damaging effects of an employee's job characteristics, fatigue, and cognitive failures, there are some personal factors which may reduce these harmful effects and work as a protective factor. At any workplace, which may pose stress in form of job demands and cause fatigue, employees may perform better if they possess personal resources which can enable them to deal with their workplace stress and resulting fatigue (Fila, 2016). One of such personal resources is the personality trait of mental toughness. The trait of mental toughness is proposed as a moderating construct in the present study with an understanding that this is one of the personality traits which is more evidently linked with stress response. This is the trait which has been mainly explored with reference to sports psychology and currently the authors proposed that it must be researched in other settings as well. Gerber et al. (2013) discussed that many competitive and pressured environment exist other than sports setting as well which need to be explored with reference to mental toughness.

Past research also indicates that trait of mental toughness in employees may reduce their risk of developing fatigue. For instance, Gerber et al. (2018) reported a

reduced risk of burnout in athletes with high mental toughness when they were exposed to high levels of stress. Similarly, students with high mental toughness reported less mental fatigue when exposed to high levels of stress as compared to students with low mental toughness (Gerber et al., 2015).

Mental Toughness

A variety of definitions of mental toughness have been proposed over the period of time. In varying definitions, mental toughness is regarded as ability of performing under stress or pressure (Henman, 1996), one's control over his/her emotions and the situations which they encounter in daily lives (Clough & Strycharczyk, 2012a), an individual's capability of coping with pressure (Goldberg, 1998), to rebound from failures (Woods, Hocton, & Desmond, 1995), possession of superior mental skills (Bull, Albinson, & Shambrook, 1996), and an individual's strong self-belief and faith on one's self of controlling their destiny while remaining largely unaffected by the adverse circumstances and competition (Clough, 2002).

Mental toughness has some other associated features which may make mentally tough people to react the way they do. For example, usage of problem focused coping strategies such as logical analysis, mental imagery, thought control, as well as effort expenditure (Nicholls, 2008), rare usage of unhealthy coping strategies including resignation, distancing, and distraction strategies to cope up with their life and circumstances, more pain tolerance in isometric weight holding tasks as compared to average individuals (Crust & Clough, 2005), experiencing lower levels of stress as well as experiencing feeling of control upon encounter with adverse life circumstances (Kaiseler, 2009).

Characteristics of mentally tough individuals. Jones (2002) aimed at deriving characteristics of mentally tough individuals through qualitative research methods including focus groups and interviews. Research indicated twelve attributes of mentally tough people including a strong self-belief in one's ability to accomplish competition goals, handling performance setbacks by bouncing back with an increased determination for success in future, self-belief of possession of abilities and qualities which make the individual unique and better than opponents, internal motivation to succeed, difficult to distract while focusing on task in hand, easy to regain control after facing unexpected or uncontrollable events, extending limits of physical and psychological pain while putting efforts during training and competition, accepting the inevitability of anxiety and believing that it can be controlled, remaining largely unaffected by others' performances either good or bad, thriving under pressure, remaining focused despite of personal life's distractors, and an ability of switching focus on and off during play as per requirement.

Creasy, Stratton, Maina, Rearick, and Reincke (2008) consulted previous research by Jones (2002) and added further characteristics. The newly added characteristics included physical and psychological preparedness with good physical and mental health, possessing conviction, possessing strong will to succeed despite of facing setbacks, ability to make significant contributions in team through adjusting to change, possessing competitiveness and taking pride in it, resolving small problems effectively and preventing them from transforming into bigger problems, taking the fight approach and being ready to play, and being passionate.

Components of mental toughness. All of the above mentioned characteristics of mental toughness belong to four components. Clough, Crust, and

Earle (2002) developed 4C model of mental toughness to discuss these four components.

Model of mental toughness. Clough et al. (2002) proposed a model of mental toughness which included four components that is; confidence, challenge, control, and commitment. While conceptualizing mental toughness and developing its measure (MTQ48, Mental Toughness Questionnaire-48), the approach taken by both of the researchers was to combine existing psychological theory and applied sport psychology in an attempt to bridge the gap between research and practice. While considering the characteristics of mental tough individuals, they found clear comparisons between their emerging mental toughness data and the concept of hardiness. This is the reason that their explanation of mental toughness is a further extension of the concept of hardiness. Clough and Strycharczyk (2012b), further, argued that mental toughness is a generic concept and should not be limited to the sports domain. They feel as sports specific measures would be unlikely to move the field forward in any meaningful way.

Regarded as the most parsimonious account of the construct of mental toughness (Gould, Dieffenbach, & Moffett, 2007), Clough (2002) defined four factors of mental toughness in his researches which are renowned as 4 Cs. Four factors in 4 Cs include control, challenge, commitment, as well as confidence. Control refers to one's feeling of control over the environment in which they operate leading to exertion of more influence on their environment. Such individuals may have control on their emotions, that is, they are more vigilant about their anxieties and do not reveal their emotions to others. Individuals may also feel that they have control over their life circumstances and they can bring a difference in environment if they put

effort. Commitment refers to stickability through which mentally tough people are more likely to carry out their tasks in presence of adversities and hurdles. Individuals with higher levels of commitment possess higher levels of self-belief that they can accomplish particular tasks which are considered difficult for individuals with low mental toughness.

The component of challenge describes the mindset of mentally tough individuals through which they perceive the challenges of their lives as opportunities to learn and grow instead of looking at those challenges as hurdles. Thus, mentally tough individuals tend to use more effective problem solving and coping techniques. The fourth component of confidence is the self-belief of the individual in his/ her own abilities while dealing with a challenge. People, high on this component, possess a kind of inner strength and stand on their ground while dealing with other individuals (Coulter, Mallett, & Gucciardi, 2010).

Empirical evidence on mental toughness. As far as organizational setting is concerned, the implications of mental toughness are important in newly emerging competitive workplace settings. For example, Marchant et al. (2009) examined mental toughness in occupational settings in which they found that levels of mental toughness varied significantly between employees in different managerial positions, with senior managers displaying the highest levels of toughness, followed by middle managers, junior managers, and then clerical staff. Gerber et al. (2013) examined mental toughness in relation to life satisfaction and the occurrence of depressive symptoms among employees. Results indicated a positive relationship of mental toughness life satisfaction and negative relationship to depressive symptoms. Therefore, mental

toughness can be considered as an important construct in occupational and health settings.

Research by Gucciardi, Jackson, Hodge, Anthony, and Brooke (2015) asserted that mental toughness was directly linked with supervisor-rated work performance of the employees. Not only employees got better response from their coworkers when they exhibited the characteristics of mental toughness but they also used these characteristics are a personal resource at their workplace to acquire beneficial results (Klette, 2017).

Recent line of research on mental toughness indicates mental toughness as a significant personal resource in face of stressful situations. Gerber, et al. (2018) reported that their research participants with higher mental toughness reported less mental health issues when exposed to stress, as compared to the participants with lower mental toughness. Jaeschke, Sachs, and Dieffenbach (2016) concluded an indirect relationship between both types of the fatigue (physical and psychological) and mental toughness in their study. Similarly, Cowden, Crust, Jackman, and Duckett (2018) reported that a higher form of motivation can be encouraged with higher personal standards of perfectionism by developing their mental toughness, hence reducing their stress which can be caused by perfectionism. This research also terms mental toughness as a trait that can be learned.

Research also indicates that there exist gender differences in mental toughness. When compared on four components of mental toughness, men scored higher on components of control, confidence, and challenge as compared to women (Gucciardi, 2012; Wadey, Evans, Hanton, & Neil, 2012). Research also indicates that a higher perception of control on one's life circumstances and emotions is linked with

coping styles that is; men's task oriented coping strategies (including planning and logical analysis needed to overcome a task-related stressor) make them perceive more in control of their life circumstances, as compared to women, leading to confidence that they can accomplish difficult tasks (Kaiseler & Polman, 2012).

While considering the importance of mental toughness in daily life, various interventions are designed to enhance mental toughness of individuals. For example, Sheard and Golby (2006) evaluated the effects of a 7-week program consisting of goal setting, visualisation, relaxation, concentration, and thought stopping skills. It was found to result in significant increases in mental toughness in a group of athletes.

Mental toughness intervention programs are gaining popularity due to their effective outcomes. For example, Clough and Strycharczyk's (2012c) intervention program, known as "stay and succeed", encourages learners to think about control, confidence, challenge, and commitment. Furthermore, the project encourages participants to be better prepared for what life "throws at them", cope with difficulties and challenges, be more resilient, better organized, adopt positive thinking, and bounce back from setbacks.

Theoretical Framework

Every workplace contains some factors which affect the performance of the employees. Some of these factors are risk factors which may threaten the productivity of the employees, whereas some of the factors are protective factors which provide safety in a work environment which may cause deterioration in employees' performance. Past research (Adil & Baig, 2018) indicates that job characteristics including job demands, job control, and workplace support can exert far-reaching effects on employees' performance and productivity. Not only a higher level of job demands leads to lower job satisfaction and lower work well-being (Brough & Pears, 2004) among employees but low levels of social support and workplace support can also result in poor psychological wellbeing (Escriba-Aguir & Tenias-Burillo, 2004), minor psychiatric morbidity, health problems, and absentees from work (Ahlin et al., 2018; Asif, Javed, & Janjua, 2018; Kivimaki et al., 2003). Thus, in present research, presence of high level of job demands and lower levels of job control and workplace support are taken as the risk factors which may hamper the cognitive performance of the employees.

Not only presence of high level of job demands and lesser job control and workplace support affects the performance of the employee, but these risk factors may bring about certain other conditions which exacerbate the risk created by these job characteristics. For example; demanding tasks and lack of support and job control are said to cause fatigue among employees (Fan & Smith, 2017b) and this fatigue causes deterioration in cognitive performance of the employees which results in forgetfulness, lack of compliance with safety measures, distraction, and difficulty in sustainability of attention (Fan & Smith, 2020).

While operating in such workplaces which may cause work stress, fatigue, and cognitive deterioration for the employees, there are certain personality characteristics may operate as a protective factor and help the employee in sustaining performance at workplace. Thus, the personality trait of mental toughness is proposed as a protective factor in the present study. The protective quality of mental toughness is evident in previous literature. For example; Gucciardi et al. (2015) highlighted the existence of positive relationship between mental toughness and work performance ratings of employees by their supervisors and Tham, Kong, Yung, and Lee (2015) found that mental toughness is negatively correlated with job stress (presence of high level of job demands). Thus, a high level of mental toughness in employees would help in coping with high demands, low workplace support, and low job control effectively as well as it would prevent employees from making cognitive errors when they are fatigued. The resulting theoretical model, after a detailed review of past literature, has been developed as follow:

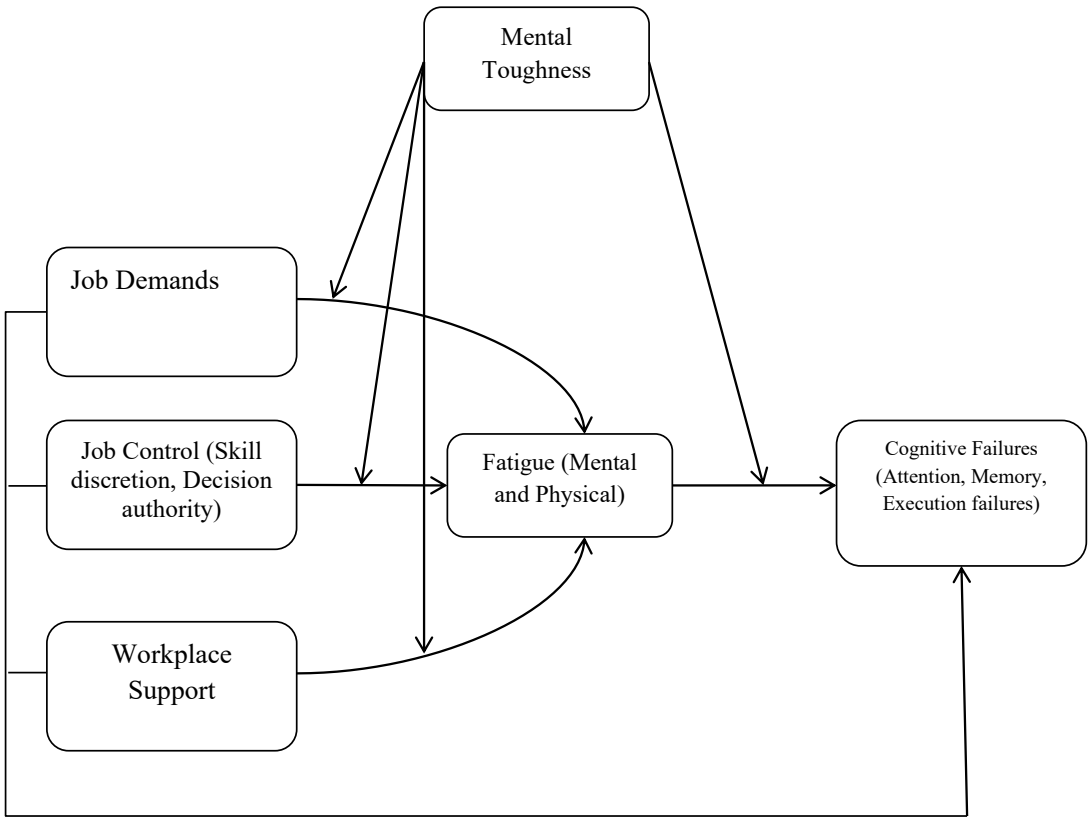

Figure 1. Derived Theoretical Model of the Study

Rationale of the Present Study

The present research aimed at investigating the interplay of job demands, job control, workplace support, cognitive failures, fatigue, and mental toughness in context of national and international pharmaceutical companies in Pakistan. Job characteristics including job demands, job control, and workplace support were derived from job demand-control-support model and an in-depth study of past literature indicated room for implication of the model in local context of Pakistan.

Despite of the development of job demand-control-support model in Western context, it presents the constructs which are equally applicable in local context and are

potential predictors for causing stress in employees. Though, applicability of the model is universal, yet there is possibility of differences when it comes to perceptions of employees regarding demands, control, and support at their workplaces. Employees in Western individualist societies have a more reactive nature towards their work stressors; a sense of susceptibility towards their health damages, cognitive losses and decline in performance; and an emphasis on individuality, autonomy, and self-development at workplace. On the other hand, an emphasis on group harmony, loyalty, and adherence to social norms in non-western countries may alter the understanding and coping strategies of employees towards workplace stressors (Cendales & Gomez, 2018). In this way, the current research will add to the literature on job demand-control-support model on Pakistani population and will be helpful in providing comparable data and directions for further research in Asian societies.

Non-inclusion of personal factors is another limitation of the model (Fila, 2016). Outcomes of the model may differ based upon personality and demographic factors (income, living settlement, age, and education) of the employees. In order to address this gap in the literature, personality trait of mental toughness has been added in model as a moderator between job characteristics and their cognitive outcomes. Mental toughness is the personality trait which is directly linked with stress response therefore, possessing the trait of mental toughness can potentially alter the responses of the employees when they are faced with high level of job demands, and lower levels of job control and workplace support during their job.

Additionally, the concept of mental toughness is recently gaining popularity outside the domain of sports psychology, therefore, there is lack of research on mental

toughness in organizational settings. Research on mental toughness in organizational settings provides basic information about the relationship of construct with demographics and some other psychological constructs and its role as a moderator between stressful job situations and their outcomes has been explored rarely. As majority of the studies on mental toughness in organizational settings are, primarily, conducted at descriptive level and explore the demographical correlates of mental toughness, the current research will be an addition in research on mental toughness with respect to organizational settings generally and more particularly in Pakistani organizational setting.

During last few years, health industry has faced a major period of depression around the globe leading to an overwhelming pressure on pharmaceutical companies and their employees. COVID-19 pandemic has tested the mettle of pharmaceutical companies all over the world yet, stress of pharmaceutical companies' employees is an exceptionally under researched area of study. Additionally, majority of the previous research on pharmaceutical companies does not bring about differences based on functional areas of the employees. Thus, present study will be helpful in providing a comprehensive review of study variables in relation to three different functional areas of pharmaceutical companies including sales/marketing, HR, and production departments. Keeping all the objectives in view, the study will add to the theoretical and practical implications of the study variables which will be effective for devising strategies to overcome work stress, fatigue, and cognitive failures in pharmaceutical companies' employees.

METHOD

Chapter 2

Method

Research Design

The present research was cross-sectional survey design in which, broadly, two studies were conducted in order to achieve two varying objectives of the research. Study-I comprised of three phases in which selection of study constructs and their respective instruments, translation and adaptation of instruments, and their empirical evaluation was intended whereas; study-II, titled as the main study focused on hypothesis testing. Details of the study and their respective phases are as follow:

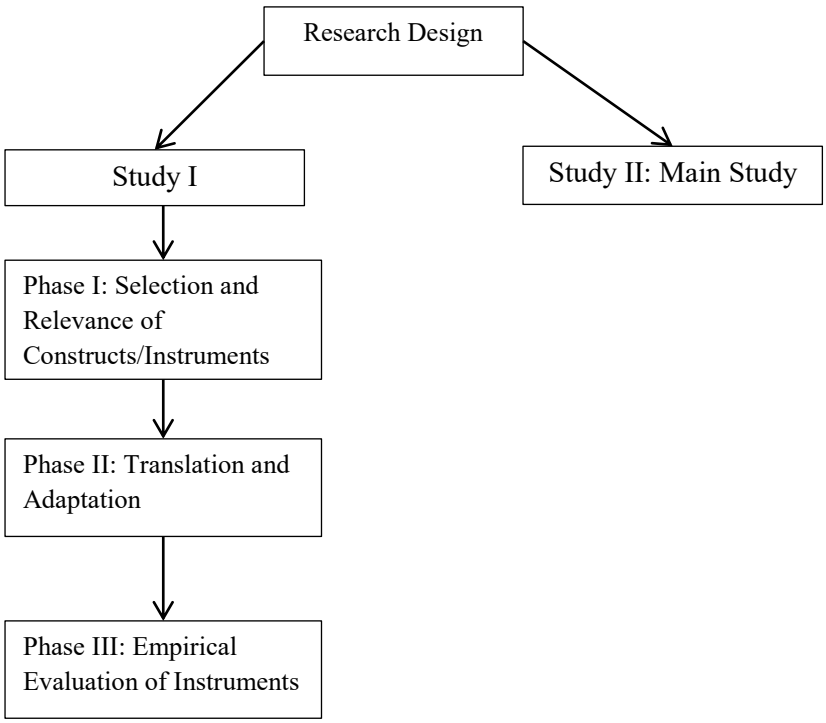

Figure 2. Research Design of the Study

Study-I

Study I was designed to address the initial phases of the research which included selection and evaluation of relevance of constructs/instruments in local context, translation and adaptation of the instruments, as well as empirical evaluation of the modified instruments. Study I was carried out in following three phases:

Phase-I. This phase was designed to address the clarity and relevance of constructs in the local context. The foremost objective of this phase was to evaluate the relevance of the selected constructs with reference to Pakistani pharmaceutical companies including selection of theory driven relevant instruments. In order to fulfill these objectives, two brain storming sessions were conducted with sales/marketing and production department employees of two different pharmaceutical companies.

Phase-II. The key objectives of the phase II included adaptation and translation of the selected instruments. The decision of translation of instruments was undertaken in first phase of the study after brainstorming session with production employees who were unable to understand English language used in instruments. After translation, a small tryout of the new *Urdu* version of the instruments was carried out on 14 employees from sales/marketing and production department to evaluate their understanding of *Urdu* items.

Phase-III. This phase of empirical evaluation of the instruments consisted of two major objectives which included determining the validity and reliability estimates of instruments as well as confirmation of their measurement models. Past research had been consulted in order to confirm measurement models of the instruments and

confirmatory factor analyses were used for meeting the objective of this phase. Data for analyses, in this phase, was collected from 196 sales/marketing and production employees.

Study-II

Study-II was the main study and the major objective of this study was hypotheses testing. All the hypothesized relationships among constructs, which were established in theoretical framework, were tested in this study on a sample of 406 pharmaceutical employees. Thus, the study II was intended at determining the mediating role of fatigue between job demand, control, workplace support and cognitive failures as well as evaluating the moderating role of mental toughness between job demand, job control, workplace support and fatigue; and between fatigue and cognitive failures. Additionally; exploration of role of demographic variables (e.g., age, gender, work experience, family system, physical illness, job position, department, and organization type), with reference to study variables, was another objective of the main study.

Chapter-III

Study I

Phase-I: Selection and Relevance of Constructs and Instruments in Local Context

The first phase of the study was to investigate the relevance of the study constructs with reference to Pakistani pharmaceutical companies as well as selection of the relevant instruments. In order to achieve the said objective, a qualitative approach was used to achieve clarity, relevance, and applicability of the constructs in local context.

Objectives. Objectives of this phase were as follow:

1. Investigating the relevance of the variables in local settings (of pharmaceutical companies)
2. Selection of most relevant instruments for measuring job demands, job control, social support, mental toughness, cognitive failures, and fatigue at workplace.

Brainstorming Sessions for Investigating the Relevance of Variables. In order to fulfill the first objective of the current phase, two brain storming sessions were conducted. Both of the brain storming sessions emphasized the understanding, relevance, and dimensionality of the study variables with regard to Pakistani pharmaceutical companies.

Sample. Convenient sampling technique was used for recruiting the sample for the brain storming sessions. In order to gauge the understanding and relevance of job demands, job control, social support, fatigue, mental toughness, and cognitive failures, brain storming sessions were conducted with employees of sales/marketing and production departments. Number of employees from sales/marketing department was 7 and group consisted of area managers (N = 2) and medical representatives (N = 5). The other session included 6 participants from production department which included production manager (N = 1), packaging head (N = 2), and blister machines operators (N = 3). Other details of the session are as follow:

Table 1

Details of Brainstorming Sessions Conducted for Determining the Relevance of Chosen Study Constructs in Local Work Settings

Session No.	Company	No. of Participants	Gender	Time of Session	Time Duration
Session I	Macter	7	Men	5 PM	45 minutes
Session II	Goodman	6	5 Men, 1 Woman	12:45 PM	35 minutes

Table 1 presents the details of sample, gender, number of participants and time duration of each of the brain storming session. Details of both of the sessions are as below:

Details of session-I. The session was conducted in evening time when medical representatives got together in their office for closing of sales for that day. Researcher introduced herself and research purpose followed by distribution of a printed paper with definitions and examples of study variables (see Appendix-A). Respondents were simply asked to read the written material and ask questions in case of ambiguity before starting discussion.

During discussion, the focus remained on employees' own experiences regarding job demands, control, workplace support, mental toughness, and cognitive failures. Employees quoted injury related incidents at workplace due to workload and all participants agreed upon existence and relevance of the study variables in sales/marketing department of pharmaceutical companies. The agreement of the participants remained 100% for this phase.

Details of session-II. Session-II was conducted in day time right after employees' lunch break. Same procedure of session I was followed in session II. Entire group agreed with relevance of study variables with production department of pharmaceutical companies and no competing point of view emerged. Following table reflects the themes, which were agreed upon, during both brain storming sessions:

Table 2

Themes of Study Constructs Identified Through Brainstorming Sessions

Constructs and Their Dimensions	**Indicators Identified in Sessions**
Job Demands	1. Time constraints for accomplishing tasks 2. Demand of concentration on work (in case of working on machines primarily) 3. Working speedily 4. Meeting deadlines of production or sale targets
Job Control	1. Control on work environment 2. Freedom to take work-related decisions 3. Control on job timings 4. Control on work choice
Workplace Support	1. Good relationship with colleagues 2. Good relationship from immediate boss/manager 3. Overall supportive relationships in work setting 4. Understanding and unity among employees for acquiring their rights

Continued…

Constructs and Their Dimensions	Indicators Identified in Sessions
Cognitive Failures	1. Difficulty in remembering things and tasks including meetings, appointments, phone (extension) numbers and equipment etc. 2. Difficulty in remembering work procedures 3. Misplacing things which have to be used in work procedures (e.g., packaging related stuff) 4. Forgetting personal belongings at workplace 5. Involuntary acts while operating machines 6. Wrong execution/operations of task and machines 7. Moments of confusion 8. Distraction from the actual work 9. Inability to pay attention or daydreaming while at workplace 10. Inability to understand or remember tasks and/or instructions
Mental Toughness	1. Working under pressure 2. Being optimistic 3. Being positive 4. Coping effectively 5. Enthusiasm 6. Quick reactions to situations 7. Confidence in future life circumstances 8. Self-control 9. Self-worth
Fatigue	1. Tiredness 2. Excessive need for rest 3. Loss of energy/ Weakness 4. Dizziness 5. Muscle cramps 6. Inability to think and speak clearly 7. Difficulty in finding correct vocabulary 8. Lack of clarity of thoughts in mind 9. Lack of concentration and attention

Table 2 presents the indicators, of the study constructs, which were highlighted during brain storming sessions. On basis of these indicators, next step of the phase was carried out which is as below:

Selection of Relevant Instruments

The second objective of this phase was to look for the scales on the following criteria:

1. Relevance of the scales with work setting of Pakistani pharmaceutical companies
2. Valid and reliable psychometric properties
3. Short time duration for administration of the scales (this requirement was mentioned by the participants from both departments. Sales/marketing employees had no specific time for duty in office and they used to visit office for transitory periods. Similarly, production employees mentioned that they can only be available in lunch timings so administration time of the scales should be shorter).

Selected instruments. All of the themes identified in the aforementioned results of brain storming sessions were taken into account to select theory driven scales which were already available in prior literature for measuring the requisite variables. While keeping all the requirements in view, the scales which best suited the research purposes included Demand-Control-Support Questionnaire (based on Job Demand-Control-Support model proposed by Karasek & Theorell, 1990), Mental Toughness Questionnaire - 18 (based on Mental Toughness Model proposed by Clough, Earle, & Sewell, 2002), Workplace Cognitive Failures Scale (Wallace & Chen, 2005), and Chalder Fatigue Scale (based on physical and mental fatigue dimensions by Chalder et al., 1993). Details of all of these scales are as follow:

1. ***Demand-Control-Support Questionnaire.*** Demand-Control-Support Questionnaire (DCSQ) is a theory driven questionnaire which was based on job demand-control-support model and was developed by Karasek and Theorell (1990). It has three dimensions which measure employees' perceptions of demands, control, and support for his/ her workplace. The scale is consisted of total 17 items in which subscales of demand, control, and support have 5, 6, and 6 items respectively. Job control dimension of the scale is further divided into two dimensions including skill discretion and decision authority which consist of 4 and 2 items respectively. All of the scale items are responded on a score range between 1 to 4. For subscales of demand and control; score of 1, 2, 3, and 4 correspond to never, rarely, sometimes, and often respectively. In this way, a respondent needs to indicate the frequency of demand, skill discretion, and decision authority which he/ she may experience at workplace. On the other hand, the rating of 1, 2, 3, and 4 correspond to completely disagree, disagree, agree, and completely agree on subscale of social support. The potential score range for job demand, job control, and social support is 5 – 20, 6 – 24, and 6 – 24 respectively. In addition to it, the potential score range for subscales of skill discretion and decision authority (subscales of job control) are 4 – 16 and 2 – 8 respectively. The reliability of the overall scale and subscales range between .65 to .80.

2. ***Mental Toughness Questionnaire-18.*** Mental toughness scale is developed by Clough et al. in 2002. It is the shorter version of Mental Toughness Questionnaire-48 (MTQ48) which has 48 items and 4 subscales. This short version of MTQ48 has 18 items and it is a uni-dimensional scale yielding a single score for mental toughness of the individual. All of the 18 items of the scale are rated on a five

point likert scale where 1 indicates completely disagree and 5 indicates completely agree. Thus, the potential score range of the scale is 18 – 90. The reliability of the scale is .82.

3. ***Workplace Cognitive Failures Scale.*** This scale was developed by Wallace and Chen in 2005 with three sub-scales including memory failures, attention failures, and execution failures with 5 items in each sub-scale. The response categories of all the items ranged from 1 to 5 where 1 indicated complete disagreement with the statement and 5 indicated complete agreement with the statement. Thus, the overall score range of the scale was 15 – 75 and score range for each of the subscale remained 5 – 25. The reliability of the scale .75.

4. ***Chalder Fatigue Scale.*** The scale had been developed by Chalder et al. in 1993. The scale has been used as a uni-dimensional scale as well as two-dimensional scale. There are total 11 items in the scale if it is used as a uni-dimensional scale. In case of two dimensions, the first dimension of physical fatigue has 7 items and mental fatigue component has 4 items. All of the items of the scale are rated on a four point likert scale ranging between 0 – 3 where 0 indicated the level of fatigue which is lesser than usual, 1 indicates the usual level of fatigue, 2 indicates more than usual fatigue, and 3 indicates significantly more than usual fatigue. As a uni-dimensional scale, the potential score range tend to be 0 – 33. On the other hand, the score range will be 0 – 21 and 0 – 12 for physical and mental fatigue, respectively, when scale is used as two-dimensional scale. The overall reliability of the scale is .92.

Expert opinion on scales. After selection of the scales, these scales were presented to different experts for their opinion on content of the scales. Two types of

experts had been contacted for evaluation of the scales including subject matter experts and field experts. Subject matter experts were contacted for verifying the content, its cultural and workplace setting suitability. Additionally, scales were provided to field experts to assess the scales' suitability with reference to their particular workplace setting (e.g., sales/marketing, HR, and production departments separately), tasks, skills, and responsibilities involved.

Finalization of the instruments. For all of the instruments, evaluators stated that items are relevant to their workplace settings. Due to lower level of education, most of the employees, specifically from production department, were unable to respond to questionnaire in English language. Therefore, there was a need for translation and adaptation of the instruments in national language. Details of translation and adaptation process of the instruments are documented in next phase.

Phase-II: Translation and Adaptation of Instruments

The primary objective of phase II was translation of instruments in *Urdu* language and their adaptation in local context. Objectives of the phase II were achieved using qualitative method.

Objectives

Detailed objectives of the try-out phase were as follow:

1. Translation and adaptation of all the aforementioned instruments
2. Tryout of the scales on a small sample to verify the linguistic and conceptual clarity of *Urdu* version of the instruments

Instruments

All of the instruments, selected in phase-I, were part of process of translation and adaptation in phase-II. Names of the instruments are as follow:

1. Demand-Control-Support Questionnaire
2. Mental Toughness Questionnaire - 18
3. Workplace Cognitive Failures Scale
4. Chalder Fatigue Scale

Translation and Adaptation Process

The major aim in translation of the scales was to acquire content and conceptual similarity between original and translated versions as well as to retain the maximum information given in the original scale.

Procedure. In order to translate the scales, Brislin's (1976) guidelines for translation process were used. Following steps were used in order to translate scales:

1. Forward translation
2. Committee approach
3. Backward translation
4. Committee approach
5. Consultation regarding translations from authors of the instruments

Forward translation. For forward translation, scales were given for *Urdu* translation to five bilingual individuals among whom four individuals had a minimum education of 18 years in psychology while the fifth one had 18 years of education in *Urdu* language. Translators included four female experts and one male expert. In this way, five *Urdu* translations against each statement of the scales were obtained.

Committee approach after forward translation. After receiving *Urdu* translations, a committee approach had been conducted in which best version of *Urdu* translation had been chosen. The *Urdu* translation had been chosen while keeping the conceptual equivalence of the English statements in view. The members of this committee included the researcher, one member with 18 years of education in *Urdu* language, and one member with 18 years of education in psychology.

Backward translation. Then backward translation was conducted for translating finalized *Urdu* versions of the scales back into English version involving five bilinguals with minimum education of 18 years in psychology and linguistics (including four female and one male expert). An important consideration was that

none of the individuals, contacted for forward translation, were made part of the backward translation for achieving the notion of objectivity in translation process. The reason was that individuals involved in forward translations were already aware of the scales' statements and their familiarity with scales may affect the selection of appropriate statements.

Committee approach after backward translation. After receiving English version, it was compared with original English version and final changes were made. The members of this committee included the researcher, one member with 18 years of education in English language, and one member with 18 years of education in psychology.

Consultation with original authors of the scales. After this entire process, a comparison of original and back translated English versions were emailed to original authors of the scales for their reviews and comments so they could identify any further need for correction in terminologies used and concepts translated. Scales were finalized with the consent of original authors and a booklet for data collection were made after receiving satisfactory responses from original authors.

Translated Versions of Scales

Following are the changes which had been made in every scale:

1. Demand-Control-Support Questionnaire. There were three subscales in demand-control-support questionnaire among which demand and control were quite easier to translate, according to translators of the scales. As far as the subscale of support is concerned, it came up with some statements for which

developing conceptual compatibility was more important. For example; “My colleagues are there for me” was translated as “ یشےہسفقیکبس ہشی ہنکےلیےیہیں سرتےہیں’. While, “get on well” was translated as “ہشراعن اچھےہوبً’. In this way, I get on well with my colleagues/superiors was translated as “ یہشےپلٌںیفقکیبساف ثلشبک ےےعبتھ ہشراعن اچھےیں’. In such a way, the conceptual compatibility of *Urdu* and English versions had been developed.

2. Mental Toughness Questionnaire-18. For the scale of mental toughness, there were some of the words which were difficult to translate in *Urdu* as it is. In order to tackle such words, the statements were handled on basis of conceptual compatibility between original and Urdu version. For example; the statement “I usually find it hard to summon enthusiasm for the tasks I have to do” was translated as “ہجھقشسکیب ہورکوکش ًےکےلیے جوکڈ وجزشپہیکلش ًے ںیھ ہئکلوتی ہے-”. “Speaking my mind” was translated as “ثشملاطہبسکشربًwhereas back-down was translated as “گشنیضکشربً”

3. Workplace Cognitive Failures Scale. While translating and adapting this scale, there were certain items which needed to be changed according to the employees who are working in three different departments of pharmaceutical companies (e.g., sales/marketing, HR, and production departments). One of the statements was that “cannot remember work related phone numbers” for which “extension number” was added in the statement because most of the employees were using their intercoms and used only extension numbers to contact each other. Another statement was that “forget where you have put something you use in your job (e.g., training booklet, notes, FAQs etc.). This statement was most suitable for people from sales/marketing and HR department but not for production employees. In order to

make it more suitable for all three departments, words of literature, medicine samples, pens, tools, gloves etc. were added to the statement. Same strategy was used in statement no. 12 where things mentioned in parenthesis were changed with above mentioned things. Statement no. 6 referred to usage of bulletin board and this is the term which is not usually used in Pakistani offices. So it had been changed to "notice board" whereas the source of SMS was added on recommendation of one of the try-out participants because they were usually informed through SMS for urgent tasks. So, statement in Urdu was transformed as " موجود شپظی نطی / ی ل ای سواڈسثظٹو ً
ہوں جبتب ٹھومکو تکبغپی.

4. Chalder Fatigue Scale. The only statement in this scale which needed to be conceptually equivalent was statement no. 9 that is "Do you make slips of the tongue when speaking?" This statement was part of the mental fatigue subscale and the idea was that an individual is unintentionally talking about something which was back of his mind and not relevant to current course of discussion. In order to make a better sense out of this statement, it was translated as " غیاپآےوہےتشگثبیک
ٹبگش تےیں جو قصود ًیںوتی؟

Tryout of the Instruments

The second objective of the phase II was tryout of the scales on a small sample in order to verify the comprehension of *Urdu* version of the scales by employees of sales/marketing, HR, as well as production departments.

Sample. A convenient sample of 20 pharmaceutical company employees was contacted for initial tryout of translated scales. Among these 20 employees, 7 belonged to sales/marketing department, whereas 7 were from production department,

and remaining 6 were contacted from HR department. The mean age of the sample was 35.2 years.

Procedure. Respondents were asked to fill the scales alongwith reviewing the scales while taking the content, examples given in statements, and appropriateness of instructions into account. The average time recorded for filling entire booklet was between 20 to 25 minutes.

Result. No further recommendations were made and scales were considered appropriate and relevant for pharmaceutical companies' employees by all respondents of tryout phase. After completing the tryout phase, the questionnaire booklets were ready for empirical evaluation of the translated version of the instruments in next phase.

Phase-III: Empirical Evaluation of Instruments

After conducting tryout of *Urdu* version of the instruments, booklet of instruments was considered prepared to collect data for pilot study with below mentioned objectives. This phase was undertaken in order to fulfill next two objectives of the research that is; establishing the psychometric properties of the translated instruments through quantitative techniques as well as determining the measurement models of the instruments through confirmatory factor analyses (CFAs). Despite of using the theory driven instruments, there is always a need to address the relevance and applicability of the instruments in local context (Ghiselli, 2012). This process is necessary to establish validity and reliability of instruments. Other details of phase-III are as follow:

Objectives

Following were the objectives of present phase:

1. To determine the psychometric properties of the instruments
2. To validate the factor structure of the scales through confirmatory factor analyses of all the instruments

Instruments

All of the scales, which were translated in phase-II of the study, were used in pilot study.

Sample

Employees from five different pharmaceutical companies were made part of the study through purposive sampling (N = 194). The age range of the sample was between 20 to 68 years (M = 30.41, SD = 7.27) and the years of experience ranged between 1 to 37 years (M = 6.72, SD = 6.20). Sample was gathered from two pharmaceutical companies including Goodman Laboratories and Macter Majority of the respondents were working in sales/marketing departments (N = 150), whereas others were working in production department (N = 4). Sample included both male (N = 162) and female employees (N = 32) Most of the respondents were living in joint family system (N = 150) and remaining were living in nuclear family system (N = 44). Majority of the sample indicated being married (N = 150) whereas; remaining were single (N = 44). Lastly; a few of the respondents encountered work-related injury (N = 11).

Inclusion criteria. Only those employees were included in the research who had minimum one year of overall job experience as well as at least 6 months of work experience in their current organization.

Exclusion criteria. Any employee with less than 6 months of employment in current organization and employees with any physical or mental condition, for which they were taking medicine, were not included in the sample.

Procedure

Directors of all the above mentioned pharmaceutical companies were contacted, in their headquarters, in order to acquire permission for data collection. On

the assigned dates, meeting with potential respondents was arranged during their office timings in which they were not assigned any job task. Sales/marketing employees were mostly contacted after their monthly or bimonthly meetings whereas; production employees were contacted right after their lunch break. Respondents were briefed about the purpose of the research and structure of the questionnaires to make them respond to questionnaires in a convenient way.

Verbal and written consent was taken from every employee prior to data collection. Additionally; respondents were encouraged to ask questions if they didn't understand any statement or response option whereas; their right to withdraw from the process was also articulated. Confidentiality of the data was assured during written as well as verbal instructions and employees were given as much time as they needed to fill the questionnaires. Questionnaires were then collected and checked for missing data and respondents were thanked for their contribution.

Results

The analyses of the current phase were carried out in order to determine the validity and reliability of the scales so that it can provide basis for hypothesis testing for main study. Confirmatory factor analyses (CFA) of all the scales had been undertaken due to unavailability of indigenous researches using these said scales. Scales included Demand-Control-Support Questionnaire (Theorell & Karasek, 1990), Mental Toughness Questionnaire - 18 (Clough et al., 2002), Chalder Fatigue Scale (Chalder et al., 1993), and Workplace Cognitive Failures Questionnaire (Wallace & Chen, 2005).

Descriptive statistics. At the initial level of the analysis, reliability estimates were determined through Cronbach's alpha coefficient. In addition to that, values of skewness and kurtosis for each variable were estimated to determine the normality of the data. Reporting of potential values of data set indicated the range of scores which a respondent can acquire whereas; actual score revealed the scores which respondents got after summation of their score on each variable.

Table 3

Descriptive Statistics and Reliabilities Estimates of all the Scales and Their Respective Subscales (N = 194)

							Range	
Scales	No. of items	α	*M*	*SD*	Skewness	Kurtosis	Potential	Actual
JD	5	.70	15.26	2.06	-.65	.38	5-20	9-19
JC	6	.61	19.58	3.11	-.62	-.16	6-24	10-24
Skill Disc	4	.71	13.61	2.04	-1.15	1.64	4-16	6-16
Dec Auth	2	.70	5.96	1.79	-.52	-.83	2-8	2-8
WS	6	.79	17.44	3.34	-.97	1.52	6-30	6-24
WCFS	15	.88	33.69	10.28	.32	.13	15-75	15-70
Memory	5	.72	11.63	3.87	.24	-.31	5-25	5-23
Attention	5	.75	11.42	4.05	.48	-.02	5-25	5-23
Execution	5	.81	10.63	4.07	.61	.22	5-25	5-25
MTQ	18	.87	65.17	12.45	-1.21	.33	18-90	35-82
CFS	11	.77	10.47	5.83	.63	.33	0-33	0-31
MF	4	.76	4.59	2.79	.31	-.58	0-12	0-12
PF	7	.75	5.87	3.82	.77	.65	0-21	0-21

Note. JD = Job Demands, JC = Job Control, Skill Disc = Skill Discretion, Dec Auth = Decision Authority, WS = Workplace Support, WCFQ = Workplace Cognitive Failures Scale, MTQ = Mental Toughness Questionnaire, CFS = Chalder Fatigue Scale, MF = Mental Fatigue, PF = Physical Fatigue.

Table 3 indicates the means, standard deviation, alpha coefficient, skewness, and kurtosis of job demands, job control and its subscales, workplace support, cognitive failures and its subscales, mental toughness, fatigue and its subscales. As far

as the alpha coefficients of the scales and subscales are concerned, the reliability of job control was lower than the desired criterion of .70 (Pallant, 2013). Alpha coefficients of the remaining scales and subscales were higher than .70 and thus, considered reliable for further data collection. Scales, with low alpha coefficient, were examined further through confirmatory factor analysis.

Table further indicates the values of means and standard deviations of all the scales and their respective subscales where values of standard deviation indicated the spread of the data. As values of standard deviation are showing moderate values, it can be concluded that data is normally distributed around its mean which ultimately indicates the normal distribution of the data. Two other values through which normality of the data is investigated are the values of skewness and kurtosis which both are in normal range of -2 to +2. All of these values also indicate a relative lack of social desirability in responses of the scales.

Validity estimates. Another objective of this phase of the study was to evaluate the measurement models of the scales used in the study. This objective has been fulfilled by conducting confirmatory factor analysis (CFA) of all the scales. One of the foremost reasons for conducting CFA was to evaluate the factor structures of the scales in local context.

Two key concerns, while conducting CFAs, were the appropriateness of the sample size for conducting analysis and determining the parameters of the varying indices of CFAs for extracting right inferences from the analysis. In order to fulfill the first concern, Cohen's (2013) recommendations are followed specifying that subjects to variables ratio can be minimum 5 for conducting the said analysis. In this way, the sample size of 194 was considered appropriate for conducting the analysis.

For addressing the second concern, Chi Square, Goodness of Fit Index (GFI), Tucker-Lewis Index (TLI) and Root Mean Square Error of Approximation (RMSEA)

are used. According to Pearl (2012), a good fit of the model would be considered in which the value of GFI would be ≥ .90 and RMSEA would be ≤ .06. Both of these criteria are used in order to validate the fit of the measurement models of all the scales.

Additionally, the value of RMSEA was seen in order to determine the model fit. As per recommendations of Dattalo (2013) as well as Hoyle and Isherwood (2013), the RMSEA values, used to evaluate the model fit mostly used in social sciences, are categorized as good fit (.00 - .05), fair fit (.05 - .08), mediocre fit (.08 - .10), and poor model fit (where values of RMSEA exceed from .10).

CFA of Demand-Control-Support Questionnaire. This questionnaire is a non-summative questionnaire of three different constructs including job demands, job control and its subscales of skill discretion and decision authority, and workplace support. The scale is based on Job Demand-Control-Support model by Karasek and Theorell (1990). Most of the research on the questionnaire has been conducted in western context and most popular validation studies are conducted by Theorell (2013) and Sanne et al. (2005). It has been documented in the literature that validation studies, conducted on different populations, have different results. For example, Sanne et al. (2005) confirmed a three factor model for the scale while conducting research on Norwegian employees in which subscales of job control (skill discretion and decision authority) were not considered as separate dimensions. In the same study, a four structure model (in which job control was divided into its sub-components of skill discretion and decision authority) was only considered most suitable for men in high status and women in low status jobs. A similar four factor solution was also detected by Hokerberg et al. (2010) in which job control was divided into two dimensions of skills discretion and decision authority. While keeping

in view the past literature, a four factor solution was tested in current study. Result of this four factor solution is as follow:

Table 4

Item Loadings for Demand-Control-Support Questionnaire (N = 194)

Scale/ Subscales	Item No.	Item Loadings
Job Demand	1	.82
	2	.36
	3	.46
	4	.11
	5	.44
Skill Discretion	6	.56
	7	.52
	8	.49
	9	.22
Decision Authority	10	.82
	11	.65
Workplace Support	12	.72
	13	.63
	14	.67
	15	.38
	16	.50
	17	.48

Table 4 indicates the results of CFA of Demand-Control-Support Questionnaire in which four factors solution is used. The item loadings of the scale are ranging between .11 to .82. Although most of the item loadings are satisfactory but two items of the scale have loadings lower than the defined criteria that is; the item loading should be more than .30. These items include item number 4 from job demands with an item loading of .11 and item number 4 in skill discretion scale with

an item loading of .22. These two items are analyzed qualitatively for potential errors in sentence structure and translation of the items. It is found out that items do not contain double barrel messages, language errors, sentence construction errors, and confusion in response options. Thus, instead of deleting any of the items, it is decided to include these two items for main study. The resulting model and its model fit values are as follow:

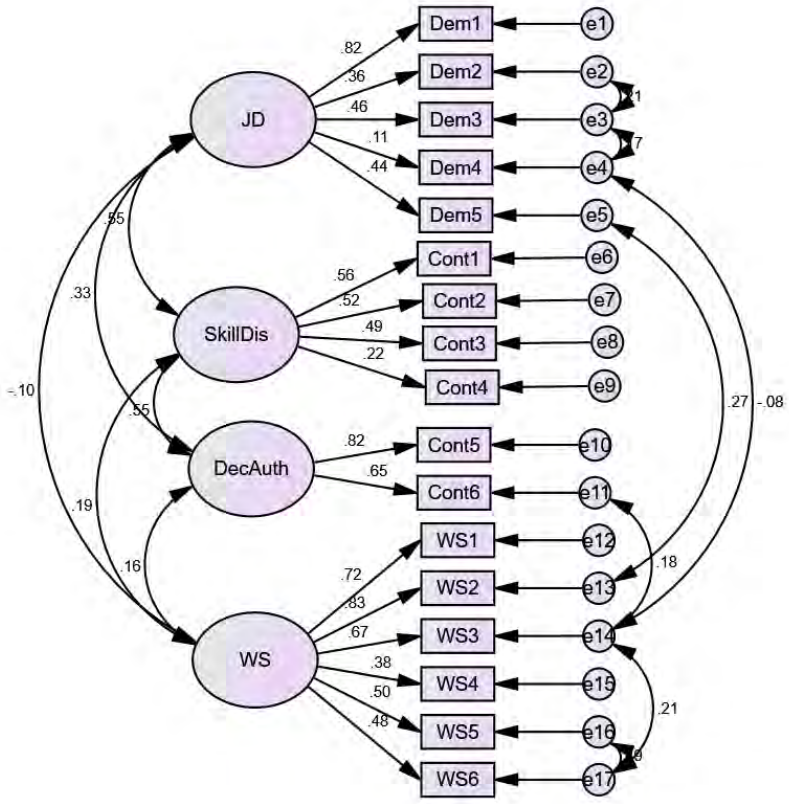

Figure 3. Confirmatory Factor Model of Demand-Control-Support Questionnaire

Table 5

Indices of Model Fit of Demand-Control-Support Questionnaire (N = 194)

χ^2	d*f*	χ^2/(d*f*)	GFI	TLI	RMSEA
Model 1 (17 items without adding error covariance)					
193.48	112	1.72	0.87	0.84	0.06
Model 2 (17 items after adding error covariance)					
173.91	105	1.65	0.91	0.90	0.05

Note. GFI ≥ .90, TLI ≥ .90, RMSEA ≤ .06

Table 5 indicates the model fit indices of Demand-Control-Support Questionnaire. Model 1 contains the values of default model whereas; model 2 indicates the values of GFI, TLI, and RMSEA after adding error covariance. It is indicated in the table that chi square to *df* ratio is acceptable (Cohen, 2013) even in the first model but other indicators of model fit (GFI, TLI, and RMSEA) are not adequate in the first model.

In order to rectify the model, error covariances were added among items 2, 3, 4, 5, 11, 13, 14, 16, and 17. After adding these seven error covariances, chi square to df ratio dropped to further 1.65. Additionally, values of GFI, TLI, and RMSEA reached their acceptable ranges. Thus, the values of GFI and TLI reached to the value of .90 and value of RMSEA dropped to .50 (Hoyle & Isherwood, 2013) indicating it as a good model fit.

CFA of Workplace Cognitive Failures Scale. Workplace Cognitive Failures Scale has three subscales namely attention failures, memory failures, and execution failures. Previous research (Wallace & Chen, 2005) clearly demonstrates the presence

of three distinct dimensions of the construct. Thus, current research has also used a three factor solution of the scale.

Table 6

Item Loadings for Workplace Cognitive Failures Scale (N = 194)

Scale/ Subscales	Item No.	Item Loadings
Attention Failure	1	.47
	2	.68
	3	.45
	4	.59
	5	.67
Memory Failure	6	.45
	7	.66
	8	.68
	9	.79
	10	.55
Execution Failure	11	.55
	12	.61
	13	.54
	14	.81
	15	.78

Table 6 indicates the item loadings of three subscales of the Workplace Cognitive Failures Scale. All of the items of the scale have acceptable factor loadings and thus, all of the items are considered appropriate to use in the main study.

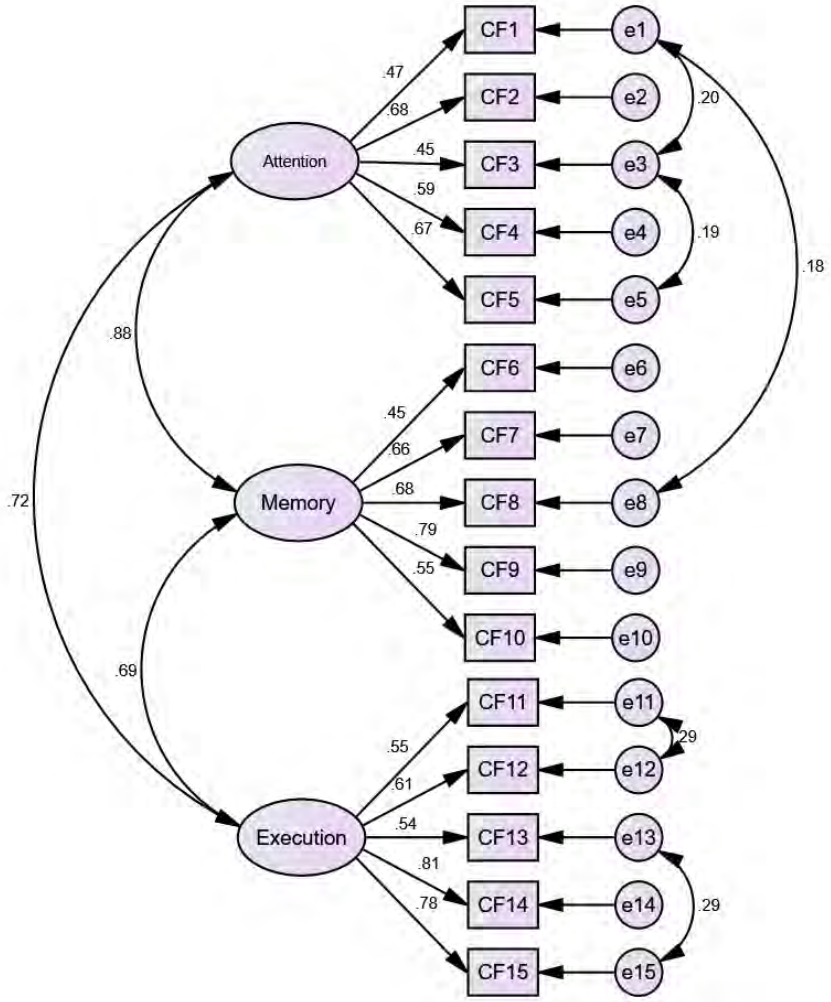

Figure 4. Confirmatory Factor Model of Workplace Cognitive Failures Scale

Table 7

Indices of Model Fit of Workplace Cognitive Failures Scale (N = 194)

χ^2	d*f*	χ^2/(d*f*)	GFI	TLI	RMSEA
Model 1 (15 items without adding error covariances)					
182.57	87	2.09	0.90	0.88	0.07
Model 2 (15 items without adding error covariances)					
139.26	82	1.69	0.94	0.92	0.05

Note. GFI ≥ .90, TLI ≥ .90, RMSEA ≤ .06

Table 7 indicates the model fit indices of Workplace Cognitive Failures Scale. It is depicted in the values of model 1 that chi square to *df* ratio is in acceptable range even in the default model (Cohen, 2013) as well as the value of GFI which is at .90. Whereas the values of TLI and RMSEA are not in acceptable range for which error covariances were added.

Model 2 presents the values of model fit indices after adding error covariances among item numbers 1, 3, 5, 8, 11, 12, 13, and 15 and total 5 error covariances have been added. Chi square to *df* ratio dropped to 1.69 after adding covariances which is still in acceptable range and value of GFI increased to .94. The value of RMSEA decreased to .06 which is considered a good model fit for the scale.

CFA of Chalder Fatigue Scale. Chalder Fatigue Scale encompasses two dimensions of fatigue including physical fatigue and mental fatigue. In previous studies, the scale has been used as uni-dimensional as well as two dimensional scale

(Jason & Choi, 2008). For current research, both of the dimensions have been considered for analysis.

Table 8

Item Loadings for Chalder Fatigue Scale (N = 194)

Scale/ Subscales	Item No.	Item Loadings
Physical Fatigue	1	.43
	2	.54
	3	.59
	4	.48
	5	.58
	6	.52
	7	.67
Mental Fatigue	8	.65
	9	.69
	10	.69
	11	.26

Table 8 indicates the item loadings of two subscales of the Chalder Fatigue Scale. Subscale of physical fatigue is comprised of 7 items, whereas the subscale of mental fatigue is comprised of 4 items. The item loadings of the scale ranged between .26 to .69 for both of the subscales. All of the items of the scale have acceptable factor loadings except one item (item number 4 in subscale of mental fatigue) in which the item loading is lower than the criterion (.30).

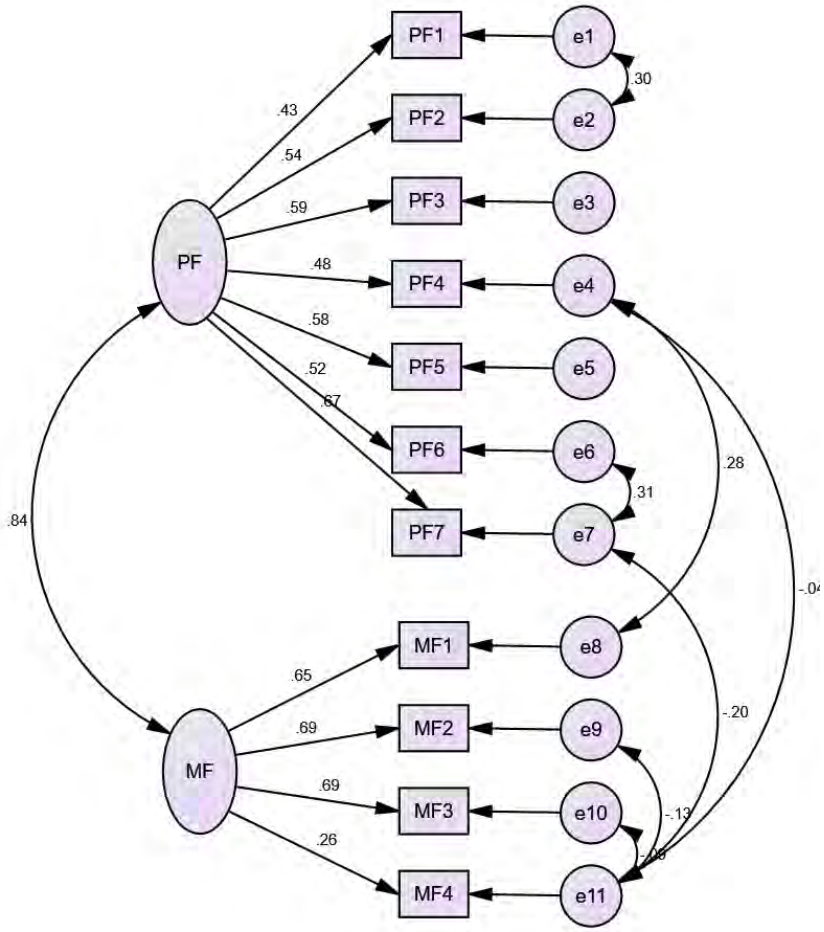

Figure 5. Confirmatory Factor Model of Chalder Fatigue Scale

Table 9

Indices of Model Fit of Chalder Fatigue Scale (N = 194)

χ^2	d*f*	χ^2/(d*f*)	GFI	TLI	RMSEA
Model 1 (11 items without adding error covariances)					
111.17	43	3.12	0.86	0.83	0.09
Model 2 (11 items after adding error covariances)					
61.79	36	2.24	0.95	0.92	0.06

Note. GFI ≥ .90, TLI ≥ .90, RMSEA ≤ .06

Table 9 indicates the model fit indices of Chalder Fatigue Scale with two subscales namely, physical fatigue and mental fatigue. It can be observed in values of model 1 that value of chi square ratio to *df* is in acceptable range while values of GFI, TLI, and RMSEA are not in acceptable range.

Model 2 indicates the values of model fit indices after adding error covariances in which error covariances were added among item numbers 1, 2, 4, 6, 7, 8, 9, 10, 11 and total number of error covariances remained 7. The modified model 2 indicates the values of GFI, TLI, and RMSEA which are in acceptable range whereas; the value of RMSEA is .06 which indicates a fair model fit for the scale with two factor solution.

CFA of Mental Toughness Questionnaire–18. Mental Toughness Questionnaire-18 is a uni-dimensional scale with eighteen items (Dagnall et al., 2019) thus, present research also used uni-dimensional solution for the questionnaire.

Table 10

Item Loadings for Mental Toughness Questionnaire - 18 (N = 194)

Scale/ Subscales	Item No.	Item Loadings
Mental Toughness	1	.73
	2	.66
	3	.63
	4	.73
	5	.73
	6	.66
	7	.60
	8	.60
	9	.63
	10	.72
	11	.63
	12	.59
	13	.70
	14	.69
	15	.72
	16	.55
	17	.67
	18	.75

Table 10 indicates the item loadings of Mental Toughness Scale which included 18 items. The table indicates that all of the item loadings are in satisfactory range. Following are the figure and model fit indices after adding covariances:

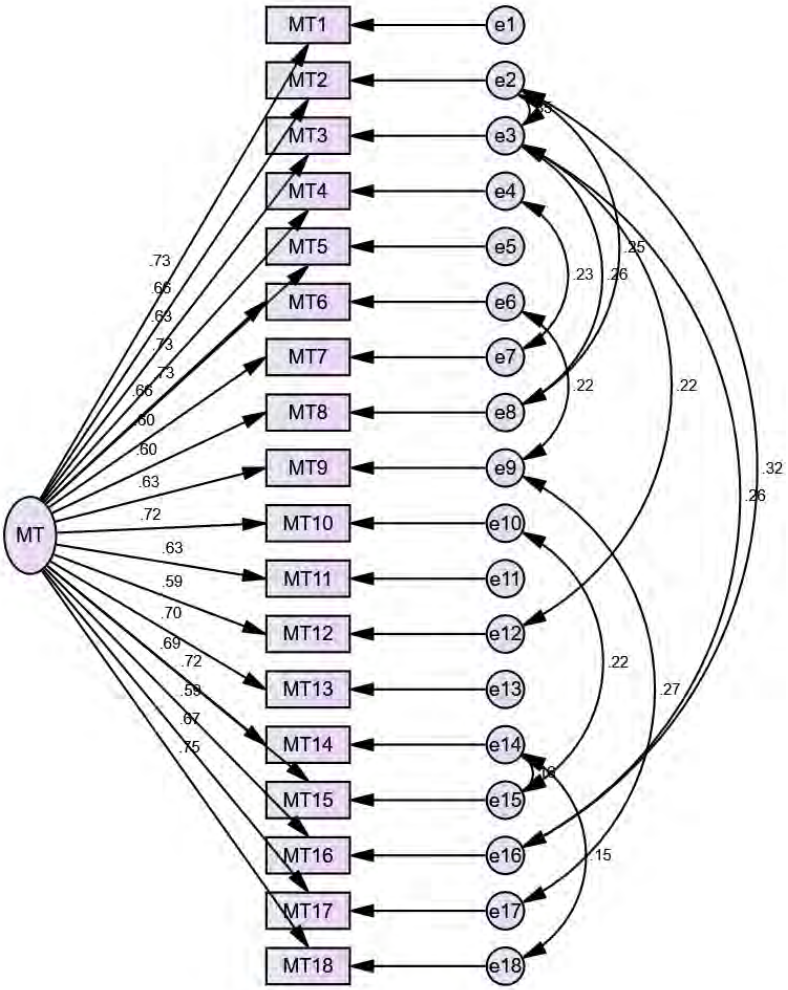

Figure 6. Confirmatory Factor Model of Mental Toughness Questionnaire-18

Table 11

Indices of Model Fit of Mental Toughness Questionnaire - 18 (N = 194)

χ^2	d*f*	χ^2/(d*f*)	GFI	TLI	RMSEA
Model 1 (18 items without adding error covariances)					
421.67	135	3.12	0.84	0.82	0.09
Model 2 (18 items after adding error covariances)					
277.76	124	2.24	0.91	0.90	0.06

Note. GFI ≥ .90, TLI ≥ .90, RMSEA ≤ .06

Table 11 indicates the model fit indices of mental toughness questionnaire – 18. In model 1, it can be observed that chi square to *df* ratio is in acceptable range whereas; the value of GFI, TLI, and RMSEA are not in acceptable range. It can also be observed that the value of RMSEA is indicating the poor fit. Though, all of the item loadings are in acceptable range, yet error covariances have been added in order to attain a good model fit. After allowing the items to covary and addition of 11 error covariances, a fair fit has been achieved for the said model.

Construct validity. The next step in validating the instruments is to determine the construct validity of the scales. In order to do so, the item-total correlations of each instrument are calculated. Construct validity of the scales also have been determined through convergent validity and results are as follow:

Demand-Control-Support Questionnaire. Demand-Control-Support Questionnaire is a non-summative scale that is; it is comprised of three distinctive constructs and does not yield a single score. In order to determine the construct

validity of this scale, item-total correlations were calculated for job demands, job control, and workplace support; respectively.

Table 12

Item-Total Correlations of Demand-Control-Support Questionnaire (N = 194)

Item No.	Item-Total Correlations	Corrected *r*
	Job Demands	
1	.69**	.61**
2	.72**	.59**
3	.70**	.58**
4	.51**	.37**
5	.71**	.51**
	Job Control	
1	.68**	.56**
2	.59**	.49**
3	.73**	.48**
4	.47**	.23**
5	.74**	.61**
6	.73**	.59**
	Workplace Support	
1	.79***	.65**
2	.81***	.72**
3	.81***	.68**
4	.66**	.51**
5	.77**	.64**
6	.78***	.65**

*** $p<.001$, ** $p<.01$

Table 12 indicates the results of item total correlations of Demand-Control-Support Questionnaire. Results indicate that all items of all three constructs of the scale are correlated moderately to strongly with their total score except item number 4 in job demands and item number 4 in job control. These are the same items which were found to have low loadings while reporting results of CFA. Except these two items, values of other item total correlations yielded significant moderate to strong correlations which indicates that all items belong to their respective dimension thus; they are measuring the same construct.

Workplace Cognitive Failures Scale. Workplace cognitive failures scale included three dimensions/subscales including attention, memory, and execution failures. While determining the construct validity of the scale, it was expected that respective items of all three subscales will be significantly correlated with their total scores. The results of these item total correlations are as follow:

Table 13

Item-Total Correlations of Workplace Cognitive Failures Scale (N = 194)

Item No.	Item-Total Correlations	Corrected *r*
	Attention Failures	
1	.71**	.67**
2	.72**	.63**
3	.74**	.68**
4	.69**	.62**
5	.71**	.62**
	Memory Failures	
1	.62**	.57**
2	.75**	.68**
3	.74**	.69**
4	.76**	.65**
5	.69**	.58**
	Execution Failures	
1	.73**	.64**
2	.70**	.64**
3	.72**	.63**
4	.80***	.75**
5	.79***	.76**

*** $p<.001$, ** $p<.01$

Table 13 is indicating the item total correlations of three dimensions of Workplace Cognitive Failures Scale with their respective items. The results indicate moderate to high item total correlations among all the subscales and their respective items which points towards the measurement of the same construct and thus, construct validity of the scale.

Chalder Fatigue Scale. Chalder Fatigue Scale is comprised of two dimensions and their item total correlations are as follow:

Table 14

Item-Total Correlations of Chalder Fatigue Scale (N = 194)

Item No.	Item-Total Correlations	Corrected *r*
	Physical Fatigue	
1	.62**	.54**
2	.67**	.61**
3	.66**	.60**
4	.58**	.50**
5	.64**	.59**
6	.65**	.57**
7	.72**	.65**
	Mental Fatigue	
1	.62**	.52**
2	.65**	.55**
3	.64**	.53**
4	.70**	.58**

** $p<.01$

Table 14 indicates the correlations between the items of physical fatigue and mental fatigue with their respective total scores. It can be seen from the table that all of the items of the scales are significantly correlated with their respective subscales which indicates that they are measuring the same construct.

Mental Toughness Questionnaire–18. Mental Toughness Questionnaire–18 is a uni-dimensional summative scale. In order to determine the construct validity of this uni-dimensional scale, item total correlation is calculated for all 18 items of the scale. In order to determine the construct validity of a uni-dimensional scale, the item total correlation needs to be significantly higher.

Table 15

Item-Total Correlations of Mental Toughness Questionnaire–18 (N = 194)

Item No.	Item-Total Correlations	Corrected *r*
1	.73**	.71**
2	.74**	.72**
3	.70**	.68**
4	.72**	.70**
5	.70**	.68**
6	.71**	.68**
7	.60**	.58**
8	.67**	.64**
9	.70**	.68**
10	.71**	.68**
11	.68**	.65**
12	.64**	.61**
13	.69**	.67**
14	.67**	.65**
15	.71**	.69**
16	.66**	.64**
17	.72**	.70**
18	.75**	.74**

** $p<.01$

Table 15 is representing the item total correlations of Mental Toughness Questionnaire–18 which is indicating that all of the items are significantly and positively correlated with total score of the scale. In addition to it, the values of the correlations are high enough to determine that all of the items are measuring the same construct which, ultimately, refers to the construct validity of the scale.

Relationship among all study variables. Another important step after determining the construct validity of all the scales was to analyze the initial relationship pattern of all the scales.

Table 16

Inter-scale Correlations of all Study Variables (N = 194)

Variables	1	2	3	4	5	6
1. Job Demands	-	.32**	-.09*	.24*	.38*	-.05*
2. Job Control		-	.12	-.14*	-.12*	.09*
3. Workplace Support			-	-.22**	-.19**	.19**
4. Fatigue				-	.43**	-.06*
5. Cognitive Failures					-	-.18*
6. Mental Toughness						-

** $p<.01$, * $p<.001$

Table 16 is representing the correlation coefficient among all study variables. The purpose of this correlation was to determine the initial pattern of the study variables. The results indicate that job demands and job control are positively and moderately correlated with one another, whereas job demands and job control yielded significant moderate correlations with construct of fatigue and cognitive failures

where job demands is positively correlated with cognitive failures and negatively correlated with mental toughness. Additionally, job control negatively correlated with cognitive failures and positively correlated with mental toughness. Workplace support is negatively correlated with fatigues as well as cognitive failures whereas; positively correlated with mental toughness. Lastly, the construct of cognitive failure is significantly negatively correlated with mental toughness. This indicates that all of the variables of the study are correlated in the hypothesized directions.

Additionally; all of the correlations among the study variables are low to moderate correlations which, further, indicate the distinctiveness of all the study variables that is; pointing to the discriminant or divergent validity of the study variables.

Discussion

The foremost purpose of undertaking the phase-I of the study was to make sure the relevance of the study constructs in context of Pakistani pharmaceutical companies' as well as looking for the theory driven scales which will be a good reflection of cognitive and behavioral aspects of jobs of employees in local settings. In order to fulfill the above mentioned two purposes, the first step undertaken was conduction of brain storming sessions with employees of sales/marketing and production departments from Macter and Goodman Pharmaceuticals. The purpose of conducting sessions with two different departments was to gauge the picture of job demands, job control, workplace support, fatigue, mental toughness, and cognitive failures in employees working in varying job settings. Brain storming session included employees from managerial and non-managerial posts to cater variety of

responses in some of the crucial variables like job demands and job control (which is said to be different at different job positions).

Results of these brain storming sessions indicated that all of the study variables and their related indicators were well understood and expressed by almost all of the employees though; intensity was different for each of the employee according to their own job position and consequent exposure to their work settings. For example, the aspects of physical fatigue were more emphasized by the production employees working on blister machines and medical representatives.

All of the dimensions mentioned in the Table 2 provided the ground for choosing relevant and work setting appropriate instruments for furthering the research. On basis of the results of the brain storming sessions, four theory driven instruments were identified for measuring job demands, job control, workplace support, mental toughness, fatigue, and cognitive failures. These scales included Demand-Control-Support Questionnaire (Karasek & Theorell, 1990), Workplace Cognitive Failures Scale (Wallace & Chen, 2005), Mental Toughness Questionnaire - 18 (Clough et al., 2002), and Chalder Fatigue Scale (Chalder et al., 1993).

After choosing most suitable available instruments from literature, these instruments were provided to experts for judgment of their cultural and linguistic appropriateness with regard to sales/marketing, HR, and production departments. Content and process subject matter experts were contacted for evaluation of the scales which included experts from subject of psychology and field experts from pharmaceutical companies. Two concerns, regarding instruments, were highlighted during the entire process of evaluation of the selected instruments. The first concern

was the time taken in filling the questionnaires' booklet. This concern emerged during brain storming sessions as well as while consulting field experts from pharmaceutical companies. The foremost reason of this concern was that employees needed to fill the scales during their working hours. The second concern was inability of the production employees to fill scales' booklet in English language. In order to address both of the concerns, those instruments were chosen which encompassed all the main themes of brain storming sessions (for all study constructs) with minimum number of statements and decision of translation of all the instruments was undertaken. Translations were conducted in phase-II of this study through forward and backward translation method and final consultation was taken from the original authors of the instruments who evaluated the conceptual equality of translated versions of the instruments

The sole purpose of the phase-III was to determine the psychometric properties of the instruments which needed to be used in the next phase of main study. The translated versions of aforementioned instruments needed to be validated in local work settings by determining the reliability estimates as well as dimensionality of all the instruments. In order to determine the dimensionality, previous literature was consulted for all the instruments.

While empirically testing the translated versions of the instruments, a sample of 194 employees from different pharmaceutical companies at Rawalpindi and Islamabad was taken. Reliability estimates of all the instruments were determined through alpha coefficients whereas; construct validity was established through convergent and divergent/ discriminant validity. The first instrument was Demand-Control-Support Questionnaire for which previous literature was reviewed which

indicated varying factor structures of the scale for varying populations. For example; Mase et al. (2012) conducted research on nursery schools workers in which the factor structure of Demand Control Support Questionnaire came up in form of three distinct structures where two dimensions of job control (skill discretion and decision latitude) did not emerge as two distinct dimensions. Further, Sanne et al. (2005) also concluded Demand Control Support Questionnaire as three dimensional scale but their research revealed a four dimension solution for white collar male employees and blue collar female employees. In current study, a four dimension solution was considered appropriate with satisfactory item loadings and model fit.

Previous research for Workplace Cognitive Failures Scale clearly indicated three dimensions solutions which could also be replicated in the current study (Kalakoski et al., 2020). These dimensions included attention, memory, and action execution failures. CFA of Chalder Fatigue Scale was conducted with two dimensions of physical fatigue and mental fatigue which indicated satisfactory item loadings and good model fit. Two dimensional factor structure was also confirmed in previous researches (Chalder et al., 1993; Chow et al., 2007; Cella & Chalder, 2010). Mental Toughness Questionnaire – 18 was a uni-dimensional scale and its uni-dimensionality is also reported in previous research (Gerber et al., 2018). The confirmation of factor structures of all the instruments indicated their deduction from their respective theories.

Though CFAs had shown the desired factor structures yet, some of the items could not meet the minimum criteria of item loading. Instead of excluding these items, it was suggested by the content experts that these items must be included in

next phase of the research where a larger sample could determine whether these items should be excluded from data analysis of the main study or not.

Conclusion. This entire study was undertaken in order to decide whether the selected instruments for the study were valid and reliable enough to be used in the main study (that is hypotheses testing). Thus, reliability estimates and validity estimates were made focus of the phase-III of the study. Results of the empirical evaluation indicate that all of the scales are reliable and yield validity estimates and factor structures which are in accordance to the previous literature. Thus, it can be concluded that all the scales of the study are dependable to be used for the next phase of the study (main study).

Chapter-IV

Study II: Main Study

Main study is the continuation of the previous study in which already validated instruments are used to determine the relationship among all the study variables. As a different sample is acquired for the main study, confirmatory factor analyses are conducted to confirm factor structures on the new sample. Furthermore, relationship of demographic variables (personal and organizational variables) with study variables is explored in the main study. Direct, indirect, and interactive effects are explored among varying study variables in form of mediation and moderation and path analyses are conducted in order to get a cumulative picture of relationship among all study variables.

Objectives

Main study consisted of the hypotheses testing and model testing with following objectives:

1. To examine the significant predictors of workplace cognitive failures from study variable including job demands, job control, workplace support, fatigue, and mental toughness
2. To determine the mediating role of fatigue and its subscales (physical fatigue and mental fatigue)
3. To examine the moderating role of mental toughness in relationship among all study variables.
4. To investigate the group differences on basis of varying demographic variables (e.g., age, gender, marital status, type of organization, work experience, and department).

Hypotheses

Keeping in view the before-mentioned objectives, three types of hypotheses had been generated that is; hypotheses for direct effects, indirect effects, and group differences. Previous literature had been consulted for devising all the directional hypotheses. Following are the hypotheses which were devised:

Direct effects. Hypotheses, made on the direct links of the study variables, were as follow:

H1a. Job demands will positively predict cognitive failures and its dimensions (attention, memory, and execution failures)

H1b. Fatigue and its dimensions (physical fatigue and mental fatigue) will positively predict cognitive failures and its dimensions (attention, memory, and execution failures)

H1c. Job control and its dimensions (skill discretion and decision authority) will negatively predict cognitive failures and its dimensions (attention, memory, and execution failures).

H1d. Workplace support will negatively predict cognitive failures and its dimensions (attention, memory, and execution failures).

H1e. Mental toughness will negatively predict cognitive failures and its dimensions (attention, memory, and execution failures).

Indirect effects. Following hypotheses were formulated on indirect relationship of all the study variables:

H2a. Fatigue and its dimensions (physical fatigue and mental fatigue) will mediate the relationship between job demands and cognitive failures and its dimensions (attention, memory, and execution failures)

H2b. Fatigue and its dimensions (physical fatigue and mental fatigue) will mediate the relationship between job control and its dimensions (skills discretion and decision authority) and cognitive failures and its dimensions (attention, memory, and execution failures).

H2c. Fatigue and its dimensions (physical fatigue and mental fatigue) will mediate the relationship between workplace support and cognitive failures and its dimensions (attention, memory, and execution failures).

H3a. Mental toughness will moderate the relationship between job demands and fatigue and its dimensions (physical fatigue and mental fatigue)

H3b. Mental toughness will moderate the relationship between job control and fatigue and its dimensions (physical fatigue and mental fatigue)

H3c. Mental toughness will moderate the relationship between workplace support and fatigue and its dimensions (physical fatigue and mental fatigue)

H3d. Mental toughness will moderate the relationship between fatigue and its dimensions (physical fatigue and mental fatigue) and cognitive failures and its dimensions (attention, memory, and execution failures)

Group differences. Hypotheses based on demographics of the respondents are as follow:

H4a. Male employees will experience higher level of job demands, job control, cognitive failures and its dimensions (attention, memory, and execution failures), and mental toughness as compared to female employees.

H4b. Female employees will experience higher level of workplace support, and fatigue and its dimensions (physical fatigue and mental fatigue) as compared to male employees

H5a. Employees, working on managerial positions, will experience higher level of job demands, job control and its dimensions (skills discretion and decision authority), workplace support, and cognitive failures and its dimensions (attention, memory, and execution failures) as compared to employees working on subordinate positions

H5b. Employees, working on subordinate positions, will experience higher level of fatigue and its dimensions (physical fatigue and mental fatigue) as compared to employees working on managerial positions

H6. Employees, working in multinational pharmaceutical companies, will experience higher levels of job demands, job control, workplace support, mental toughness, fatigue and its dimensions (physical fatigue and mental fatigue) and cognitive failures and its dimensions (attention, memory, and execution failures).

H7a. Employees in active jobs will experience higher level of job demands, job control, workplace support, and mental toughness as compared to employees in passive, high strain, and low strain jobs.

H7b. Employees in high strain jobs will experience higher level of fatigue and its dimensions (physical fatigue and mental fatigue) and cognitive failures and its dimensions (attention, memory, and execution failures) as compared to employees in active, passive, and low strain jobs.

Operational Definitions of Study Variables

Job demands. Job demands are conceptualized as any kind of psychological stressor which hampers the normal functioning at workplace leading to hazardous outcomes (Karasek as cited in Larsson et al., 2019). Job demands includes demand for

working fast, working hard, putting great effort in work, insufficient time for completing tasks, and facing conflicting demands at workplace.

In order to operationally define the job demands in current study, job demands subscale of Demand-Control-Support Questionnaire (Karasek & Theorell, 1990) has been used, consisting of five items. High scores indicate perception of existence of high level of job demands whereas; low scores indicate perception of low level of demands at workplace.

Job control. Job control is the perception of general control of an employee over his workplace environment in terms of control or autonomy over the tasks as well over one's conduct (Theorell, 2013). The construct of job control had been operationalized as an employee's scores on the subscale of job control in Demand-Control-Support Questionnaire (Karasek & Theorell, 1990). This subscale consisted of six items in which the high score indicate perception of presence of high level of control at workplace whereas; low score indicate perception of lack of job control.

The construct of job control is further divided into two dimensions that is; skill discretion and decision authority. Skill discretion refers to the variety of skills which can be learned through and utilized at one's workplace. Skill discretion is measured through four items in which high score indicated a greater possibility of learning and utilizing a large breadth of skills at workplace and vice versa. Decision authority, on the other hand, refers to the authority to choose between tasks as well as work procedure. This dimension was operationalized through two items in subscale of job control where high score indicated higher possibility of decision authority and low scores indicated relative lack of decision authority at workplace (Negussie & Kaur, 2016).

Workplace support. Workplace support is defined as the helpful interaction of the employees with their superiors / bosses as well as colleagues (Theorell et al.,

2015) which include a peaceful environment with lack of conflict with authorities and colleagues, helpfulness, unity, and good relations at vertical and horizontal levels of management. For present research, workplace support is operationalized as scores on the support subscale of Demand-Control-Support Questionnaire (Karasek & Theorell, 1990) where high scores indicate perception of high workplace support by colleagues and superiors and vice versa.

Cognitive failures. Cognitive failures refer to hampered mental functioning which gives birth to disruptive task execution which an individual is capable of accomplishing, otherwise (Elfferich, et al., 2010). The construct is operationalized as scores on Workplace Cognitive Failures Scale (Wallace & Chen, 2005) where high scores indicated high occurrence of cognitive failures and low scores indicated low occurrence of cognitive failures at workplace.

In current research, three types of cognitive failures are taken into account including attention failures, memory failures, and execution failures. Attention failures refer to the inability of an individual to pay attention to important tasks or task details as well as inability to be persistent in paying attention (problems with encoding of information into memory). Memory failure is the inability to retrieve the relevant information from memory for performing a task whereas; execution failure occurs in form of unintended actions at workplace which are also referred to as action slips in which the intension does not match the action of the individual (Carrigan & Barkus, 2016). Attention, memory, and execution failures are operationalized as three subscales in Workplace Cognitive Failures Scale (Wallace & Chen, 2005) where high scores indicate higher occurrence of the respective failure and vice versa.

Fatigue. Lack of energy, general tiredness leading to decrease in physical performance which cannot be treated with rest or sleep and increments the real or perceived difficulty of a task is defined as fatigue (Ahola & Hakanen, 2007). Present

research operationalized fatigue as scores on 11 items of Chalder Fatigue Scale (Chalder et al., 1993) where high score indicate high level of fatigue and low scores indicate low level of fatigue.

Two important dimensions of the fatigue, used in current research, are physical and mental fatigue. Physical fatigue is defined as the physical pain, feeling of tiredness, as well as cramps in muscles due to workload or undue stress whereas; mental fatigue refers to inability of an individual to optimally perform cognitive tasks due to cognitive overload (Chow, 2018). Physical and mental fatigue are operationally defined as scores on 11 items of Chalder Fatigue Scale (Chalder et al., 1993) in which first seven items represent physical fatigue and remaining four items represent mental fatigue. High scores on each type of fatigue indicate high levels of physical and mental fatigue and low score indicate low level of physical and mental fatigue.

Mental toughness. Mental toughness is a strong faith and self-belief of an individual for their control on their destiny and life circumstances as well as quality of being unaffected under stress, adversity, and competition (Gucciardi & Gordon, 2014). As the present research is using Clough's conceptualization of mental toughness, the construct is operationalized as scores on Mental Toughness Questionnaire – 18 (Clough et al., 2002). This scale includes 18 items where high scores indicate that the individual has higher tendency of being mentally tough and vice versa.

Sample

A purposive sample of 406 pharmaceutical employees was gathered for main study. Five hundred and forty nine employees were initially contacted for data collection purpose. In this way, the response rate for data collection remained 73.95%. Employees were taken from three different departments of Macter, Medicate International, Novartis, Searle, and CCL pharmaceutical companies. These

departments included sales/marketing, production, and HR departments. Additionally, Data was also collected from 17 employees from distribution department but it could not be included in main study due to insufficiency of data for varying analysis. The age range of the sample ranged between 17 and 69 years of age (M = 31.25, SD = 8.22). The overall work experience of the employees ranged between 1 year to 40 years (M = 8.10, SD = 7.22).

Inclusion criterion. Inclusion criterion of the sample was decided as atleast one year of overall work experience as well as six months of work experience in the current organization.

Exclusion criterion. Employees with any mental or physical disability, for which they were taking medication, were not included in the sample. Further details of the sample are given below:

Table 17

Demographic Characteristics of the Sample (N = 406)

Demographics	*f*	%
Gender		
Men	335	82.5
Women	71	17.5
Education		
Till Graduation	294	72.4
Post-Graduation	112	27.6
Marital Status		
Single	176	43.3
Married	230	56.7
Family System		
Separate	149	36.7
Joint	257	63.3
Organization		
National	224	55.2
International	182	44.8

Department		
Sales/Marketing	188	46.3
Production	127	31.3
HR	91	22.4
Work-Related Injuries		
With injuries	27	7.7
Without injuries	379	93.3

Instruments

All instruments, which were translated and adapted in the first study, were used to assess the study variables in the main study as well. While translating and adapting the instruments, no changes were made in number of items and their response options thus, their description remained same. Alongwith the instruments, consent form and demographic sheet was also provided to the respondents to gather their permission for data collection and other pieces of information which can elaborate on research purpose.

Procedure

In order to carry out the main study, permissions were taken from headquarters and CEOs of all the respective companies and time slots were reserved in order to collect data from companies' employees. In addition to the permission from CEOs, individual consent was also acquired from each employee before filling the questionnaire booklet and only those employees were provided with booklet who were willing to provide the data. Additionally, all the employees, who had given consent, were assured of the liberty to quit the process of filling out the questionnaires if they wanted to do so. Researcher assured physical presence during entire process of

data collection so as to facilitate the clarification of statements for participants in case of any ambiguity.

For each of the employee, written and verbal instructions were given before providing questionnaires booklet. Employees were made sure of anonymity of their responses and that none of their responses would be shared with their company management. At the end of data collection, employees were graciously thanked for their time and effort.

Results of Main Study

Results of the main study included CFAs and descriptive analyses of all the instruments in order to determine their validity and reliability for new sample as well as to re-evaluate the items which did not meet the criterion of satisfactory item loadings. Model testing is carried out in order to determine the indirect and interactive relationship among study variables through mediation and moderation. Finally, *t*-test and One-Way ANOVA are conducted for examining group differences on study variables.

Current research is a cross sectional mono-method research and all the data of the study is collected through self-reported measures. In case of the mono-method, it is difficult to avoid the problem of common method variance. It is important to handle the problem of common method variance due to its potential of producing measurement error and thus, leading to inaccurate inferences drawn through varying analyses (Coenen & Bulck, 2016). In order to tackle this problem, different remedies have been used in the present study. These remedies are as follow:

Anonymity. The first thing, which was undertaken in order to get the natural responses from the respondents, was to determine the anonymity of their responses. They were ensured, verbally and through consent form, that their responses will be kept anonymous. While doing so, they were made sure that there is no right or wrong option in scales and they just need to give rating on the statements which they find most suitable for themselves. Respondents were also made sure that their responses will not be shared with their authorities and data collection process will not affect their job in any case. In this way, genuinity of responses had been achieved (Podsakoff, MacKenzie, Podsakoff, 2016). All of these steps were undertaken in order to reduce the social desirability in responses of the employees (Craighead, Ketchen, Dunn, & Hult, 2011).

Inter-construct randomization. Method of inter construct randomization was used in order to tackle order effect. So, scales were presented to respondents in varying sequences (Duncan, 2013).

Improvement in scale items. In order to minimize the chances of random responses, the scale's items were improved so that all items will be easily comprehendible for the respondents and guessing and random responses could be controlled (Craighead et al., 2011). In order to do so, translation and adaptation of every scale was undertaken in the second phase of the study-I as well as their validity and reliability were also determined in third phase of the study-I.

Confirmatory Factor Analyses of Adapted Instruments

As a different sample has been acquired for the main study, confirmatory factor analyses were performed to test the factor structures of the instruments with new sample. Additionally, it was also necessary to re-evaluate the appropriateness of some of the items from Job Demand-Control-Support Questionnaire and Chalder Fatigue Scale which had low item loadings in study-I. Results of these confirmatory factor analyses are as follow:

CFA of adapted Demand-Control-Support Questionnaire. Item loadings for a four factor solution of Demand-Control-Support Questionnaire are as follow:

Table 18

Item Loadings for Demand-Control-Support Questionnaire (N = 406)

Scale/ Subscales	Item No.	Item Loadings
Job Demand	1	.60
	2	.63
	3	.66
	4	.46
	5	.56
Skill Discretion	6	.73
	7	.58
	8	.76
	9	.42
Decision Authority	10	.75
	11	.78
Workplace Support	12	.76
	13	.83
	14	.79
	15	.52
	16	.63
	17	.63

Table 18 indicates the results of CFA of Demand-Control-Support Questionnaire. The item loadings of the scale range between .46 to.83. All of the item loading values fulfills the minimum criteria of .30. Item number 4 in job demands subscales and item number 4 in skill discretion subscale, which had low item loadings in previous study, have also achieved satisfactory item loadings in main study. The resulting model and its model fit indices are as follow:

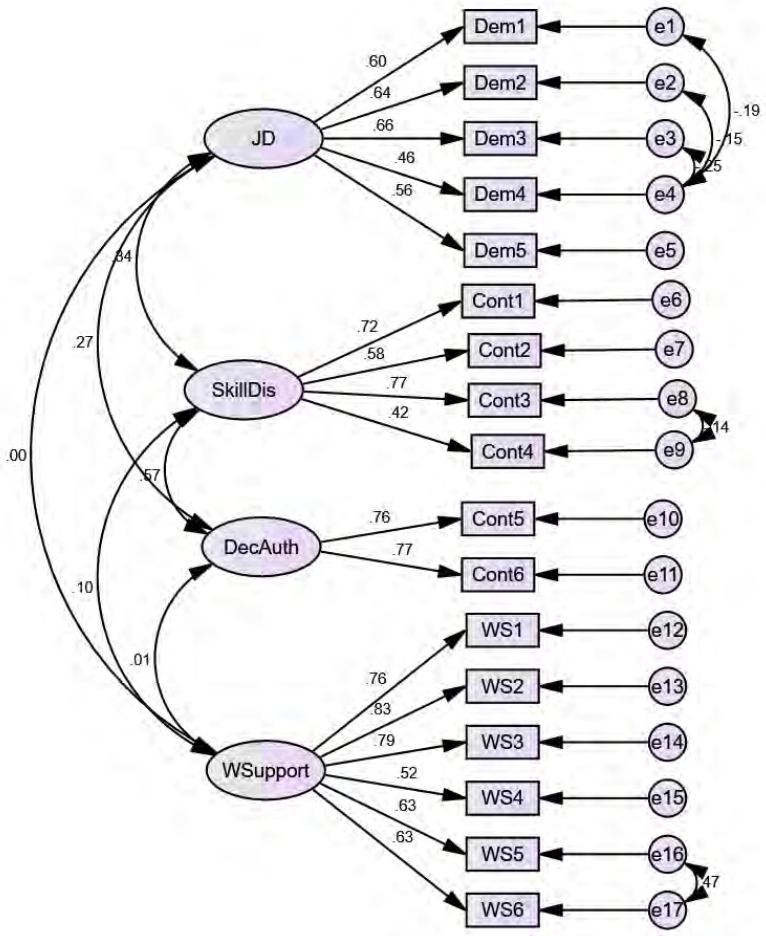

Figure 7. Confirmatory Factor Model of Demand-Control-Support Questionnaire

Table 19

Indices of Model Fit of Demand-Control-Support Questionnaire (N = 406)

χ^2	d*f*	χ^2/(d*f*)	GFI	TLI	RMSEA
Model 1 (17 items without adding error covariances)					
315.03	113	2.78	0.89	0.88	0.07
Model 2 (17 items after adding error covariances)					
229.72	108	2.12	0.94	0.92	0.05

Note. GFI ≥ .90, TLI ≥ .90, RMSEA ≤ .06

Table 19 indicates the model fit indices of Demand-Control-Support Questionnaire. Model 1 contains the values of default model whereas; model 2 indicates the values of GFI, TLI, and RMSEA after adding covariance. In order to achieve the acceptable values of GFI, TLI, and RMSEA, five covariances were added among item numbers 1, 2, 3, 4, 8, 9, 16, and 17. Thus, the model 2 indicates good model fit.

CFA of adapted Workplace Cognitive Failures Scale. Results of this confirmatory factor analysis are as follow:

Table 20

Item Loadings for Workplace Cognitive Failures Questionnaire (N = 406)

Scale/ Subscales	Item No.	Item Loadings
Attention Failure	1	.52
	2	.67
	3	.62
	4	.63
	5	.65
Memory Failure	6	.53
	7	.67
	8	.65
	9	.73
	10	.56
Execution Failure	11	.64
	12	.63
	13	.61
	14	.75
	15	.73

Table 20 indicates the item loadings of three subscales of the Workplace Cognitive Failures Scale. All of the items of the scale have acceptable factor loadings even in the default model. Model fit indices of the scale are as follow:

Figure 7

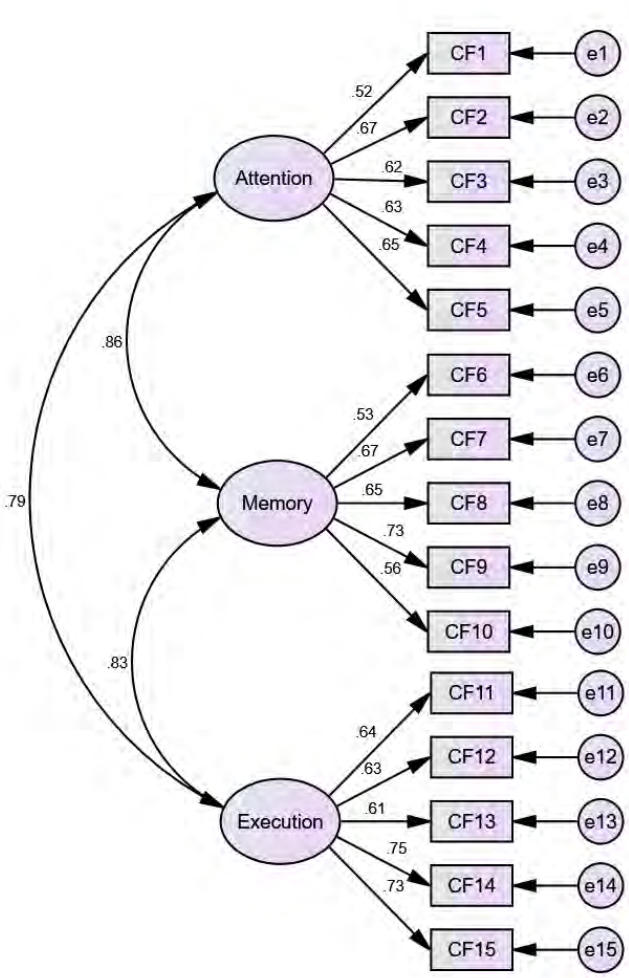

Figure 8. Confirmatory Factor Model of Workplace Cognitive Failures Scale

Table 21

Indices of Model Fit of Workplace Cognitive Failures Scale (N = 406)

χ^2	d*f*	χ^2/(d*f*)	GFI	TLI	RMSEA
Model 1 (15 items without adding error covariances)					
204.96	87	2.78	0.94	0.93	0.05

Note. GFI ≥ .90, TLI ≥ .90, RMSEA ≤ .06

Table 21 indicates the model fit indices of Workplace Cognitive Failures Scale. Model 1 contains the values of default model and all of the values of the scale indicate good model fit. Model 1 is the default model of the scale which is indicating good fit thus; no covariances are added in the model.

CFA of adapted Chalder Fatigue Scale. The results of confirmatory factor analysis for Chalder Fatigue Scale are as follow:

Table 22

Item Loadings for Chalder Fatigue Scale (N = 406)

Scale/ Subscales	Item No.	Item Loadings
Physical Fatigue	1	.51
	2	.54
	3	.63
	4	.51
	5	.61
	6	.51
	7	.66
Mental Fatigue	8	.71
	9	.69
	10	.75
	11	.36

Table 22 indicates the item loadings of two subscales of the Chalder Fatigue Scale. The item loadings range between .75 to .36. All of the items of the scale have

acceptable factor loadings (.30). Model fit indices of the scale after adding covariance are as follow:

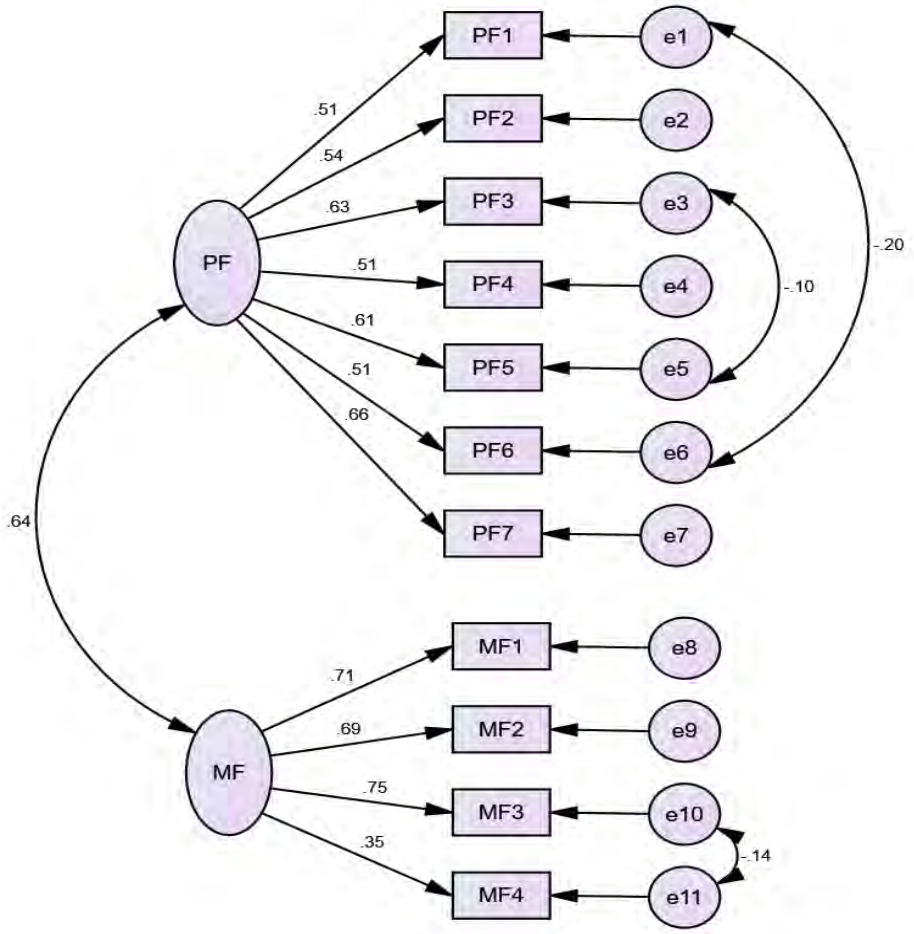

Figure 9. Confirmatory Factor Model of Chalder Fatigue Scale

Table 23

Indices of Model Fit of Chalder Fatigue Scale (N = 406)

χ^2	d*f*	χ^2/(d*f*)	GFI	TLI	RMSEA
Model 1 (11 items without adding error covariances)					
170.46	43	2.90	0.84	0.87	0.08
Model 2 (11 items after adding error covariances)					
92.08	40	2.19	0.93	0.92	0.05

Note. GFI ≥ .90, TLI ≥ .90, RMSEA ≤ .06

Table 23 indicates the model fit indices of Chalder Fatigue Scale. In order to achieve a good model fit, three covariances were added among item numbers 1, 3, 5, 6, 10, and 11. Values of model 2 indicate good model fit after adding error covariances.

CFA of adapted Mental Toughness Questionnaire-18. The results of confirmatory factor analysis for the said questionnaire are as follow:

Table 24

Item Loadings for Mental Toughness Questionnaire (N = 406)

Scale/ Subscales	Item No.	Item Loadings
	1	.72
	2	.71
	3	.68
	4	.72
	5	.69
	6	.68
	7	.59
	8	.64
	9	.67
	10	.70
	11	.65
	12	.61
	13	.68
	14	.68
	15	.71
	16	.63
	17	.70
	18	.74

Table 24 presents the item loadings of Mental Toughness Questionnaire which indicates that all 18 items of the scale have acceptable item loadings. Figure and model fit indices of the scale are as follow:

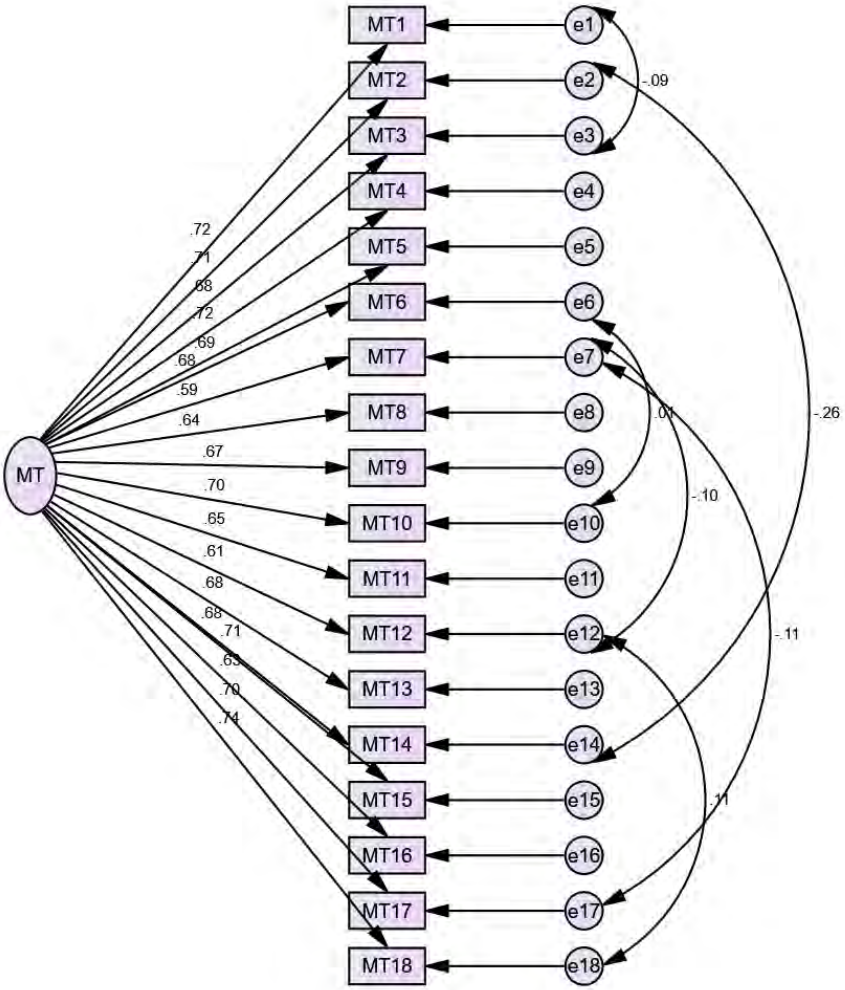

Figure 10. Confirmatory Factor Model of Mental Toughness Questionnaire-18

Table 25

Indices of Model Fit of Mental Toughness Questionnaire – 18 (N = 406)

χ^2	d*f*	χ^2/(d*f*)	GFI	TLI	RMSEA
Model 1 (18 items without adding error covariances)					
392.31	135	2.90	0.87	0.85	0.08
Model 2 (18 items after adding error covariances)					
282.62	129	2.19	0.92	0.90	0.05

Note. GFI ≥ .90, TLI ≥ .90, RMSEA ≤ .06

Table 25 is indicating the model fit indices of Mental Toughness Questionnaire, which is a uni-dimensional scale, before (Model 1) and after (Model 2) adding error covariances. In order to achieve good model fit indices, six error covariances were added to the model among item numbers 1, 2, 3, 6, 7, 10, 12, 14, 17, and 18.

Hypotheses Testing for Direct Effects, Indirect Effects, and Group Differences

This is the section which entails all the analyses which have been hypothesized for the main study. In this section, three types of hypotheses are tested that is, direct relationships among variables, indirect relationships among variables, and group differences.

Descriptive statistics. The initial step of data analysis of the main study is to examine the descriptive statistics of all the variables so that spread and normality of the data could be estimated for further analysis. Descriptive analyses include mean, standard deviation, alpha reliabilities, skewness, kurtosis, and actual and potential ranges of the data. Potential range of the data is the minimum to maximum scores which the instrument offers and actual range in the minimum to maximum range of scores attained by the respondents.

Table 26

Descriptive Statistics and Reliability Estimates of all Study Variables (N = 406)

Scales	No. of items	α (Men, Women)	*M*	*SD*	Skew	Kurt	Range	
							Potential	Actual
JD	5	.70 (.67, .76)	15.62	2.19	-.95	1.24	5-20	6-19
JC	6	.73 (.73, .72)	18.72	3.41	-.41	-.75	6-24	10-24
Skill Disc	4	.71 (.73, .70)	13.20	2.10	-.74	.51	4-16	5-16
Dec Auth	2	.73 (.73, .72)	5.52	1.97	-.38	-1.05	2-8	2-8
WS	6	.86 (.84, .89)	17.51	4.09	-.98	.44	6-30	6-24
WCFS	15	.87 (.89, .88)	31.32	10.45	.55	.07	15-75	11-70
Memory	5	.75 (.75, .73)	10.77	3.98	.49	-.81	5-25	3-23
Attention	5	.76 (.75, .78)	10.56	3.89	.72	.47	5-25	4-24
Execution	5	.79 (.79, .81)	9.98	4.09	.88	.64	5-25	4-25
MTQ	18	.82 (.85,.74)	61.15	9.87	-.05	-.42	18-90	35-88
CFS	11	.80 (.81, .76)	9.08	5.07	.68	.63	0-33	0-30
MF	4	.75 (.76, .72)	3.22	2.18	.82	.81	0-12	0-10
PF	7	.71 (.74, .70)	5.85	3.66	.45	-.04	0-21	0-21

Note. JD = Job Demands, JC = Job Control, Skill Disc = Skill Discretion, Dec Auth = Decision Authority, WS = Workplace Support, WCFS = Workplace Cognitive Failures Scale, MTQ = Mental Toughness Questionnaire, CFS = Chalder Fatigue Scale, MF = Mental Fatigue, PF = Physical Fatigue.

Table 26 indicates the total number of items, alpha reliabilities, mean, standard deviation, scores ranges, and estimates of skewness and kurtosis. It is evident from the analysis that alpha reliabilities of all the scales and their respective subscales are within the acceptable range and none of the alpha reliabilities is less than .70. Overall,

the range of alpha reliabilities is between .70 and .89. In this way, all of the reliabilities above .70 are considered in adequate range and all reliabilities which are above than .80 can be considered good (Pallant, 2013). Additionally, reliabilities were calculated for men and women separately in order to determine the consistency of scores across the groups.

Skewness and kurtosis are two important values to determine the normality of the data. It is observed that values of skewness and kurtosis for all the scales and subscales are within the range of -2 to +2. Mallery (2010) indicates that these values of skewness and kurtosis are considered normal. Additionally, same ranges are also considered acceptable by other researchers as well (Field, 2009; Gravetter & Wallnau, 2014). Lastly, the values of mean and standard deviation for all the scales and their subscales are neither too high or too small which also points towards the normal distribution of the data.

Results of hypotheses on direct effects/relationships. In order to investigate the direct relationships among the study variables, correlation matrix and regression analyses were conducted.

Correlation matrix. Correlation matrix is generated in order to determine the direction and strength of relationship among all study variables. In addition to it, correlations are also generated for some of the demographic variables including age, overall experience, experience in current organization, and number of dependents.

Table 27

Correlations Among all Study Variables (N = 406)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1-JD	-	.29**	.28**	.21**	-.02	.09	.11*	.04	.09*	-.07	.01	-.03	.07	.09	.07	.15*	.07
2-**JC**		-	.85**	.83**	.07	-.58*	-.20*	.02	.03	-.14**	-.09	-.19**	.03	.01	-.12*	.08	-.01
3- Skil Disc			-	.43**	.09*	.04	-.35*	.03	.01	-.16**	-.08	-.23**	.06	-.01	-.12*	.04	.01
4- Dec Auth				-	.010	.06	-.13*	.01	.04	-.08	-.06	-.08	-.02	.03	-.08	.09*	-.02
5-WS					-	-.17**	-.13**	-.21**	-.13*	-.22**	-.17**	-.23**	.23**	.03	-.10*	.05	.06
6-**CF**						-	.86**	.88**	.88**	.40**	.37**	.31**	-.11*	-.12*	-.01	-.14**	-.15**
7- Memory							-	.64**	.61**	.35**	.35**	.22**	-.10*	-.05	-.03	-.06	-.09*
8- Attention								-	.67**	.37**	.33**	.29**	-.05*	-.09	-.03	-.13**	-.13*
9- Execution									-	.34**	.30**	.28**	-.11*	-.16**	.01	-.16**	-.16**
10-**Fatigue**										-	.92**	.77**	-.09*	-.02	.01	-.01	-.03
11- PF											-	.47**	-.08*	-.03	-.01	-.02	-.04
12- MF												-	-.09	.01	.02	-.01	.01
13-MT													-	.08	.05	.09	.14**
14-Age														-	.22**	.86**	.68**
15-No. of Dependents															-	.21**	.19**
16-Work Exp																-	.78**
17-Current Exp																	-

Note. JD = Job Demands, JC = Job Control, Skill Dis = Skill Discretion, Dec Auth = Decision Authority, WS = Workplace Support, CF = Cognitive Failures, PF = Physical Fatigue, MF = Mental Fatigue, MT = Mental Toughness, Work Exp = Work Experince, Cur Exp = Current Experience

*p< .05, ** p< .01

Table 27 indicates the correlations among all study variables of the main study. Results indicate that job demands are significantly positively correlated with job control and its subscale of skill discretion, memory and execution failures subscales of cognitive failures as well as with overall work experience. Job control has significant positive correlation with memory failures whereas, significant negative correlations with overall fatigue, its subscale of mental fatigue and with number of dependents. Skill discretion subscale is positively and significantly correlated with overall job control and subscale of decision authority whereas; significantly negatively correlated with overall fatigue and its subscale of mental fatigue as well as number of dependents. Decision authority subscale is significantly positively correlated with memory failure subscale of cognitive failures and overall work experience. Work support was observed to be in significant negative correlations with cognitive failures and its subscales, fatigue and its subscales as well as with number of dependents whereas; a significant positive correlation existed with mental toughness.

Cognitive failures and all of its subscales are significantly positively correlated with fatigue and its subscales whereas; negatively correlated with mental toughness, age, overall work experience as well as work experience in the current organization. Mental toughness is not only significantly positively correlated with work support but it is also yielding significant positive correlation with experience in current organization. On the other hand, mental toughness has significant negative correlations with overall cognitive failures scale and its subscale of memory failure.

It is further revealed in correlation analysis that age is significantly negatively correlated with overall construct of cognitive failures and its subscale of execution failure. Demographic variable of number of dependents is significantly negatively correlated with overall construct of job control and its subscale of skill discretion as well as with work support whereas it is significantly positively correlated with other demographic variables. Overall work experience was significantly positively correlated with job demands, decision authority of job control subscale, age, and job experience in current organization, whereas significantly negatively correlated with overall construct of cognitive failures and its subscales of attention and execution failures. Experience in current organization is significantly negatively correlated with cognitive failures and all of its subscales and significantly positively correlated with mental toughness and other demographic variables. All of these correlations are significant at $p<.05$, $p<.01$.

Regression models for predicting cognitive failures and its subscales from all study variables. Hierarchical regression analyses are conducted in order to determine the significant predictors of cognitive failures and its subscales of attention, memory, and execution failures. Thus, four hierarchical regression analyses have been conducted taking overall construct of cognitive failures as outcomes variable as well as taking its three dimensions as outcome variables separately. Following are details of each hierarchical regression:

Table 28

Hierarchical Regression Analysis Predicting Cognitive Failures Through Demographic Variables and Study Variables (N = 406)

							95%*CI*	
Variables	*S.E*	*B*	R^2	ΔR^2	*F*	ΔF	*LL*	*UL*
Model 1			.14		4.30***			
Age	.12	.06					-.16	.32
Work exp	.16	-.07					-.42	.21
Cur exp	.15	-.03					-.35	.24
Gender	1.55	.01					-2.95	3.14
Marital status	1.24	-.11					-4.86	.03
No. of dependents	.22	-.01					-.51	.38
Organization type	1.19	.16**					1.67	3.00
Model 2			.26	.12	9.79***	5.49		
Age	.11	.09					-.10	.34
Work exp	.15	-.15					-.52	.07
Cur exp	.14	.01					-.25	.29
Gender	1.45	-.04					-3.93	1.77
Marital status	1.15	-.11*					-4.60	-.07
No. of dependents	.21	-.01					-.46	.37
Organization type	1.21	.18**					.59	4.17
JD	.22	.05					-.18	.68
Skill Disc	.25	.05					-.24	.74
Dec Auth	.26	.01					-.46	.55
WS	.12	-.03					-.31	.14
PF	.14	.28***					.44	.99
MF	.24	.17**					.32	1.27
MT	.05	-.16**					-.27	-.06

Note. Work Exp = Work Experience, Cur Exp = Current Experience, JD = Job Demands, Skill Disc = Skill Discretion, Dec Auth = Decision Authority, WS = Workplace Support, PF = Physical Fatigue, MF = Mental Fatigue, MT = Mental Toughness

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 28 presents the results of hierarchical regression analysis in which the overall construct of cognitive failures is taken as an outcome whereas, job demands, job control and its subscales, workplace support, and fatigue and its subscales, and

mental toughness have been taken as predictors. In order to control the variables which may bring about variance in the outcome variable other than the predictor variables and to get a true picture of variance generated by the predictor variables, demographic variables have been controlled during the analysis. The demographic variables which have been controlled in step I included age, overall work experience, work experience in current organization, gender, marital status, and number of dependents.

The analysis is conducted in two steps. In step 1, aforementioned demographic variables are taken as control variables. In second step, job demands, job control and its subscales, work support, fatigue and its subscales, and mental toughness are added as predictors. Results indicate that organization type and significantly predicted cognitive failures in step I and model explained 14 percent variance in the outcome variable. In step II, after controlling for demographic variables; type of organization and marital status are the demographic variables which are significantly predicting cognitive failures. From the study variables, it is concluded that physical fatigue, mental fatigue, and mental toughness are significantly predicting cognitive failures in which physical and mental fatigue are positively, whereas mental toughness is negatively predicting cognitive. In total, model 2 is predicting 26 percent variance in construct of cognitive failures.

Table 29

Hierarchical Regression Analysis Predicting Attention Failures Through Demographic Variables and Study Variables (N = 406)

							95%*CI*	
Variables	*S.E*	*B*	R^2	ΔR^2	*F*	ΔF	*LL*	*UL*
Model 1			.11		4.09***			
Age	.04	.16					-.01	.16
Work exp	.06	-.17					-.21	.03
Cur exp	.05	-.01					-.12	.10
Gender	.59	.01					-1.13	1.18
Marital status	.47	-.14					-2.04	-.18
No. of dependents	.08	-.01					-.19	.15
Organization type	.45	.16**					.35	1.42
Model 2			.25	.14	8.03***	3.94		
Age	.04	.17					-.01	.17
Work exp	.05	-.21*					-.22	.01
Cur exp	.054	.01					-.10	.11
Gender	.56	-.04					-1.53	.68
Marital status	.44	-.13					-1.92	-.16
No. of dependents	.08	-.01					-.18	.13
Organization type	.47	.10**					-.12	1.72
JD	.08	.01					-.16	.17
Skill Disc	.09	.08					-.04	.33
Dec Auth	.10	-.04					-.28	.11
WS	.04	-.12*					-.18	-.01
PF	.05	.23***					.12	.33
MF	.09	.17**					.12	.48
MT	.02	-.093					-.07	.01

Note. Work Exp = Work Experience, Cur Exp = Current Experience, JD = Job Demands, Skill Disc = Skill Discretion, Dec Auth = Decision Authority, WS = Workplace Support, PF = Physical Fatigue, MF = Mental Fatigue, MT = Mental Toughness

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 29 indicates the results of hierarchical regression analysis in which attention failures subscale of cognitive failures is taken as outcome variable,

demographic variables are controlled in step I and all other study variables are taken as predictors in step II.

In step I of the analysis, organization type emerged as a significant predictor of attention failures. Overall variance explained by model 1 is 11 percent. In step II of the analysis, work experience and organization type significantly predicted attention failures from the demographic variables and work support, physical fatigue, and mental fatigue emerged as significant predictors for attention failures in which work support is a negative predictor of attention failures and two other variables are positive predictors. Overall, model 2 is explaining 25 percent variance in construct of attention failures.

Table 30

Hierarchical Regression Analysis Predicting Memory Failures Through Demographic Variables and Study Variables (N = 406)

							95%*CI*	
Variables	*S.E*	*B*	R^2	ΔR^2	*F*	ΔF	*LL*	*UL*
Model 1			.12		3.05**			
Age	.04	.07					-.05	.13
Work exp	.06	-.02					-.13	.11
Cur exp	.05	-.04					-.14	.08
Gender	.59	-.11*					-1.39	-.94
Marital status	.47	-.07					-1.51	.36
No. of dependents	.08	-.05					-.27	.07
Organization type	.45	.13*					.90	.89
Model 2			.21	.09	7.25***	4.2		
Age	.04	.12					-.02	.15
Work exp	.05	-.12					-.18	.04
Cur exp	.05	.01					-.10	.11
Gender	.57	-.13*					-1.74	.50
Marital status	.45	-.06					-1.43	.35
No. of dependents	.08	-.04					-.23	.08
Organization type	.47	.15**					-.50	1.37
JD	.08	.04					-.08	.26
Skill Disc	.09	.03					-.12	.26
Dec Auth	.10	.06					-.07	.32
WS	.04	.01					-.09	.09
PF	.05	.30***					.18	.40
MF	.09	.08					-.04	.33
MT	.02	-.16**					-.11	-.02

Note. Work Exp = Work Experience, Cur Exp = Current Experience, JD = Job Demands, Skill Disc = Skill Discretion, Dec Auth = Decision Authority, WS = Work Support, PF = Physical Fatigue, MF = Mental Fatigue, MT = Mental Toughness

*< p .05** $p < .01$, *** $p < .001$

Table 30 indicates the results of hierarchical regression for memory failures subscale of cognitive failures. Analysis includes control of demographic variables in

step I of the analysis and predictors of memory failures were added in step II of the analysis.

Results of step I indicate gender of the employee as a significant predictor of memory failures at workplace and model explained 12 percent variance in construct of memory failures. In step II, physical fatigue and mental toughness emerged as significant predictors of memory failures in which physical fatigue is a positive predictor and mental toughness is a negative predictor of memory failures. Model 2, overall, is explaining 21 percent variance in construct of memory failures.

Table 31

Hierarchical Regression Analysis Predicting Execution Failures Through Demographic Variables and Study Variables (N = 406)

							95%*CI*	
Variables	*S.E*	*B*	R^2	ΔR^2	*F*	ΔF	*LL*	*UL*
Model 1			.08		3.66**			
Age	.04	-.07					-.13	.05
Work exp	.06	-.01					-.13	.11
Cur exp	.06	-.01					-.12	.10
Gender	.62	.02					-.91	1.51
Marital status	.49	-.08					-1.70	.24
No. of dependents	.09	.02					-.12	.23
Organization type	.47	.13*					.80	1.06
Model 2			.20	.12	7.14***	3.48		
Age	.04	-.05					-.11	.06
Work exp	.06	-.07					-.16	.07
Cur exp	.05	.01					-.09	.12
Gender	.59	-.01					-1.20	1.13
Marital status	.47	-.09					-1.67	.17
No. of dependents	.08	.03					-.11	.22
Organization type	.49	.07**					-.41	-1.52
JD	.09	.08					-.02	.33
Skill Disc	.10	.02					-.16	.23
Dec Auth	.11	.01					-.20	.21
WS	.04	.01					-.08	.10
PF	.05	.21***					.08	.31
MF	.09	.18**					.15	.54
MT	.02	-.16**					-.11	-.02

Note. Work Exp = Work Experience, Cur Exp = Current Experience, JD = Job Demands, Skill Disc = Skill Discretion, Dec Auth = Decision Authority, WS = Work Support, PF = Physical Fatigue, MF = Mental Fatigue, MT = Mental Toughness

* p < .05, ** p < .01, *** p < .001.

Table 31 is indicating the result of hierarchical regression for prediction of execution failures subscale of cognitive failures through demographic variables and other study variables. In step I, after controlling for demographic variables, predictors

of execution failures are added into the step II. It is revealed from the results of the analysis that organization type emerged as a strong predictor of execution failures in step I whereas, physical fatigue, mental fatigue, and mental toughness emerged as significant predictors of execution failures at step II. Physical and mental fatigue are positive predictors and mental toughness is a negative predictor of execution failures. The model, overall, explained 20 percent variance in construct of execution failures.

Results of Indirect Relationships Among Study Variables

Indirect relationships among study variables are studied through moderation and mediation analyses. As discussed in the rationale of the study, the objective of the study is to explore the moderating role of mental toughness and mediating role of fatigue in relationship between predictor variables (job demands, job control, and workplace support) and the outcome variable of cognitive failures and its dimensions.

In order to fulfill the objective of the study, a comprehensive model from Process' models is chosen. The chosen model is model number 58 from Process 2.16.3 in which the path *a* (path between predictor and mediator) and path *b* (path between mediator and outcome variable) both are moderated by the moderator (Hayes & Scharkow, 2013). Following are details of moderated mediation analyses of the study:

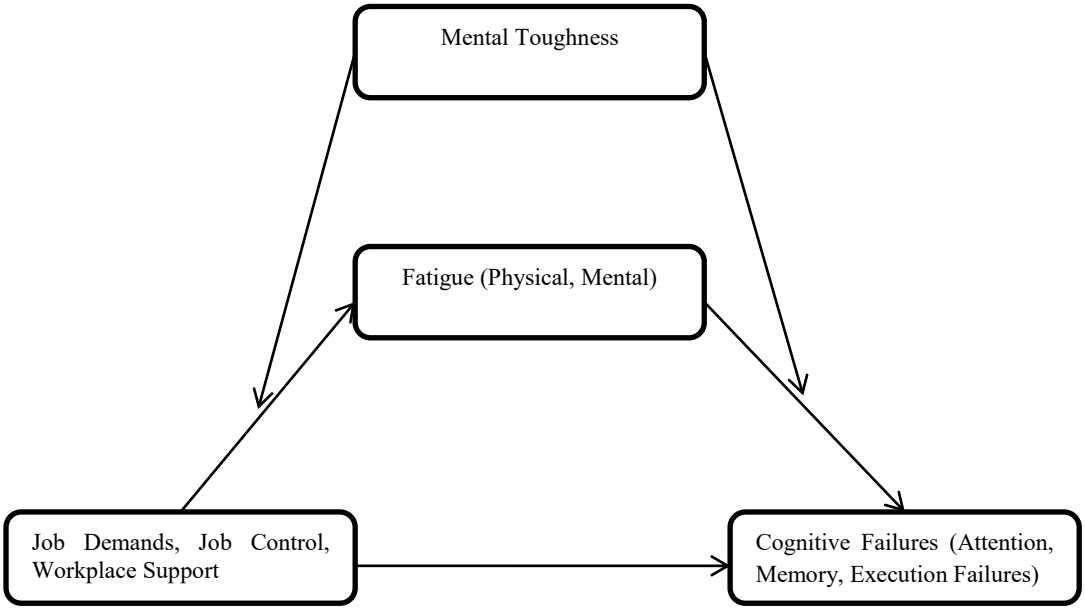

Figure 11. Moderation of Mental Toughness in Relationship Between Job Characteristics and Cognitive Failures Through Fatigue

While conducting the above mentioned analyses; job demands, job control, and workplace support are taken as predicting variables; respectively. Fatigue, physical fatigue, and mental fatigue are taken as mediators and cognitive failures and its dimensions are taken as outcome variables. Thus; considering all these combinations, a total of 48 analyses are conducted. Analyses indicate workplace support as the most significant predictor and overall construct of fatigue and dimension of physical fatigue as the significant mediators.

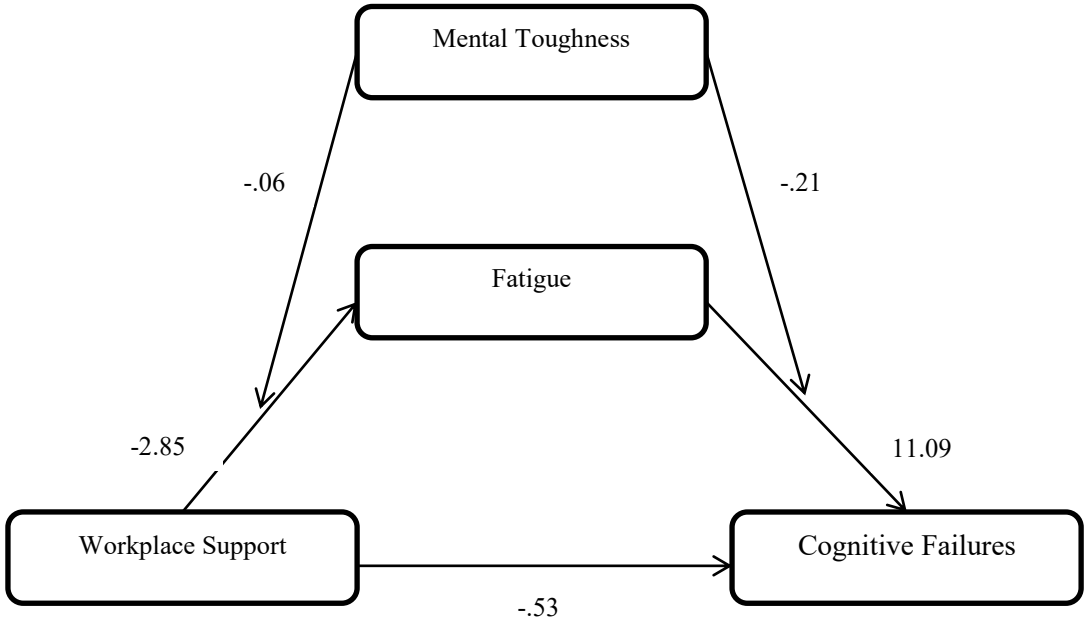

Figure 12. Moderation of Mental Toughness in Relationship Between Workplace Support and Cognitive Failures Through Fatigue

Above mentioned figure is depicting the moderated mediation analysis in which workplace support is taken as predictor, fatigue as mediator, and cognitive failures as outcome variable. Further information is given below in the table:

Table 32

Moderated-Mediation Effects of Workplace Support, Fatigue, and Mental Toughness on Cognitive Failures (N = 406)

Predictors	R^2	*F*	*p*	Coefficients	LLCI	ULCI
Model 1	.18	5.17	.001			
Outcome Variable: Fatigue						
Workplace support				-2.85	-.74	-4.96
Mental toughness				-1.07	-.34	-1.81
Work support x Mental toughness				-.06	-.10	-.02
Model 2	.34	9.07	.001			
Outcome Variable: Cognitive Failures						
Work support				-.53	-.08	-.99
Fatigue				11.09	17.68	4.50
Mental toughness				-.534	-3.40	-1.61
Fatigue x Mental toughness				-.21	-.09	-.33
Conditional Indirect Effect of Work Support on Cognitive Failures through Fatigue						
Moderator: Mental Toughness				Effect	LLCI	ULCI
Low mental toughness				.037	-.07	.35
Medium mental toughness				-.41	-.72	-.16
High mental toughness				-1.47	-2.45	-.72

Table 32 presents the results of moderated mediation analysis. Model 1 is indicating the analysis of path *a* in which workplace support, mental toughness, and their interaction is predicting fatigue. Values of coefficient are indicating that workplace support, mental toughness, and their interaction term are significantly negatively predicting fatigue and counting for 18 percent variance in fatigue. Model 2 is presenting the analysis of path *b* in which work support, fatigue, mental toughness, and interaction term of fatigue and mental toughness are predicting cognitive failures. Values of coefficient indicate that workplace, mental toughness, and interaction term of mental toughness and fatigue are negatively and significantly predicting fatigue whereas; fatigue is positively and significantly predicting cognitive failures.

Conditional indirect effects reflect the effect of work support on cognitive failures through fatigue in presence of mental toughness. There were three groups of mental toughness including low, medium, and high mental toughness groups. Result indicates that this indirect effect is significant for medium and high mental toughness groups and non-significant for low mental toughness group that is; in presence of fatigue, workplace support will significantly negatively predict cognitive failures for employees with high and medium mental toughness but not for employees with low mental toughness.

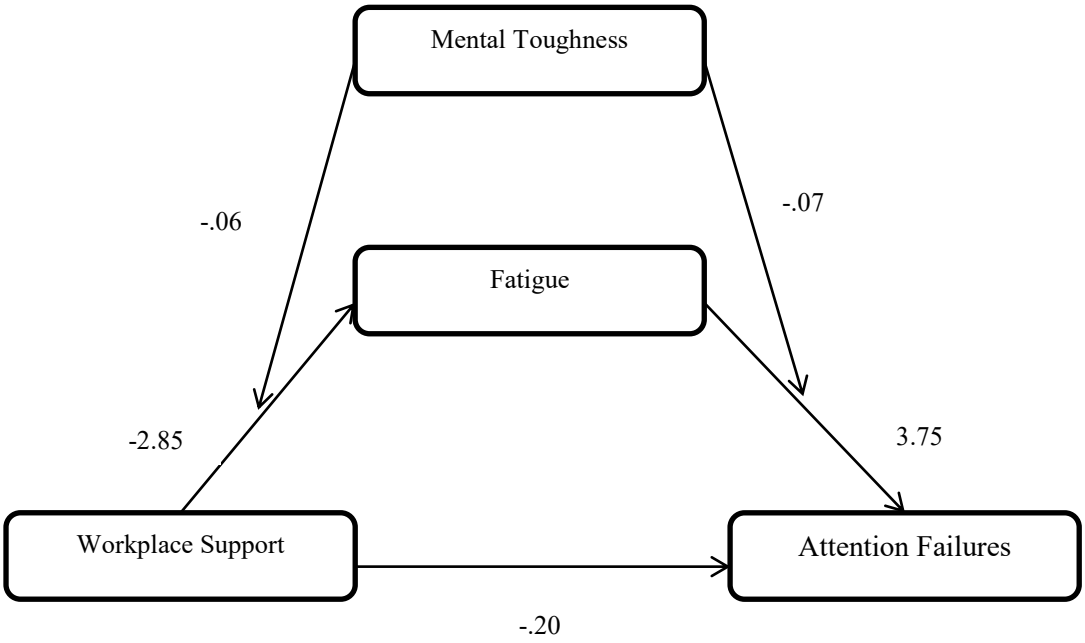

Figure 13. Moderation of Mental Toughness ın Relationship Between Workplace Support and Attention Failures Through Fatigue

The above mentioned figure is depicting moderated mediation analysis in which workplace support is taken as predictor variable, fatigue as mediator, and attention failures as outcome variable.

Table 33

Moderated-Mediation Effects of Workplace Support, Fatigue, and Mental Toughness on Attention Failures (N = 406)

Predictors	R^2	*F*	*p*	Coefficients	LLCI	ULCI
Model 1	.18	5.17	.001			
Outcome Variable: Fatigue						
Workplace support				-2.85	-.74	-4.96
Mental toughness				-1.07	-.34	-1.81
Work support x Mental toughness				-.06	-.10	-.02
Model 2	.36	9.39	.001			
Outcome Variable: Attention Failures						
Work support				-.20	-.024	-.37
Fatigue				3.75	6.04	1.10
Mental toughness				-1.04	-1.48	-.59
Fatigue x Mental toughness				-.07	-.02	-.11
Conditional Indirect Effect of Work Support on Attention Failures through Fatigue						
Moderator: Mental Toughness				Effect	LLCI	ULCI
Low mental toughness				.03	-.02	.17
Medium mental toughness				-.09	-.18	-.01
High mental toughness				-1.47	-.72	-.18

Table 33 is presenting the moderated mediation in which path *a* between workplace support and fatigue is moderated by mental toughness thus; Model 1 in the table represents the predictors of fatigue which include workplace support, mental toughness, and interaction term of workplace support and mental toughness. All these three predictors are significantly and negatively predicting fatigue and explaining 18 percent variance in fatigue. In model 2, the path between fatigue and attention failures is moderated by mental toughness. Thus, fatigue is significantly positively predicting attention failures and workplace support, mental toughness, and interaction term between fatigue and mental toughness is significantly negatively predicting attention failures. Additionally, all of the predictors are explaining 36 percent variance in attention failures.

Conditional indirect effects of workplace support on cognitive failures through fatigue indicate that fatigue only mediates this relationship in medium and high mental toughness groups but this relationship remains non-significant in case of group of employees with low mental toughness.

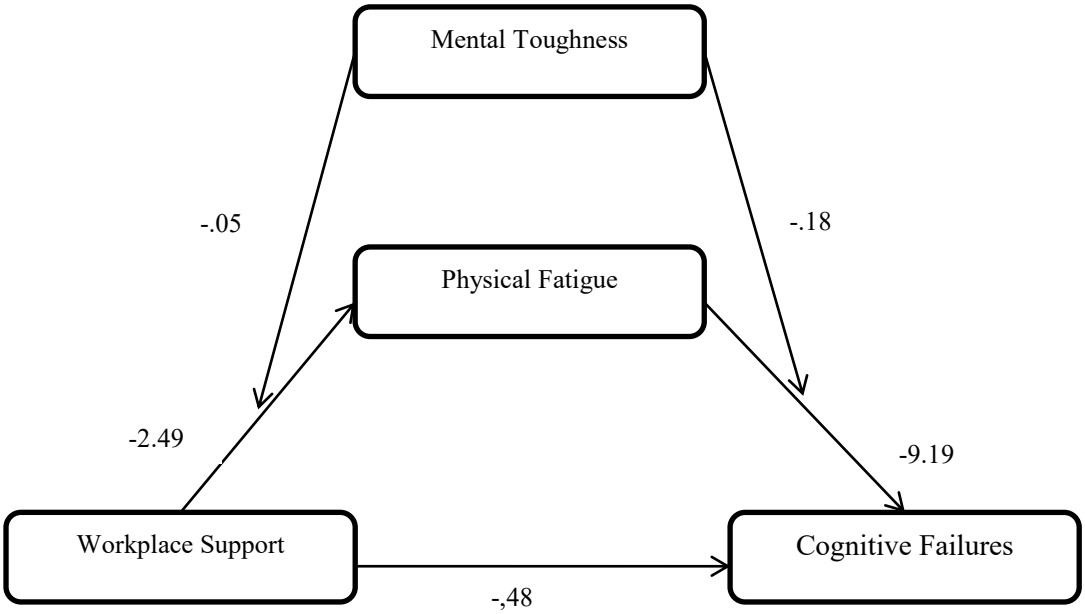

Figure 14. Moderation of Mental Toughness in Relationship Between Workplace Support and Cognitive Failures Through Physical Fatigue

The figure depicts the moderated mediation in which workplace support is taken as predictor variable, physical fatigue as mediator, and overall construct of cognitive failures as outcome variable. Following are the details of the analysis:

Table 34

Moderated-Mediation Effects of Workplace Support, Physical Fatigue, and Mental Toughness on Cognitive Failures (N = 406)

Predictors	R^2	*F*	*p*	Coefficients	LLCI	ULCI
Model 1	.18	4.83	.001			
Outcome Variable: Physical Fatigue						
Workplace support				-2.49	-.92	-4.07
Mental toughness				-.89	-.34	-1.45
Work support x Mental toughness				-.05	-.08	-.02
Model 2	.57	7.94	.001			
Outcome Variable: Cognitive Failures						
Work support				-.48	-.02	-.95
Physical Fatigue				9.19	17.18	.81
Mental toughness				-1.91	-2.93	-.90
Physical Fatigue x Mental toughness				-.18	-.03	-.33
Conditional Indirect Effect of Work Support on Attention Failures through Fatigue						
Moderator: Mental Toughness				Effect	LLCI	ULCI
Low mental toughness				-.02	-.03	.04
Medium mental toughness				-.39	-.73	-.10
High mental toughness				-1.21	-2.36	-.39

In table 34, Model 1 indicates the analysis of path *a*. Path *a* is moderated by mental toughness and indicates that workplace support, mental toughness, and interaction term between workplace support and mental toughness are significantly negatively predicting physical fatigue. All these three predictors are explaining 18 percent variance in construct of physical fatigue. Model 2 is presenting the analysis of path *b* of the model in which cognitive failures are predicted through workplace support, physical fatigue, mental toughness, and an interaction term between physical fatigue and mental toughness. Except physical fatigue, all other predictors are predicting cognitive failures significantly and negatively whereas, physical fatigue is

predicting cognitive failure significantly and positively. All these predictors are explaining 57 percent variance in outcome variable of cognitive failures.

The conditional indirect effects of workplace support on fatigue indicate that physical fatigue only mediates the relationship between workplace support and cognitive failures in group of employees who possess high and medium mental toughness and this relationship is non-significant for employees with low mental toughness. Thus; mental toughness is moderating this entire relationship.

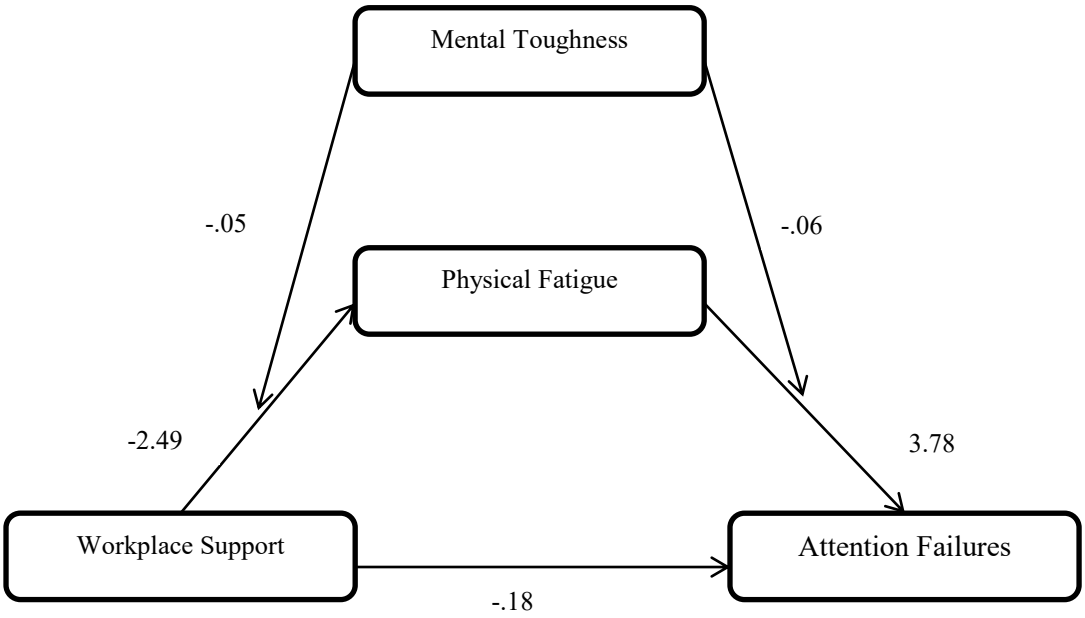

Figure 15. Moderation of Mental Toughness in Relationship Between Workplace Support and Attention Failures Through Physical Fatigue

In above mentioned figure, workplace support is taken as predictor, physical fatigue as mediator, attention failures as outcome variable and mental toughness as moderator. Rests of the details of the analysis are as given below:

Table 35

Moderated-Mediation Effects of Workplace Support, Physical Fatigue, and Mental Toughness on Attention Failures (N = 406)

Predictors	R^2	*F*	*p*	Coefficients	LLCI	ULCI
Model 1	.18	4.83	.001			
Outcome Variable: Physical Fatigue						
Workplace support				-2.49	.92	4.07
Mental toughness				-.89	.34	1.45
Work support x Mental toughness				-.05	-.08	-.02
Model 2	.33	7.94	.001			
Outcome Variable: Attention Failures						
Work support				-.18	.01	.36
Physical Fatigue				3.78	-6.24	-.08
Mental toughness				-.76	-1.14	-.38
Physical Fatigue x Mental toughness				-.06	.02	.11
Conditional Indirect Effect of Work Support on Attention Failures through Physical Fatigue						
Moderator: Mental Toughness				Effect	LLCI	ULCI
Low mental toughness				-.02	-.03	.08
Medium mental toughness				-.08	-.18	-.02
High mental toughness				-.31	-.68	-.09

Table 35 presents the mediation of physical fatigue between work support and attention failures as well as moderation of mental toughness on path *a* and path *b*. On path *a*, physical fatigue is outcome variable which is predicted through workplace support, mental toughness, and an interaction term between workplace support and mental toughness. All of these predictors are significantly negatively predicting physical fatigue. A significant interaction term of workplace support and mental toughness indicates that mental toughness is moderating the relationship between workplace support and physical fatigue. Model 2 is presenting the analysis of path *b* in which workplace support, physical fatigue, mental toughness, and an interaction

term between physical fatigue and mental toughness are predicting attention failures. Except physical fatigue, all other predictors are significantly negatively predicting attention failures; whereas physical fatigue is significantly positively predicting attention failures. Overall, these predictors are explaining 33 percent variance in attention failures. A significant interaction term between physical fatigue and mental toughness also indicates moderating role of mental toughness on path *b*.

Conditional indirect effects also indicate a significant mediating role of physical fatigue and significant moderating role of mental toughness. Analyses, further, indicates that the mediating role of physical fatigue between workplace support and attention failures is only significant for employees in medium and high mental toughness groups but it is non-significant for employees with low mental toughness.

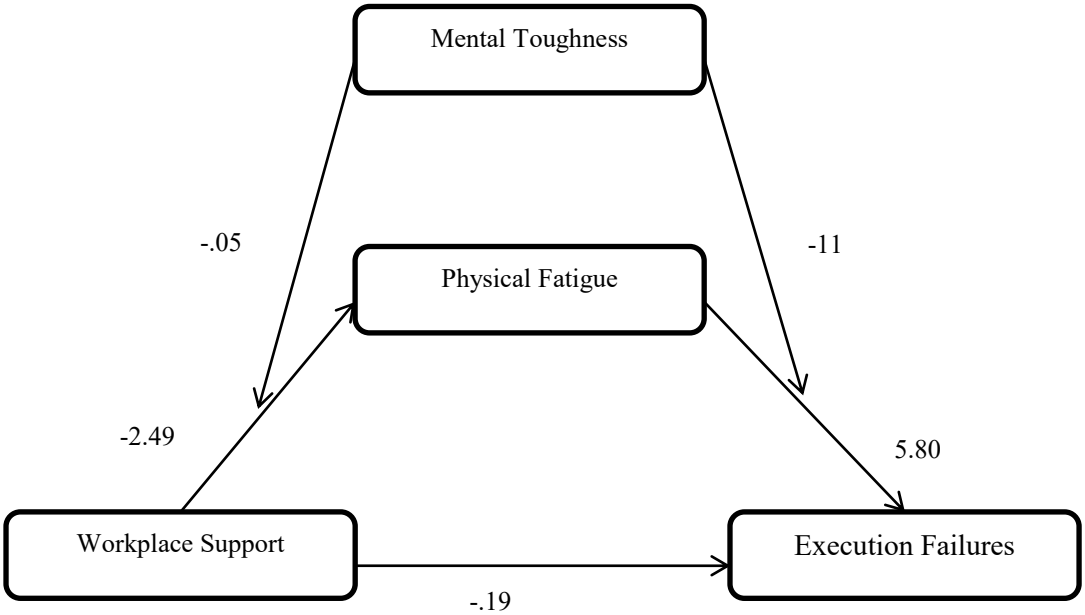

Figure 16. Moderation of Mental Toughness in Relationship Between Workplace Support and Execution Failures Through Physical Fatigue

The above mentioned figure is presenting the moderated mediation model in which workplace support is taken as predictor variable, physical fatigue as mediator, execution failures as outcome variable, and mental toughness as moderator on path *a* and path *b.*

Table 36

Moderated-Mediation Effects of Workplace Support, Physical Fatigue, and Mental Toughness on Execution Failures (N = 406)

Predictors	R^2	*F*	*p*	Coefficients	LLCI	ULCI
Model 1	.17	4.83	.001			
Outcome Variable: Physical Fatigue						
Workplace support				-2.49	.92	4.07
Mental toughness				-.89	.34	1.44
Work support x Mental toughness				-.05	-.08	-.02
Model 2	.22	4.81	.001			
Outcome Variable: Execution Failures						
Work support				-.19	-.02	-.40
Physical Fatigue				5.80	9.69	1.91
Mental toughness				-.88	-1.36	-.41
Physical Fatigue x Mental toughness				-.11	-.04	.18
Conditional Indirect Effect of Work Support on Execution Failures through Physical Fatigue						
Moderator: Mental Toughness				Effect	LLCI	ULCI
Low mental toughness				.01	-.03	.15
Medium mental toughness				-.13	-.27	-.02
High mental toughness				-.54	-1.01	-.23

Table 36 presents the mediation of physical fatigue between work support and execution failures as well as moderation of mental toughness on path *a* and path *b*. Path *a* is presenting the prediction of physical fatigue through workplace support, mental toughness, and an interaction term between workplace support and mental toughness. All of these predictors are significantly negatively predicting physical fatigue and explaining 17 percent variance in physical fatigue. On the other hand, path *b* is presenting the predicting role of workplace support, physical fatigue, mental toughness, and an interaction term between physical fatigue and mental toughness in which all predictors are significantly negatively predicting execution failures except

physical fatigue which is predicting execution failures significantly and positively. A significant term in path *a* and path *b* indicates the significant moderating role of mental toughness. Overall this model is explaining 22 percent variance in execution failures.

Conditional indirect effects of workplace support on execution failures indicate significant mediating role of physical fatigue in medium and high mental toughness group only and this mediating role is non-significant for employees in low mental toughness groups.

As it can be seen from above mentioned analyses that workplace support emerged as the only significant predict while using model number 58, alternative models were assessed while taking job control and job demands as predictors. In order to address the alternative model, model number 4 was assessed from Process 2.16.3. Model number 4 is a simple mediation model which involves one predictor variable, one outcome variable, and one mediator. The results of these mediation analyses are as follow:

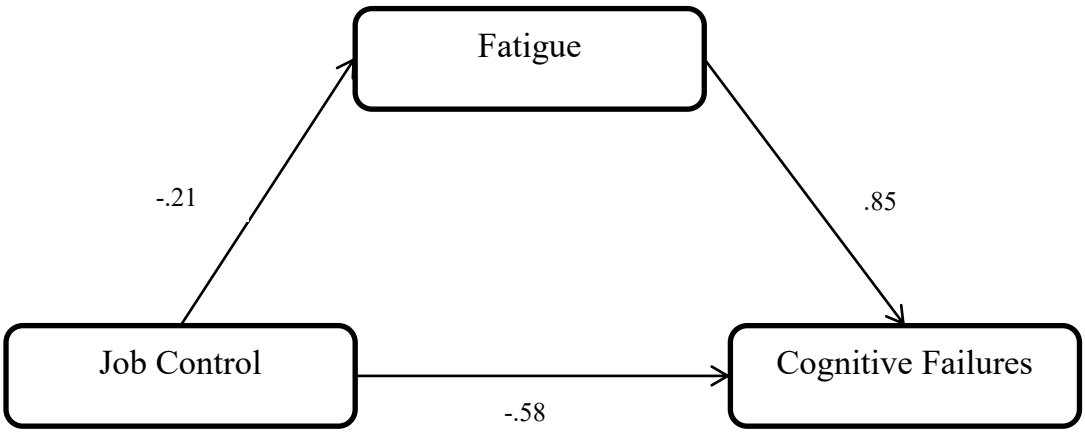

Figure 17. Mediation of Fatigue Between Job Control and Cognitive Failures

Table 37

Mediation of Fatigue Between Job Control and Cognitive Failures (N = 406)

Predictors	R^2	*F*	*p*	Coefficients	LLCI	ULCI
Model 1	.14	5.36	.021			
Outcome Variable: Fatigue						
Constant				12.95	9.72	16.17
Job Control				-.21	-.38	-.03
Model 2	.18	13.44	.001			
Outcome Variable: Cognitive Failures						
Constant				13.51	6.34	20.68
Fatigue				.85	.60	1.09
Job Control				-.58	.22	.93
Indirect Effect of Job Control on Cognitive Failures Through Fatigue						
				-.17	-.34	-.04

Table 37 indicates the mediation analysis in which job control is taken as predictor variable, fatigue as mediator, and cognitive failures as outcome variable. Model 1 indicates the prediction of mental fatigue through job control which indicates a significant negative prediction. In model 2, prediction of the construct of cognitive failures is determined through job control and fatigue. Results of model 2 indicate a significant positive prediction of cognitive failures through fatigue and a significant negative prediction through the construct of job control. Model 1 and model 2 explain 14 percent and 18 percent variance in cognitive failure; respectively. Moreover, the indirect effect of job control on cognitive failures through fatigue is significant that is, fatigue is mediating the relationship between both of the variables.

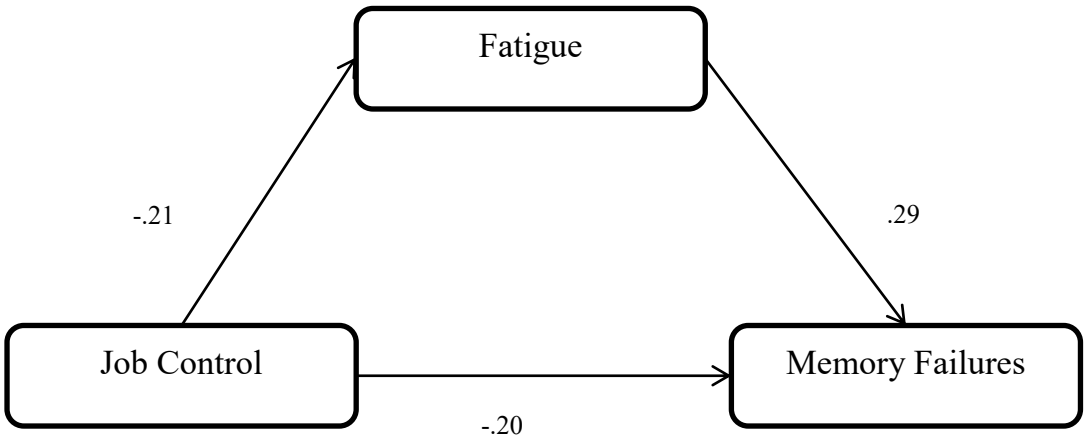

Figure 18. Mediation of Fatigue Between Job Control and Memory Failures

Table 38

Mediation of Fatigue Between Job Control and Memory Failures (N = 406)

Predictors	R^2	*F*	*p*	Coefficients	LLCI	ULCI
Model 1	.14	8.50	.001			
Outcome Variable: Fatigue						
Constant				13.08	10.4	15.82
Job Control				-.21	-.36	-.07
Model 2	.38	5.11	.001			
Outcome Variable: Memory Failures						
Constant				4.44	2.23	6.65
Fatigue				.29	.22	.36
Job Control				-.20	-.10	-.30
Indirect Effect of Job Control on Memory Failures Through Fatigue						
				-.16	-.11	-.02

Table 38 presents the simple mediation analysis in which job control is taken as predictor, fatigue as mediator, and memory failure as outcome variable. Model 1 indicates the prediction of fatigue through job control which indicates that job control is significantly negatively predicting fatigue. On the other hand, model 2 indicates the prediction of memory failures through job control and fatigue. Model 2, further, indicates that fatigue is significantly positively and job control is significantly

negatively predicting memory failures. Indirect effect model is indicating the mediation of fatigue in relationship between job control and memory failures and same direction of LLCI and ULCI indicate that this mediating relationship is significant for the model.

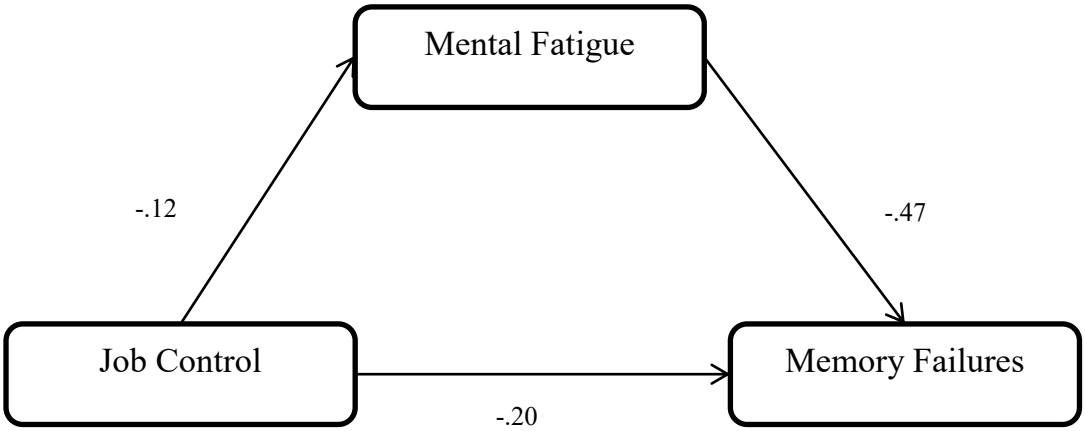

Figure 19. Mediation of Mental Fatigue Between Job Control and Memory Failures

Table 39

Mediation of Mental Fatigue Between Job Control and Memory Failures (N = 406)

Predictors	R^2	*F*	*p*	Coefficients	LLCI	ULCI
Model 1	.18	14.80	.001			
Outcome Variable: Mental Fatigue						
Constant				5.48	4.31	6.65
Job Control				-.12	-.18	-.05
Model 2	.27	16.80	.001			
Outcome Variable: Memory Failures						
Constant				5.70	3.40	7.20
Mental Fatigue				.47	.29	.64
Job Control				-.20	.08	.30
Indirect Effect of Job Control on Memory Failures Through Fatigue						
				-.16	-.10	-.03

Table 39 indicates the mediation analysis in which job control is taken as predictor variable, mental fatigue as mediator, and memory failures as outcome

variable. Model 1 indicates the analysis of prediction of mental fatigue through job control in which job control is significantly negatively predicting mental fatigue. In model 2, mental fatigue and job control are predicting memory failures in which mental fatigue is significantly positively and job control is significantly negatively predicting memory failures. Indirect effect of job control on memory failures, through mental fatigue, indicates that mediating effect of mental fatigue is significant for this model.

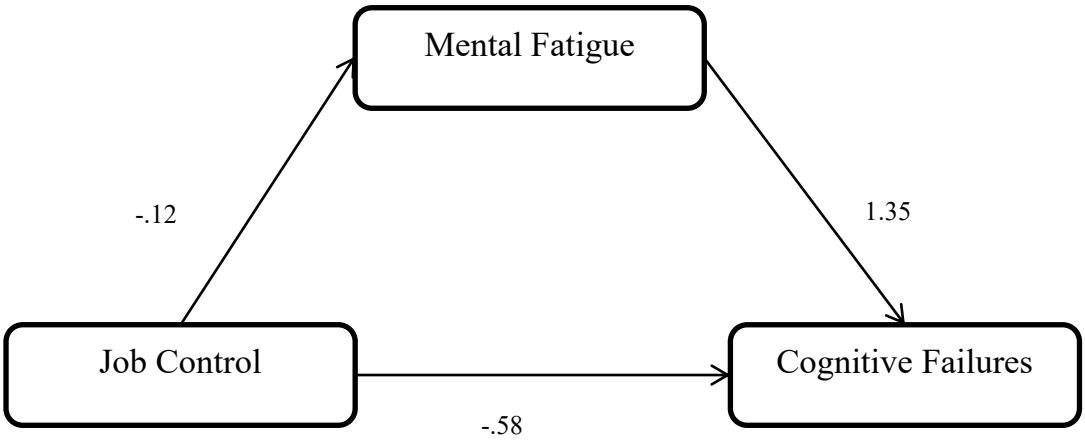

Figure 20. Mediation of Mental Fatigue Between Job Control and Cognitive Failures

Table 40

Mediation of Mental Fatigue Between Job Control and Cognitive Failures (N = 406)

Predictors	R^2	*F*	*p*	Coefficients	LLCI	ULCI
Model 1	.19	10.42	.001			
Outcome Variable: Mental Fatigue						
Constant				5.53	4.16	6.91
Job Control				-.12	-.19	-.05
Model 2	.29	12.00	.001			
Outcome Variable: Cognitive Failures						
Constant				17.01	9.50	24.52
Mental Fatigue				1.35	.74	1.95
Job Control				-.58	.19	.94
Indirect Effect of Job Control on Cognitive Failures Through Fatigue						
				-.17	-.33	-.06

Table 40 presents the results of mediation analysis in for which mental fatigue is taken as a mediator in relationship between job control and cognitive failures. Model 1 indicates prediction of mental fatigue through job control indicating job control as a significant negative predictor of mental fatigue. Model 2 presents the results of path *b* indicating mental fatigue as a significant positive and job control as a significant negative predictor of cognitive failures. Overall, model 1 and model 2 are explaining 19 percent and 29 percent variance in outcome variable of cognitive failures; respectively. In indirect analysis of the path, the values of LLCI and ULCI indicate that mental fatigue is mediating the path between job control and cognitive failures.

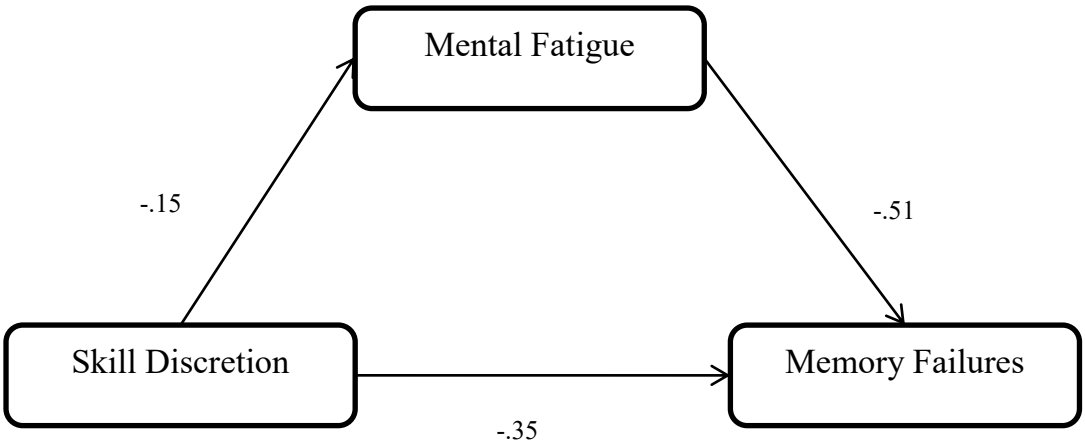

Figure 21. Mediation of Mental Fatigue Between Skill Discretion and Memory Failures

Table 41

Mediation of Mental Fatigue Between Skill Discretion and Memory Failures (N = 406)

Predictors	R^2	*F*	*p*	Coefficients	LLCI	ULCI
Model 1	.13	4.43	.001			
Outcome Variable: Mental Fatigue						
Constant				5.10	3.26	6.10
Skill Discretion				-.15	-.28	-.01
Model 2	.27	12.81	.001			
Outcome Variable: Memory Failures						
Constant				4.38	.99	7.75
Mental Fatigue				.51	.29	.74
Skill Discretion				-.35	-.11	-.59
Indirect Effect of Job Control on Memory Failures Through Fatigue						
				-.17	-.18	-.00

Table 41 indicates the mediation analysis in which skill discretion is taken as predictor variable, mental fatigue as mediator, and memory failures as outcome variable. Model 1 indicates the prediction of mental fatigue through skill discretion

which indicates a significant negative prediction. In model 2, prediction of memory failures is determined through mental fatigue and skill discretion. Results of model 2 indicate a significant positive prediction for memory failures through mental fatigue and a significant negative prediction through skill discretion. Moreover, the indirect effect of skill discretion on memory failures through mental fatigue is significant that is, mental fatigue is mediating the relationship between both of the variables.

Results of Hypotheses on Group Differences

Table 42

Mean Differences on Gender Among all Study Variables (N = 406)

Variables	Male (*N* = 335)		Female (*N* = 71)		*t*(403)	*p*	*95%CI*		Cohen's *d*
	M	*SD*	*M*	*SD*			*LL*	*UL*	
JD	15.82	2.09	14.63	2.40	4.24	.001	.64	1.74	.53
JC	18.96	3.36	17.60	3.46	3.07	.002	.49	2.22	.40
Skill Disc	13.27	2.12	12.90	1.97	1.34	.17	-.16	.90	-
Dec Auth	5.69	1.93	4.70	1.98	3.90	.001	.49	1.48	.09
WS	17.41	3.89	17.98	4.94	-1.06	.28	-1.62	.48	-
CF	31.85	10.52	28.80	9.79	2.24	.02	.38	5.72	.30
Memory	11.02	4.01	9.61	3.63	2.71	.01	.38	2.41	.37
Attention	10.71	3.93	9.84	3.68	1.71	.08	-.12	1.87	-
Execution	10.11	4.05	9.33	4.22	1.46	.14	-.26	1.83	-
Fatigue	8.99	5.16	9.49	4.63	-.74	.45	-1.79	.80	-
PF	5.76	3.70	6.30	3.43	-1.14	.25	-1.48	.39	-
MF	3.23	2.26	3.18	1.76	.17	.86	-.51	.61	-
MT	62.11	10.38	56.59	4.93	4.38	.001	3.04	8.00	.68

Note. JD = Job Demands, JC = Job Control, Skill Disc = Skill Discretion, Dec Auth = Decision Authority, WS = Work Support, FS = Family Support, CF = Cognitive Failures, MF = Mental Fatigue, PF = Physical Fatigue, MT = Mental Toughness.

Table 42 indicates the mean gender differences on all study variables. Results have indicated significant gender differences on variables of job demands, job control and its subscale of decision authority, cognitive failures and its subscale of memory failure, as well as on mental toughness. Male employees are scoring significantly higher in case of job demands, job control and its subscale of decision authority, cognitive failures and its subscale of memory failure, as well as mental toughness. All of the results are significant at $p<.001$ and $p<.01$.

Table 43

Mean Differences on Job Positions of Employees Among all Study Variables (N = 406)

Variables	Managers (*N* = 151)		Subordinates (*N* = 255)		*t*(404)	*p*	*95%CI*		Cohen's *d*
	M	*SD*	*M*	*SD*			*LL*	*UL*	
JD	16.13	1.89	15.32	2.31	3.66	.001	.37	1.25	.38
JC	20.02	2.89	17.96	3.46	6.16	.001	1.40	2.72	.64
Skill Disc	13.79	1.86	12.86	2.16	4.43	.001	.52	1.35	.46
Dec Auth	6.23	1.79	5.10	1.95	5.80	.001	.74	1.51	.60
WS	17.85	3.88	17.29	4.22	1.34	.18	-.26	1.39	-
CF	30.67	9.88	31.72	10.74	-.98	.32	-3.16	1.05	-
Memory	10.85	3.84	10.74	4.05	-.27	.78	-.69	.91	-
Attention	10.21	3.62	10.78	4.04	-1.41	.15	1.35	.21	-
Execution	9.61	3.93	10.21	4.17	-1.42	.15	-1.42	.26	-
Fatigue	8.84	5.22	9.22	4.98	-.74	.45	-1.41	.64	-
PF	5.77	3.59	5.90	3.70	-.35	.72	-.87	.60	-
MF	3.07	2.23	3.32	2.15	-1.12	.26	-.69	.18	-
MT	60.89	9.82	61.31	9.92	.41	.68	-2.40	1.58	-

Note. JD = Job Demands, JC = Job Control, Skill Disc = Skill Discretion, Dec Auth = Decision Authority, WS = Work Support, FS = Family Support, CF = Cognitive Failures, MF = Mental Fatigue, PF = Physical Fatigue, MT = Mental Toughness.

Table 43 indicates the differences on study variables on basis of job positions that is; managerial and subordinate job positions. The results of the analysis indicate that there are significant differences between managers and subordinates on variables of job demands, job control and its dimensions of skill discretion and decision authority where managers are scoring significantly higher on these study variables.

Table 44

Mean Differences on Marital Status Among all Study Variables (N = 406)

Variables	Single (N = 175)		Married (N = 235)		t(403)	p	*95%CI*		Cohen's d
	M	*SD*	*M*	*SD*			*LL*	*UL*	
JD	15.14	2.41	15.97	1.95	-3.81	.001	-1.25	-.40	.38
JC	18.71	3.24	18.74	3.55	-.08	.93	-.70	.64	-
Skill Disc	13.18	2.19	13.21	2.03	-.16	.87	-.44	.38	-
Dec Auth	5.53	1.79	5.52	2.09	.02	.97	-.38	.39	-
WS	17.71	4.08	17.34	4.09	.89	.37	-.43	1.17	-
CF	32.65	10.46	30.35	10.36	2.20	.02	.24	4.35	.22
Memory	11.00	4.08	10.63	3.89	.91	.36	-.41	1.14	-
Attention	11.10	3.92	10.15	3.84	2.43	.01	.18	1.71	.24
Execution	10.54	4.00	9.56	4.11	2.41	.01	.18	1.79	.24
Fatigue	9.38	5.12	8.87	5.02	1.01	.31	-.48	1.51	-
PF	6.06	3.66	5.71	3.66	.95	.34	-.37	1.07	-
MF	3.32	2.21	3.16	2.16	.75	.45	-.26	.59	-
MT	61.19	8.97	61.19	10.48	-.00	.99	-1.94	1.94	-

Note. JD = Job Demands, JC = Job Control, Skill Disc = Skill Discretion, Dec Auth = Decision Authority, WS = Work Support, FS = Family Support, CF = Cognitive Failures, MF = Mental Fatigue, PF = Physical Fatigue, MT = Mental Toughness.

Table 44 presents the mean differences of single and married individuals on all the study variables. Analysis indicates significant differences between single and married individuals on variables of job demands, cognitive failures and its subscales of attention failure and execution failure. Married individuals score significantly higher on job demands as compared to single individuals whereas; single individuals scored higher on attention and execution failures when compared to married individuals. Results are significant at $p<.001$, $p<.05$

Table 45

Mean Differences on Type of Organization Among all Study Variables (N = 406)

Variables	National (*N* = 224)		Multinational (*N* = 182)		*t* (403)	*p*	*95%CI*		Cohen's *d*
	M	*SD*	*M*	*SD*			*LL*	*UL*	
JD	15.18	2.44	16.15	1.71	-4.50	.001	-1.38	-.54	.46
JC	18.10	3.58	19.49	3.02	-4.16	.001	-2.04	-.73	.42
Skill Disc	12.82	2.09	13.68	2.01	-4.18	.001	-1.26	-.45	.42
Dec Auth	5.28	2.03	5.81	1.85	-2.72	.007	-.91	-.14	.27
WS	17.47	4.70	17.56	3.21	-.19	.84	-.88	.72	-
CF	29.79	9.94	33.20	10.77	-3.30	.001	-5.43	-1.37	.33
Memory	10.26	3.89	11.41	4.00	-2.91	.004	-1.92	-.37	.29
Attention	10.00	3.50	11.25	4.24	-3.24	.001	-2.00	-.49	.32
Execution	9.53	3.98	10.53	4.16	-2.48	.01	-1.80	-.20	.24
Fatigue	8.92	4.68	9.28	5.51	-.70	.48	-1.35	.63	-
PF	5.75	3.56	5.98	3.78	-.61	.53	-.94	.49	-
MF	3.16	1.93	3.29	2.46	-.60	.54	-.56	.29	-
MT	57.21	7.38	65.99	10.40	-9.92	.001	-10.51	-7.03	.97

Note. JD = Job Demands, JC = Job Control, Skill Disc = Skill Discretion, Dec Auth = Decision Authority, WS = Work Support, CF = Cognitive Failures, MF = Mental Fatigue, PF = Physical Fatigue, MT = Mental Toughness.

Table 45 depicts the results of t-test which was conducted on types of organizations i.e., organizations working at national; and international levels. The results indicate that both of the groups are scoring significantly different on variables of job demands, job control and its subscales, cognitive failures and its subscales, as well as on mental toughness. On all of these variables, employees working in international organizations are scoring significantly higher than employees working in national organizations. Results are significant at $p<.001$ and $p<.05$.

Table 46

One Way ANOVA and Post HOC Analysis of Departments With all Study Variables (N = 406)

	Sales/Marketing (N = 188)		*Production (N = 127)*		*HR (N = 91)*						95% CI
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	i>j	MD = i>j	LL – UL
JD	16.15	1.77	14.55	2.33	16.01	2.29	24.55	.000	1>2	1.6***	1.04– 2.16
									3>2	1.46***	.787 – 2.13
JC	19.82	2.76	16.40	3.41	19.69	3.03	53.67	.000	1>2	3.41***	2.51 – 4.23
									3>2	3.28***	2.30 – 4.26
Skill Disc	13.77	1.78	11.93	2.04	13.81	2.02	40.25	.000	1>2	1.83***	1.31 – 2.35
									3>2	1.87***	1.25 – 2.49
Dec Auth	6.05	1.70	4.47	1.96	5.87	1.94	30.02	.000	1>2	1.58***	1.08 – 2.07
									3>2	1.40***	.81 – 2.00
WS	17.54	3.28	16.36	5.11	19.07	3.47	12.23	.000	1>2	1.18*	.10 – 2.26
									3>2	2.71***	1.42 – 4.00
									3>1	1.52**	.32 – 2.73
CF	35.00	9.85	29.42	9.50	26.37	10.26	27.03	.000	1>2	5.58***	2.92 – 8.23
									1>3	8.63***	5.67 – 11.58
Memory	12.13	3.76	9.98	3.87	9.08	3.64	24.05	.000	1>2	2.14***	1.12 – 3.16
									1>3	3.04***	1.91 – 4.17
Attention	11.64	3.90	10.06	3.37	9.02	3.94	16.63	.000	1>2	1.58**	.57 – 2.60
									1>3	2.62***	1.49 – 3.75

Continued…

	Sales/Marketing (N = 188)		*Production (N = 127)*		*HR (N = 91)*						95% CI
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	i>j	MD = i>j	LL – UL
Execution	11.22	4.06	9.37	3.59	8.26	4.03	19.72	.000	1>2	1.84***	.78 – 2.90
									1>3	2.95***	1.78 – 4.13
Fatigue	9.53	5.52	9.23	4.71	7.93	4.40	3.18	.043	1>3	1.60*	.08 – 3.11
PF	6.28	3.85	5.73	3.66	5.16	3.13	2.99	.051	1>3	1.12*	.02 – 2.21
MF	3.25	2.41	3.50	1.95	2.76	1.91	3.06	.048	2>3	.73*	.03 – 1.43
MT	63.77	11.30	56.77	6.15	61.84	8.84	21.31	.000	1>2	7.00***	4.46 – 9.54
									3>2	5.07***	2.03 – 8.11

Note. JD = Job Demands, Skill Disc = Skill Discretion, Ded Auth = Decision Authority, WS = work support, FS = family support, PF = physical fatigue, MF = mental fatigue**,** MT = Mental Toughness

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 46 indicates the group differences of sales/marketing, production, and HR departments on all study variables. Results indicate that there are significant difference among employees of these departments on all the scales and their subscales. Such as, employees in sales/marketing department are experiencing highest level of job demands followed by HR and production department. Similar trend can be observed in variable of job control and its subscales, and mental toughness. Additionally, work support was highest in employees from HR department followed by employees in sales/marketing and production department. Sales/marketing department employees have highest scores on cognitive failures and all of its subscales. Similar data trends can be observed in variable of fatigue and its subscale of physical fatigue where sales/marketing department employees scored higher than HR department employees whereas, production employees scored significantly higher than HR department employees on subscale of mental fatigue. All of these results are significant at $p<.05$, $p<.01$, and $p<.001$.

Table 47

One Way ANOVA and Post HOC Analysis of Job Types With all Study Variables (N = 406)

	Active (*N* = 96)		Passive (*N* = 150)		High Strain (*N* = 65)		Low Strain (*N* = 93)						
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	i>j	MD = i>j	95% CI LL - UL
JD	17.62	.73	14.10	1.86	17.60	.70	14.61	1.73	163.33	.000	1>2	3.51***	3.01 – 4.01
											1>4	3.01***	2.45 – 3.56
											3>2	3.49***	2.92 – 4.06
											3>4	2.98***	2.36 – 3.60
											4>2	.50*	.00 – 1.01
JC	21.76	1.33	15.75	2.41	16.80	2.00	21.69	1.27	302.30	.000	1>2	6.00***	5.36 – 6.64
											1>3	4.96***	4.17 – 5.74
											3>2	1.04**	.31 – 1.77
											4>2	5.95***	5.29 – 6.59
											4>3	4.89***	4.10 – 5.69
Skill Disc	14.75	1.11	11.67	1.94	12.40	1.77	14.65	.99	112.38	.000	1>2	3.07***	2.55 – 3.60
											1>3	2.35***	1.70 – 2.99
											3>2	.72**	.12 – 1.32
											4>2	2.98***	2.45 – 3.51
											4>3	2.25***	1.60 – 2.90
Dec Auth	7.01	1.02	4.08	1.58	4.40	1.67	7.04	1.00	146.54	.000	1>2	2.93***	2.64 – 3.39
											1>3	2.61***	2.04 – 3.17
											4>2	2.96***	2.49 – 3.42
											4>3	2.64***	2.07 – 3.21
WS	17.91	4.00	17.27	4.31	16.40	4.02	18.25	3.75	3.14	.02	4>3	1.85*	.15 – 3.55

Continued…

	Active (N = 96)		Passive (N = 150)		High Strain (N = 65)		Low Strain (N = 93)						
												MD =	95% CI
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*	i>j	i>j	LL - UL
CF	31.00	11.22	30.00	9.60	35.50	11.81	30.86	9.37	4.45	.004	3>1	4.51*	.22 – 8.79
											3>2	5.50**	1.54 – 9.46
											3>4	4.64*	.33 – 8.95
Memory	11.09	4.25	10.10	3.90	11.86	4.12	10.70	3.56	3.28	.02	3>2	1.75*	.24 – 3.26
Attention	10.33	4.32	10.34	3.54	11.93	4.55	10.22	3.33	3.24	.02	3>1	1.60*	.01 – 3.21
											3>2	1.59*	.11 – 3.07
											3>4	1.71*	.09 – 3.32
Execution	9.57	4.00	9.55	3.60	11.70	5.13	9.92	3.87	4.84	.003	3>1	2.13**	.46 – 3.80
											3>2	2.15**	.60 – 3.70
											3>4	1.78*	.09 – 3.46
Fatigue	8.21	4.77	9.35	4.68	11.03	6.13	8.31	4.77	5.15	.002	3>1	2.81**	.74 – 4.87
											3>4	2.72**	.63 – 4.79
PF	5.48	3.31	5.86	3.38	7.07	4.56	5.46	3.58	3.13	.02	3>1	1.58*	.08 – 3.09
											3>4	1.61*	.10 – 3.12
MF	2.72	2.13	3.48	2.17	3.95	2.45	2.84	1.84	5.90	.001	2>1	.75*	.03 – 1.48
											3>1	1.22**	.33 – 2.11
											3>4	1.10**	.20 – 1.99
MT	61.62	10.37	61.01	9.69	60.49	10.27	61.37	9.57	.19	.90	-	-	-

Note: JD = Job Demands, JC = Job Control, Skill Disc = Skill Discretion, Dec Auth = Decision Authority, WS = Work Support, PF = Physical Fatigue, MF = Mental Fatigue, MT = Mental Toughness

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 47 indicates the group differences on basis of job types. Results indicate that employees in Active jobs have significantly higher scores than employees in other groups on variable of job demands, job control, and its dimensions. On variable of work support, employees in low strain jobs have attained highest score as compared to employees in other job group. Employees in high strain jobs have significantly higher scores than all other groups on variable of cognitive failures and its dimensions of attention, memory, and execution failures. Same kind of pattern can also be observed with reference to the variable of fatigue and its dimensions of mental and physical fatigue where employees in high strain jobs have scored significantly higher than any other group. Group differences are non-significant on variable of mental toughness. All other results were significant at $p<.05$, $p<.01$, and $p<.001$.

DISCUSSION

Discussion

The current research was undertaken in order to investigate the interplay of work characteristics (job demands, job control, and work support), workplace cognitive failures, fatigue, and mental toughness among employees of pharmaceutical companies. The study was further intended at exploring the moderating role of mental toughness and mediating role of fatigue in relationship between job characteristics (job demands, job control, and work support) and workplace cognitive failure where job demands, job control, and work support were taken as predictor variables and workplace cognitive failure was taken as outcome variable.

The research was primarily based on job demand-control-support model. The direct effect model was used in the research that is; independent effects of job demands, job control, and work support were examined for workplace cognitive failures. In order to cater a variety of workplace cognitive failures; attention failure, memory failure, and action execution failure were made part of the research. In addition to testing the direct relationships among study variables, indirect relationships were also examined. Thus, moderating role of mental toughness and mediating role of fatigue, in relationship between job demands, job control, work support and their resulting cognitive failures were also analysed.

While investigating the mediating role of fatigue, two dimensions of fatigue were included in the study namely, physical fatigue and mental fatigue. This bifurcation was made in order to fully understand the mechanism from predicting variables to outcome variables and comparative role of physical and mental fatigue in predicting workplace cognitive failures.

Research was conducted in form of two distinct studies. Study-I was comprised of further three phases. These phases were designed to select and estimate the relevance of study variables with reference to pharmaceutical companies including selection of relevant instruments, translation and adaptation of instruments, and empirical evaluation of the translated and adapted instruments.

For the Study- II, the primary objective was hypothesis testing in which three different types of hypotheses were generated. These three types of hypotheses included hypotheses for direct effects, indirect effects, and group differences. A purposive sample of 406 pharmaceutical employees was taken and any employee with physical or mental disability, for which they were taking medicine, was not made part of the sample.

Direct Relationships

In order to measure the direct effects of predicting variables on outcome variables, hierarchical regression analyses were carried out. It was hypothesized that job demand and fatigue and its subscales will positively predict cognitive failures and its subscales. Additionally, it was also hypothesized that job control and its subscales, work support, and mental toughness will negatively predict cognitive failures and its subscales.

Four regression analyses were conducted where overall construct of cognitive failures and its dimensions of attention, memory, and execution failures were taken as outcome variables, separately. Hierarchical regression analysis technique was used in order to control the variance of demographic variables on outcome variables. First analysis indicated that physical fatigue and mental fatigue were significant positive predictors, whereas mental toughness was significant negative predictor for overall

construct of cognitive failures (see Table 28). With reference to attention failures subscale, physical and mental fatigue were significant positive predictors, whereas workplace support was significant negative predictor (see Table 29). For memory failures, physical fatigue turned out to be significant positive predictor and mental toughness remained significant negative predictor (see Table 30). Similarly, physical and mental fatigue remained significant positive predictors for execution failures as well, whereas mental toughness was the significant negative predictor (see Table 31).

Results of these regression analyses were in line with the hypotheses of the study as well as with past research which was conducted on positive relationship between fatigue and cognitive failures. Research indicated that fatigue, in an individual, leads to reduction in alertness due to which the individual's awareness of the surrounding reduces significantly. In their research, Lim and Chai (2015) concluded that fatigue can disrupt the cognitive processes of the fatigued individuals drastically. Along with decreasing an individual's alertness, fatigue disrupts the decision making, perception or judgment, motor skills, as well as reflexes of the fatigued person. Decline in motor skills and reflexes are two reasons for vulnerability of action execution failures among individuals. Another research (Tanaka, 2015) indicated that mental fatigue can also bring about cognitive failures due to over-activation of the brain which, in turn, leads to decline in cognitive performance of the individual. The research was a Magnetoencephalography study and impact of mental fatigue was inferred through decrease in the level of alpha frequency band power in visual cortex area of the brain. Over-activation of the visual cortex resulted in decreasing in alpha frequency band power which led to cognitive impairment of the participants after performing 30 minutes fatigue-inducing task trials.

Mental fatigue does have the potential to deteriorate the attention capacities of an individual. Another research indicates that working on a 3 hours long visual attention task may create mental fatigue which can lead to increment of false alarms, reaction time, and misses during experiments resulting in decrement in performance of the individuals (Boksem et al., 2005). Research further indicated an increase in distraction towards irrelevant stimuli that is; the more an individual is mentally fatigued, the more he/she will be distracted towards irrelevant stimuli during performance of the task.

Mental fatigue not only affects the attention and perception related cognitive processes, it also increases the individual's vulnerability for experiencing action execution failures. Kato et al. (2009) demonstrated that a 60 minute long GO/NoGo visual task requiring speed and accuracy of the responses resulted in mental fatigue leading to increase in reaction time and errors. Additionally, mental fatigue disrupted the response execution intensity as well as response inhibition of the research participants who were healthy adults.

Previous literature also provides links between physical fatigue and various types of cognitive failures. For example, research on physical fatigue indicated difficulties in short term memory, tracking, and perceptual discrimination after two hours on a treadmill under a euhydrated condition. In the same research, one group was hydrated later, during the experiment, and other was kept non-hydrated and both groups, again, reported impairment in short term memory and choice reaction time after going through 30 minutes of physical exertion (Cian, Koulmann, Barraud, Raphel, Jimenez, & Melin, 2000) which indicates that physical fatigue affects the cognitive processes of individuals whether they are hydrated or euhydrated. The

research was replicated and modified by Cian et al. (2001) and results indicated impairment in perceptual discrimination and short term memory in both hydrated and non-hydrated groups referring to independent effect of physical fatigue on cognitive functioning.

Hierarchical regression analyses indicated mental toughness as a negative predictor of cognitive failures and its subscales. The term of mental toughness inherently indicates the availability of superior mental or cognitive resources. Results of mental toughness, being a negative predictor of memory and action execution failures, has also been indicated in the previous literature. A research by Dewhurst et al. (2012) on directed forgetting paradigm indicated better attention and memory of individuals who were higher on mental toughness. In their research, individuals with different levels of mental toughness were given two lists of words to remember and then they were directed to forget words from list 1. Later on, a surprise memory test included items from both lists and mentally tougher individuals were better able to recall items from list 2. Researchers concluded that this was due to the ability of cognitive inhibition, focus on task in hand, and refraining attention from irrelevant stimuli. Thus, individuals with high mental toughness make lesser mistakes in terms of attention and memory based tasks.

Delaney et al. (2015) furthered the research and concluded that undergraduates, who scored higher on mental toughness and conscientiousness from Big Five Inventory, had ability to alter their encoding strategies and focusing on relevant information while forgetting irrelevant information which enhanced their memory. Previous research clearly indicates the attributes through which mentally tough people are less likely for making execution errors. For example; Cowden et al.

(2014), in their research, indicated the presence of learned resourcefulness and abilities required in decision making process, behavioral and emotional control, and coping with stress. Gerber et al. (2015) also concluded that people with high mental toughness show lesser cognitive weariness, physical fatigue, and emotional exhaustion which hints towards their better performance with reference to action execution.

Workplace support emerged as a significant negative predictor of cognitive failures. A longitudinal research on job demand-control-support model and cognitive performance in middle aged Brazilian adults indicated that presence of higher levels of demands at workplace resulted in impaired cognitive functioning in adults. Cognitive functioning was assessed through tests incorporating verbal fluency, recall tests, and trail making task and adults working in stressful environments performed poorly on the said task. Research, additionally, concluded that social support mitigated the relationship between stress and the cognitive performance (De Souza-Talarico, 2020). Another research, by Stenfors et al. (2013), explored the relationship between work conditions and cognitive complaints through a longitudinal study. The results of their cross sectional analyses indicated that social support, over-qualification, and provision of good resources at workplace were negatively correlated with cognitive complaints. Additionally, the results of longitudinal analyses indicated that social support and skill discretion subscale of job control negatively predicted future cognitive complaints, whereas quantitative job demands and decision authority was positively predicting cognitive complaints.

Overall, it was indicated through the analyses that workplace support, job control and its subscales, and mental toughness were significant predictor variables

while predicting outcome variable of cognitive failures but job demands did not appear to be linked to cognitive failures and its subscales. Thus, it can be concluded that workplace support and job control were more relevant predictors for current study on pharmaceutical companies. Recent research indicates the evaluation of multilevel predictors to better understand the outcomes at workplaces. For example, low social support by the supervisor at workplace, over-commitment at work, and presenteeism during sickness are some of the significant risk factors of fatigue at workplace. Additionally, low social support from colleagues and working in non-surgical wards were two specific predictors for high strain and fatigue in the research conducted by Daouda et al. (2022).

Indirect Relationships

In order to determine the indirect effect of fatigue and mental toughness in relationship between job characteristics (job demands, job control and workplace support) and cognitive failures, comprehensive moderated mediation analyses were conducted. Model number 58 was chosen to conduct moderated mediation analysis from Marco Process 2.16.3. This model allowed one predictor variable, one outcome variable, one mediating variable, and one moderating variable. The important thing to note is that moderator in model number 58 moderated the path *a* as well as path *b,* simultaneously. A number of moderated mediation analyses were conducted and significant findings were reported. Results of the moderated mediation models indicated certain interesting findings. For example, workplace support emerged as the only significant predictor while using model 58.

As limited information regarding the role of predictors, in the research, could be acquired while using model number 58, alternative models were also tested e.g.,

model number 4 which determined mediating role of fatigue and its subscales in relationship between work characteristics and the resulting cognitive failures. Results of model 4 indicated relationship between job demands, job control and its subscale of skill discretion and outcomes variable of cognitive failures along with its subscale of memory failures which was mediated by fatigue and its dimensions. Previous literature also supports these findings.

Previous research indicates that job characteristics may play a significant role in producing fatigue in employees (Fan & Smith, 2017a). Though, most of the research in the past has emphasized the physical aspects of jobs which may lead to fatigue, yet a recent research has indicated that lack of social support and job control are equally potential factors to cause fatigue in employees (Fan & Smith, 2017b). Though this research does not indicate the paths through which lack of social support and job control can lead to fatigue yet, it provides a potential research question for further exploration.

Once employees develop fatigue at their workplace, they become vulnerable to commit cognitive failures due to their fatigue and this connection is supported by the past research as well which indicates that stress provoking job factors may cause fatigue and cognitive failures in employees (Homayooni et al., 2015). Results of this study indicated a positive correlation and prediction of fatigue and occupational cognitive failures through stressful work environment. Similar findings were also reported by Fan and Smith (2020) while conducting research on employees of a train operating company. The results indicated that occupational fatigue resulted in impaired cognitive performance of the employees where cognitive impairment was measured through tasks of visual search and logical reasoning. In their research,

visual search task, comprised of an activity in which an individual needed to look at a set of 60 letters and to quickly respond to the target letter if target letter, was from set of those 60 letters. On the other hand, logical reasoning task was intended to make an individual choose between two options quickly and accurately. Thus, both of the tasks involved attention, memorization, and execution control and it can be concluded that the results of current study are in line with results of past literature.

With reference to physical fatigue in model 58, it was found that physical fatigue mediated the relationship between workplace support and resulting cognitive failures including attention and execution failures in current research. In a research by Weigl et al. (2016), which was conducted on supervisory support, work overload, burnout, and depression, one of the conclusions was drawn that low supervisory support and high workload were significant predictors of exhaustion among two samples of nurses. Another study indicates that support from supervisor or the nearest superior is directly linked with lack of physical exhaustion, energy, and motivation. This study further suggested that social support at workplace is a significant moderator for reducing physical fatigue in face of work-life conflict. This research indicates towards direct relationship between supervisory support and physical exhaustion which can be used for reference point for results of current research as well.

Not only lack of work support can cause physical fatigue in employees but physical fatigue may, in turn, bring about adverse cognitive consequences as well. Research (Giulio, Maganaris, Baltzopoulos, & Loram, 2009) indicates that even the simplest physical tasks, like standing and walking, need some of the attentional resources and a combination of physical and cognitive task may leave lesser cognitive

resources for the cognitive task (when cognitive task is performed as secondary task). Thus, depletion of physical resources may lead to depletion of cognitive resources as well.

With reference to effects of physical fatigue on execution cognitive failures, Fery et al. (1997) concluded that physical exertion affected decision reaction time of participants of their experimental study for which they had recruited 13 healthy adults who needed to perform decision tasks while pedaling. It was also concluded that decision reaction time was most affected when participants were going through progressive pedaling session instead of constant pedaling session. Similarly, Zhang et al. (2015) explored the influence of fatigue on the construction workers and concluded that the workers who felt tired or exhausted were more likely to report difficulty with physical and cognitive function than workers who did not feel tired. This suggests that a worker's physical and mental abilities are influenced by their level of fatigue.

The results of moderation in model 58 indicated that combined effect of mental toughness and workplace support, in high and medium mental toughness groups as compared to low mental toughness group, inversely predicted fatigue and cognitive failures. Thus, mental toughness can be considered a protective factor against adverse workplace outcomes. These findings can be best explained in the backdrop of personal resource model (Clough et al., 2002) where mental toughness is marked with ultimate cognitive, emotional, and behavioral basis to withstand the environmental and contextual pressures. Previously, studies pointed out the protective role of mental toughness where mental toughness moderated the relationship between paranormal beliefs and perception of risk by significantly reducing the perception of

risk in individuals (Drinkwater, Dagnall, Denovan, & Parker, 2019). Additionally, researches also indicate a combined effect of mental toughness and work characteristics. For example; Balducci et al. (2020) concluded that employees, experiencing high job demands and workplace bullying, were most impacted when they had low mental toughness. Additionally, least impacted employees were those who exhibited higher levels of mental toughness. Similarly, Crust and Clough (2011) have indicated that workplace support and mental toughness may work in amalgamation in order to affect the results. A recent research also indicates the mitigating role of mental toughness between frequency of training and resulting tiredness (Iqbal et al., 2022). The findings indicated that amateur athletes, whose training days increased, reported decreased fatigue because they had developed higher levels of mental toughness.

With reference to theoretical framework developed for the current study, job demand, job control, and workplace support were theorized as predictor variables; cognitive failures and its subscales were taken as outcome variables; and fatigue and mental toughness were taken as mediator and moderator; respectively. The moderated mediation analyses, thus, confirm the proposed model except that job demand did not turn out to be a predictor of cognitive failures as it was proposed in the model initially.

Moreover, results of the model 4 indicated mediation of overall construct of fatigue and mental fatigue between job control and memory failures. According to previous research, mental fatigue is directly linked with deterioration in cognitive performance. It has been documented in previous study that any kind of poor psychosocial environment at workplace (including lack of job control, work pressure,

and injustice etc.) may eventually lead to physical, psychological, attitudinal, and behavioral outcomes (Bonde, 2008). In another study, Schuller et al. (2014) also indicated the significance of job control that is; lack of job control had strong relationship with negative spillover and exhaustion among employees from three different occupational sectors. Another study was conducted with industrial employees of Taiwan which indicated a significant positive relationship between job demands and prolonged fatigue whereas; a significant negative relationship of prolonged fatigue was observed with job control and workplace social support (Tang, Li, & Huang, 2016).

It is important to note that mental fatigue only significantly mediated the relationship for job demands and memory failure. Similar results were reported by Chaney and Fogarty (2009) where mental fatigue, directly and indirectly, predicted attention and memory related cognitive failures due to work overload. The results confirmed that mental fatigue can directly predict attention and memory cognitive failures as well as this relationship is also mediated by mood changes which occur due to experience of mental fatigue.

Group Differences

Group differences were explored with reference to various demographic variables in the study. Study variables were investigated with reference to gender, job positions, marital status, type of organization, functional area or department of the employees, and job types. *T*-test was conducted for determining differences on basis of gender (male and female employees), job positions (managerial and non-managerial positions), and type of organization (national and multinational pharmaceutical companies). For exploration of differences on basis of departments

(sales/marketing, HR, and production) and job types (active, passive, high-strain, and low-strain), One-Way ANOVA was conducted.

It was hypothesized in the study that male employees will score higher on constructs of job demands, job control, cognitive failures and its dimensions, and mental toughness, whereas female employees will score higher on constructs of workplace support and fatigue along with its dimensions. Results of the study remained significant only for the constructs of job demands, job control and its dimension of decision authority, cognitive failures and its dimension of memory failures, and mental toughness. Direction of the results remained same as it was hypothesized that is, male employees scored higher on job demands, job control, cognitive failures, and mental toughness as compared to female employees. Additionally, group differences on workplace support and fatigue remained non-significant.

Past literature on these constructs validate these gender differences. For example, Cerdas, Harenstam, Johansson, and Nyberg (2013) reported the similar patterns where male employees scored higher on job demands and job control in Swedish workplaces when compared to female employees. Furthermore, this discrepancy was larger for the variable of job control where male employees perceived that they could exert much more control at their workplace. Perception of control over the work environment can be interplay of various factors and differences between males and females, on how they deal or cope with the situations, may bring about such differences. Taylor et al. (2000) investigated the similar hypothesis in organizational setting and concluded that while encountering with high level of demands, male employees tend to use active problem focused coping including

assertive communication at workplace, time management, and effective work organization as compared to female employees who tend to use emotion focused coping including relaxation, emotional support, and distraction from the demands. This is one of the reasons that male employees score higher on job control despite of being scoring higher on job demands (Luchman & Gonzalez-Morales, 2013).

Scores on the construct of cognitive failures and dimension of memory failure were also aligned with past research. Literature states the presence of gender differences for cognitive abilities and cognitive performance indicating more mature brain regions for visual spatial attention in women leading to better performance in other cognitive functions including memory, thought processing, and speech (Feng, Prat, & Spence, 2011). Many other researches also indicate better levels of cognitive functioning and memory in adult women as compared to adult men (Linda et al., 2019; Lundervold, Wollschläger, & Wehling, 2014). Due to a higher level of inhibitory control, women are capable of maintaining attention on task in-hand for longer time periods leading to lesser errors (Yuan, He, Qinglin, Chen, & Li, 2008). This is one of the reasons that women tend to perform better at their workplaces when it comes to the tasks which require sustained attention and memory.

As far as the scores on mental toughness are concerned, past research also indicated that men report significantly higher score on mental toughness as compared to women (Andrews & Chen, 2014). Within the four components of mental toughness, men tend to score higher in on control, confidence, and challenge as compared to women (Gucciardi, 2012; Wadey, Evans, Hanton, & Neil, 2012). Research also indicates that a higher perception of control on one's life circumstances and emotions is linked with coping styles that is; men's task oriented coping strategies

(including planning and logical analysis needed to overcome a task-related stressor) make them perceive more in control of their life circumstances, as compared to women, leading to confidence that they can accomplish difficult tasks (Kaiseler & Polman, 2012).

Despite of the support provided by the past literature, the present research indicates an important find that men not only scored significantly higher on mental toughness but they also scored significantly higher on cognitive failures despite of exhibiting higher levels of mental toughness. The answer may lie into the way in which men and women are socialized in our society. The idea of masculine ideologies indicates that certain expectations from men and women are inculcated into them from childhood. Being breadwinner, dominant, strong, and tough are some of the ideologies which Pakistani society inculcates into their men. This can be a possible reason that, despite of the indication of the cognitive failures, male respondents are inclined to show higher scores on mental toughness scale (Abi, Hankir, & Zaman, 2021).

With reference to differences of job positions on study variables, it was hypothesized that managers will score higher on all study variables except fatigue and its dimensions (physical and mental fatigue). According to the results, significant differences between managers and non-managers were detected only on constructs of job demands and job control and its dimensions of skill discretion and decision authority. Managerial jobs are entitled with more responsibilities than non-managerial jobs because managers are responsible for smooth functioning, decision making, policy framing, as well as production and sales of the company. Therefore, managerial posts contain more job demands because of the fact that managers need to

oversee the performance of their reporting team as well along with their own other job responsibilities. Additionally, managers' job descriptions enable them to exert more control on their work environment and job tasks when compared with employees on non-managerial positions (Blom et al., 2016; Kaiser & Overfield, 2010).

The path between managerial position and the perception of control at one's workplace is not only related to job description of the employees but to their education and social status as well. Research indicates that associated factors with this path may include higher levels of education, job experience, income, and social status which may enable the manager to exert more control and authority at their workplace (Lunau, Siegrist, Dragano, & Wahrendorf, 2015).

Marital status is another demographic variable which was studied with reference to the study variables. Results on this demographic indicated that married employees scored significantly higher on perception of job demands and single individuals scored significantly higher on cognitive failures and attention and execution failures dimensions. No other significant differences were found on any other study variable. As far as the higher perception of job demands in married employees is concerned, past research provides links through which this sort of perception may develop. For example; research indicates that work-life balance is the factor through which married employees feel more burdened as compared to single employees while balancing their work-related and non-work responsibilities (Panisoara & Serban, 2013). Moreover, past research also indicates that unmarried individuals are better able to use a larger spectrum of coping strategies, as compared to married individuals, when they encounter job related stress which eventually leads to better management of job demands (Sidhu, Singh, Virdi, & Kumar, 2020).

As far as difference of marital status on cognitive failures is concerned, a recent research on cognitive impairment of people with different marital statuses in USA. The study was National Health and Aging study for which data was collected from 7,508 respondents. It was reported that never married individuals were at greater risk of memory and orientation related disturbances as compared to their married counterparts (Liu, Zhang, Burgard, & Needham, 2019). According to the researchers, marital status is an overlooked demographic in studies which can be a protective factors for married individuals. Other researches also indicate similar pattern, for example; Feng et al. (2014) also observed 2.5 times higher incidence of cognitive impairment in single individuals as compared to married individuals. Further research has also explored associated factors which may bring about such kind of differences in cognitive functioning of single and married individuals. For example, Jennings, Farrell, Liu, and Montana (2022) pointed out two important factors that is; marriage helps in providing cognitive stimulation to married individuals and cognitive functioning of single individuals is largely dependent on the value of marriage and stigma related to non-marriage in a society. Emphasis on getting married and stigma related to non-marriage can also be considered two of the factors which are prevalent in Pakistani society and thus, results of the study may indicate towards the same trend.

The present research also aimed at exploring the differences of pharmaceutical companies' employees based on type of organization in which they were working. Two types of pharmaceutical organizations, which were addressed in current study, were national and multinational pharmaceutical organizations. The results of the *t*-test indicated that employees from multinational pharmaceutical companies scored

significantly higher on study variables of job demands, job control and its dimensions, cognitive failures and its dimensions, as well as mental toughness.

Some of the basic differences between a national and multinational company include investments, production capability of the company, production operations in foreign countries, competitors, and man power. A multinational company has larger investments, investments in foreign countries, production of products in foreign countries, international competitors, and more man power as compared to national level companies. While working in a multinational company, employees may experience higher level of job demands as compared to employees working in national companies because multinational companies need to compete at international level thus; the demands of production and sales/marketing may exceed when compared to national companies (Sageder & Feldbauer-Durstmüller, 2019)

In order to compete in international markets, multinational companies tend to train their employees more effectively. Multiple bi-annual and annual training sessions can be helpful in managing the job well and acquiring the perception of job control. The more an employee is sophisticatedly trained for undertaking job processes, the higher perception of job control will evolve. A comparison between Pakistan's national and multinational pharmaceutical companies indicated an edge of multinational companies in using operation decision support, strategic planning, and internal and external integration IT systems which enabled the employees of multinational companies to exert better control on their technological systems. Though, no differences in capabilities of the employees of national and multinational companies were noticed in the study (Kamal & Hasan, 2004).

Multinational companies are more complex in comparison to national organizations with reference to their management systems. Thus, multinational companies require a constant evaluation of risks, opportunities, adjustments of assets, and designing of activities in order to compete in international market. A higher level of engagement in such judgments and activities may reduce the ability of the employees of emptying their minds from information noise and concentrating on strategic planning, leading to occurrence of cognitive failures (Kaplan, 2011).

A difference of activities and trainings between employees of national and multinational companies can explain their differences on the study construct of mental toughness. Mental toughness can developed depending on the availability of a conducive work environment. Research indicates that an organization, which trains its employees technical skills, logical skills, and interpersonal skills, helps developing their mental toughness eventually (Klette, 2017). This can be considered a prime reason of significant differences on scores of national and multinational pharmaceutical companies' employees on mental toughness.

A noticeable finding with reference to gender differences and type of organization was that the respondents scoring higher on mental toughness were those who were scoring higher on cognitive failures as well. Though these results are against the conceptualization and of constructs of mental toughness and cognitive failures in current research, this is the very issue which needs to be explored further. A probable cause of this finding in the current research may relate to the measurement tools that is, workplace specific cognitive failures were measured in the research and mental toughness scale was a generalized scale. Development and usage of a work-specific mental toughness may yield better results. Ruparel, Choubisa, Seth, & Dubey,

(2022) has recently worked on development of a work-specific mental toughness scale which can prove to be a good alternative of already available scales, depending on further research work on the scale.

One-Way ANOVA was carried out in order to look into the departmental differences with reference to study constructs. In order to conduct this analysis, employees from three departments were identified. These departments included sales/marketing, HR, and production departments. No directional hypothesis was built for this comparison due to the lack of previous literature on departmental comparison on these study variables. Results of the analysis indicated that employees from sales/marketing department scored significantly higher on job demands, job control and its dimensions and cognitive failures and its dimensions, and physical fatigue. On the other hand, production department employees scored significantly higher than HR department employees on mental fatigue.

These differences can be attributed to the work environment and work responsibilities of the employees, primarily. In comparison to the production and HR departments, employees from sales/marketing department are required to function at two places simultaneously that is; in their offices and in field for sale of their company products. Thus, they may encounter with some of the work demands more often such as, dealing with conflicting demands at workplace. Past research has also indicated work overload and difficulty to achieve sale targets as the major sources of stress among sales department employees (Sharma & Singh, 2016). Field work may also be a cause of physical fatigue for the employees of sales/marketing department because they need to move between their office and field, wait in queues to meet

doctors and pharmacists, and to travel frequently which may enhance their vulnerability for physical fatigue as well.

Another One-Way ANOVA was carried out in order to look for differences on study variables for the employees whose job types were different including active, passive, high-strain, and low-strain jobs. Results indicated that employees in active job scored significantly higher on job demands, job control and its dimensions. Employees in high-strain jobs scored significantly higher on the variables of cognitive failures and its dimensions, as well as fatigue and its dimensions, whereas employees in low-strain jobs scored significantly higher on variable of workplace support as compared to any other employee.

By definition, active jobs are characterized by a significantly higher level of job demands and job control (Karasek & Theorell as cited in Larsson et al., 2019) thus, only those employees were put in the category of active jobs whose score on job demands and job control was higher than median score on both of the variables. This is the reason that employees in active jobs have highest scores on variables of job demands and job control.

On the other hand, employees in high-strain jobs scored significantly higher on cognitive failures and its dimensions as well as fatigue and its dimensions. High-strain jobs are characterized by high job demands and low job control and these results are in accord with previous literature that is; high-strain jobs impact the cognitive functioning of the employees due to their exposure to stressful workplace situation where they experience high levels of job demands but have a little or no control on their jobs. Thus, such job conditions can lead to disruptions in memory (Morgan et al., 2004), episodic memory, and retrieval of information (Ohman et al.,

2007). It is also indicated in the previous studies that stressful working environment cause emotional exhaustion and mental fatigue in employees (Guan et al., 2017).

Lastly, employees in low strain jobs scored significantly higher on the variable of workplace support as compared to employees in active, passive, and high strain jobs. Low strain jobs are characterized by low job demands and high job control. Previous research indicates that the perception of level of workplace support may affect the employees' perception of job demands and job control at a workplace and employees with higher workplace support may experience low levels of job demands and high levels of job control (Banarjee & Doshi, 2020).

Conclusion

It can be concluded from results of the present study that job control, work support and their combination can affect the cognitive processes of the employees who are working in different departments of pharmaceutical companies. Not only these work characteristics impact the cognitive performance of the employees directly but they can also induce physical and mental fatigue in employees which can be proved deteriorating for the employees. It was also concluded from the research that gender, marital status, job position, functional area, job type, and family system also produced differences in scores of variables. In face of low job control and work support, mental toughness emerged as the protective factor which can be helpful in dealing with workplace stressors, significantly reducing the fatigue and resulting cognitive failures.

Limitations and Suggestions

There are a number of potential limitations of the current research which should be considered while inferring the findings of the present study. First is the

usage of only self-reported measures in the study which creates the possibility of response bias. Therefore, inculcation of some qualitative techniques in future studies (such as interviews and focus group discussions) may bring about response variability. Secondly, sample was approached only from Rawalpindi and Islamabad based offices of pharmaceutical companies which may limit the generalizability of the findings. Gathering data from other cities of Pakistan would enhance the generalizability of the findings in future researches. Thirdly, the primary design of current research is cross sectional which may hinder the inclusion of various demographics; whereas upcoming investigations should consider the possibility of using longitudinal designs so as to derive in-depth data. Fourthly, the study did not include any employee with any physical and mental condition for which they needed medication. This exclusion criterion was developed in order to avoid confounding variables. Further researches, interested in studying the effects of physical and mental conditions, can take unique physical and mental conditions of employees in account. Finally, influence of other related constructs (such as personal dispositions, managerial support, and leadership styles, and non-work related factors) in relation to mental toughness and cognitive failures can be explored in forthcoming investigations to draw comprehensive inferences about the phenomenon.

Implications

Multiple theoretical and pragmatic implications of the present study can be derived. Firstly, findings offer baseline information in understanding the theoretical connections between specificity of job demand-control-support model and cognitive failures in the context of organizational settings. Secondly, inferences drawn from the current study offer useful insights into the significant protective personal attributes of employees (such as mental toughness) which can be catered by HR practitioners while

designing jobs and outlining job descriptions. Thirdly, results of the study can be utilized in devising intervention plans for employees who are experiencing job demands, pressures, and strains at their workplaces and improving their skills of attention and cognitive resources. Fourthly, findings of the study would offer fundamental information for designing customized organizational modules which would enhances the cognitive, emotional and behavioral resources of the employees.

Additionally, research results have indicated the importance of workplace support and job control in reducing cognitive performance of the employees. Thus, research findings can be helpful in developing intervention plans in pharmaceutical companies targeting the workplace environment where employees can develop harmonious relationships with others and feel autonomy while carrying out their work related activities. While addressing the issue of physical and mental fatigue at workplace, the research results can be helpful for HR departments to devise work schedules in a way which will be helpful in reducing the fatigue levels of the employees.

Understanding the role of mental toughness is prudent for managers to effectively manage their workforce. Every organization aims at recruiting a workforce that performs to the best of its abilities and maintains a positive attitude towards the operational and commercial confronts faced by the organizations. Thus, establishing the construct in academic literature may be quite beneficial for recruitment and selection, retaining mentally tough employees who can sustain in stressful situations and perform to the best of their abilities; assessment and development, measuring competencies, employee development and talent management. Alongwith including the mental toughness as a recruitment criterion during selection process at workplaces, mental toughness training can be added as part of personal and

professional development through trainings for increasing productivity of the workforce.

Though workplace related implications of the study are quite straightforward, yet these implications can be expanded to other fields/ areas of life as well. For example development of mental toughness, through training, can be used as preventive strategy for children at schools during early years of education so they will develop into individuals who will be better able to cope with stressful circumstances in their lives. Developing confidence, commitment, control, and a mindset to take life stressors as challenges will help students develop their resilience in face of life challenges. Additionally, being mentally tough will be beneficial for developing and exhibiting more cognitive resources which can be beneficial while dealing with fatigue-induced cognitive failures (including reduced concentration, impairment in short term memory and impairment in judgment). In clinical settings, research can provide support for precursors of fatigue and cognitive failures which can help therapists to take these variables into account and devise therapies accordingly.

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APPENDICES

Appendix-A

Brain Storming Sessions Template

Introduction

At start of both of the brain storming sessions, researcher was introduced to the entire group and participants' introduction was also acquired and they were informed regarding the purpose of the research.

Discussion Topics

Job demands. At the start of the discussion, participants were introduced with the concept of job demands as job stressors which are psychological in nature and may include stress related to completion of assigned work and workload, dealing with unexpected tasks at workplace, as well as dealing with personal conflicts which are usually related with job tasks. Additionally, these are also the job aspects that require physical as well as psychological effort, and are associated with physiological and psychological costs.

Probe 1. Which job demands you experience at your workplace?

Probe 2. What a hectic day at your workplace look like?

Probe 3. Which aspects of your work are more demanding?

Job control. Job control is the employee's control on job related tasks and decisions, and employees' own conduct during in working hours. It is a person's ability to influence what happens in their work environment, in particular to influence matters that are relevant to their personal goals. Job control may include control over work tasks, control over the work pace and physical movement, control over the social and technical environment, and freedom from supervision.

Probe 1. What are some of the indicators of job control at your workplace?

Probe 2. What difference the sense of job control makes during a usual work day?

Workplace support. Social support at workplace refers to overall extent of helpful social interactions of the employees which they experienced while interacting with his coworkers as well as supervisors. It is the availability or actual receipt of assistance provided to an employee by one or more individuals at their workplace and may be provided by individuals within the organization including, supervisors, subordinates, coworkers, or even customers.

Probe 1. What are some of the indicators of social support at your workplace?

Probe 2. Which kind of social support is available at your workplace?

Probe 3. How do you define a supportive interaction with your boss or colleague?

Probe 4. Under what circumstances, workplace support can alter the perception of job demands at workplace?

Cognitive failures. The concept of cognitive failures was presented to the participants as inability of an individual to perform a certain cognitive task for which he/she is capable of doing otherwise, occurrence of a breakdown in mental functioning of the individual, or emergence of error in execution of the task in hand due to that mental breakdown. It is, further, defined as failures in perception, memory, and motor functioning which are unintentional and does not match with the actual intentions of the individual. These failures can occur at three levels including failure in attention, memory, and execution of a task. Attention failure is the failure which an individual commits while perceiving a piece of information; memory failure can appear while retrieving the already memorized information, and execution failure appears while an individual is executing a task which is also known as action slips.

Probe 1. To what extent you are vulnerable for these cognitive failures?

Probe 2. To what extend job demands can be responsible for occurrence of cognitive failures?

Probe 3. What are some of the examples of attention, memory, and execution or action failures you have ever experienced at your workplace?

Fatigue. Fatigue was introduced as a decrease in physical performance associated with an increase in the real or perceived difficulty of a task or exercise, subjective experience of tiredness or lack of energy. Normal tiredness is usually not experienced as an unpleasant state, since it can be remedied by rest and sleep. Fatigue, however, has an unpleasant quality; it is not necessarily related to exertion and is not easily or fully restored by rest or sleep.

Probe 1. What are some of the aspects of work which can lead to physical fatigue?

Probe 2. What are some of the aspects of work which can lead to mental fatigue?

Probe 3. What are the possible indicators of physical and mental fatigue in an employee?

Probe 3. What can be possible ways to reduce the level of physical and mental fatigue for an employee?

Mental Toughness. mental toughness is regarded as ability of performing under stress or pressure, one's control over his/her emotions and the situations which they encounter in daily lives, an individual's capability of coping with pressure, to rebound from failures, possession of superior mental skills, and an individual's strong self-belief and faith on one's self of controlling their destiny while remaining largely unaffected by the adverse circumstances and competition. mental toughness is regarded as ability of performing under stress or pressure, one's control over his/her emotions and the situations which they encounter in daily lives, an individual's

capability of coping with pressure, to rebound from failures, possession of superior mental skills, and an individual's strong self-belief and faith on one's self of controlling their destiny while remaining largely unaffected by the adverse circumstances and competition.

Probe 1. How characteristics of mentally tough employees may manifest while working in pharmaceutical companies?

Probe 2. How would a mentally tough employee operate in a workplace which is high on job demands and low on job control and workplace support?

Probe 3. What effects mentally tough employees can cast on production/productivity of the company?

Appendix-B

Demand-Control-Support Questionnaire

Please indicate your response to the following items by **ticking at one** of the options. Please answer these items carefully, thinking about **how is your job generally**, do not spend too much time on any one item.

S.No	Statements	Often	Sometimes	Seldom	Never/almost never
1	Do you need to work very fast?				
2	Do you have to work very intensively?				
3	Does your work demand too much effort?				
4	Do you have enough time to complete your job?				
5	Does your work often involve conflicting demands?				
6	Do you have the possibility of learning new things through your job?				
7	Does your work demand immediate attention?				
8	Does your work require creativity?				
9	Do you have to do the same thing over and over again?				
10	Do you have a choice in deciding how you do your work?				
11	Do you have a choice in deciding what you do at work?				
12	There is a calm and pleasant atmosphere where I work.				
13	There is a good spirit of unity.				
14	My colleagues are there for me.				
15	People understand that I can have a bad day.				
16	I get on well with my superiors.				
17	I get on well with my colleagues.				

Appendix-C

Workplace Cognitive Failures Scale

Please indicate your response to the following items by **ticking at one** of the options. At your workplace, **do you experience that you**:

S. No	Statements	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	Cannot remember whether you have or have not turned off work equipment?					
2	Fail to recall work procedures?					
3	Cannot remember work-related phone numbers?					
4	Cannot remember what materials are required to complete a particular task?					
5	Forget where you have put something you use in your job (e.g., training booklet, notes, FAQs,etc)					
6	Fail to notice postings or notices on the facilities bulletin board(s) or e-mail system?					
7	Do not fully listen to instruction?					
8	Day-dream when you ought to be listening to somebody?					
9	Do not focus your full attention on work activities?					
10	Are easily distracted by coworkers?					
11	Accidentally drop objects or things?					
12	Throw away something you mean to keep e.g., scripts, rates, FAQs, etc)					

13	Say things to others that you did not mean to say?					
14	Unintentionally press control switches on machines?					
15	Accidentally started or stopped the wrong buttons on software or desktop.					

Appendix-D

Chalder Fatigue Scale

I would like to know about any problems you have had with feeling tired, weak or lacking in energy in the last month. Please answer all the questions by ticking the answer which applies to you most closely.

S.No	Statements	Less than usual	No more than usual	More than usual	Much more than usual
1	Do you have problems with tiredness?				
2	Do you need to rest more?				
3	Do you feel sleepy or drowsy?				
4	Do you have problems starting things?				
5	Do you lack energy?				
6	Do you have less strength in your muscles?				
7	Do you feel weak?				
8	Do you have difficulty concentrating?				
9	Do you make slips of the tongue when speaking?				
10	Do you find it more difficult to find the correct word?				
		Better than usual	No worse than usual	Worse than usual	Much worse than usual
11	How is your memory?				

Appendix-E

Mental Toughness Questionnaire – 18

Please indicate your response to the following items by **ticking at one** of the options. Please answer these items carefully, thinking about **how you are generally**, do not spend too much time on any one item.

S. No	Statements	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	Even when under considerable pressure I usually remain calm					
2	I tend to worry about things well before they actually happen					
3	I usually find it hard to summon enthusiasm for the tasks I have to do					
4	I generally cope well with any problems that occur					
5	I generally feel that I am a worthwhile person					
6	"I just don't know where to begin" is a feeling I usually have when presented with several things to do at once					
7	I usually speak my mind when I have something to say					
8	When I make mistakes I usually let it worry me for days after					
9	In discussions, I tend to back-down even when I feel strongly about something					
10	I generally feel in control					
11	I often wish my life was more predictable					
12	When I am feeling tired					

	I find it difficult to get going					
13	I am generally able to react quickly when something unexpected happens					
14	However bad things are, I usually feel they will work out positively in the end					
15	I generally look on the bright side of life					
16	I generally find it hard to relax					
17	I usually find it difficult to make a mental effort when I am tired					
18	If I feel somebody is wrong, I am not afraid to argue with them					

Appendix-F

Consent Form and Demographic Sheet

میرا تعلق قومی ادارۂ نفسیات، قائداعظم یونیورسٹی اسلام آباد سے ہے۔یہ ادارۂ تعلیم وتدریس کے علاوہ سماجی اور نفسیاتی موضوعات پر تحقیق کرتا ہے ۔موجودہ تحقیق بھی اسی سلسلے کی ایک کڑی ہے۔اوراس تحقیق کے سلسلے میں مجھے آپ کا تعاون درکار ہے۔تحقیق کا مقصد ادویات بنانے والی کمپنیوں میں کام کی نوعیت اور خصوصیات کو جاننا ہے۔آپ کو یقین دلایا جاتا ہے کہ آپ سے حاصل کردہ معلومات کو صیغہ راز میں رکھا جائے گا۔اور صرف تحقیقی مقاصد کے لئے استعمال کیا جائے گا۔آپ کو یہ اختیار حاصل ہے کہ جب چاہیں اس عمل سے دستبردار ہو سکتے ہیں۔

عروج مجیب

آپ کے تعاون کا شکریہ۔

دستخط----------

تاریخ----------

جواب دہندگان کے بارے میں بنیادی معلومات

نام: ----------

جنس: ----------

عمر: ----------

فون نمبر/ای میل: ----------

تعلیم: ----------

ازدواجی حیثیت: ----------

خاندانی نظام (مشترکہ / انفرادی): ----------

آپ پہ انحصار کرنے والے افراد کی تعداد: ----------

مجموعی طور پر کام کا تجربہ (سالوں میں): ----------

موجودہ کمپنی میں کام کا تجربہ (سالوں میں): ----------

جاب کی نوعیت (مستقل/کنٹریکٹ/روزمرہ کی بنیاد پر): ----------

جاب شفٹ (صبح/شام/رات): ----------

ڈیپارٹمنٹ: ----------

عہدہ: ----------

کام سے متعلقہ حادثات/چوٹیں: ----------

جسمانی معذوری و دیگر بیماریاں: ----------

Appendix-G

Urdu Version of Demand-Control-Support Questionnaire

جہ ریل جبست لظبنگی ًتیبًفہ کتش ہے کہ آپ کے کبم کی ووہی ًوتی کی غیہش ےجشت کو د یبی ع ے
ڈ تے ویآگے دیئے ہوئے ئشجوتا ہ ہیں عے کغی ای پش } ✓ کب ًتی لگبئیں۔

ن مبر ش مار	ب یانات	اکثر اوقات	کبھی کبھار	شاذو نادر	کبھی نہیں
1.	یب آپ کو شتی ضی ع کبکم شن پڑتب ہے۔				
2.	یب آپ کو تہب ئی تُنہی ع کے کبکم شن پڑتب ہے؟				
3.	یب آپ کے کب ہت ہ حتُ طلت ہے؟				
4.	یب آپ کے پبط کلبیم خت کش ً کے لی کےبف ی وق تت ب ہے؟				
5.	یب آپ کے کبکم ل ش ضب دم طجب تپش ھتولتب ہے؟				
6.	یب آپ کے کبم ی ں ًی ئےیضیں عکھ ُ ےک ے اکبً بتی ہ غش یں۔				
7.	یب آپ کے کبم ی ف وسیتوجی کب س وتی ہے؟				
8.	یب آپ کے کبم ی رتخلقی صلاحس کب س ہے؟				
9.	یب آپ کو ئ لک شغی سبوم ث ب ک شپڑتب ہے؟				
10.	یب آپ کو ی ہ بلتقیں ح بصل ہے کہ آپُ بپلک بمکی غ ے اجًبم ہتے یں؟				
11.	یب آپ کو ی ہ بلتقیں ح بصل ہ ےکہ آپ یلےُ کبکم ب تاخبجود کش عکی یں؟				
12.	جہ بری ککبشت ب ہ وری بک بہب ح ولمیش عکوی اوت خو ئگ واس ہے۔				

				ہیں جز شکی جوتبی ہیچبتب ہے۔	13.
				ہے ہو س فق بی کےبس تش ی ہنک ے لی ے ی ہ غش س رتے ی ں۔	14.
				لوگ لطب تکو عوجھ تکت ےہی ں کہ تش ا دوہتشُ ا/ خش اۃ ٹگ ض س تگب ہے۔	15.
				ب عق ش ث بکلا ے عبت ھی ش ے ہش اعن اچھ ے ی ں۔	16.
				ہپل س فق بی کےبس رک ے بعت ھ تش ے ہش اعن اچھ ے ی ں۔	17.

Appendix-H

Urdu Version of Workplace Cognitive Failures Scale

ٌُش جہوتوکھیستِ علق کـبم کـےدوس ای ہوًالہوے تجشوبت عے ہـے۔ ہشجـبسوتنکیبی عے پڑ تے وئےآگـے ئیے ہوئـے ہاثتـ ہیعـے کـغی لیکپش } ✓ کـپ ًتی لیگئیں۔

کـول طوس پش نفـق	نفـق	غیش جبًجلس	غیش نفـق	کـول طوس ل غیش نفـق	یشًبت	وًش وبس
					یہد ًیں سکیپھبتـےکـہ آپ ًکےبم عےتعلق ہ یھبی /آلاتـ ٹکیعہ یب ًیں ؟	1
					سبکمش ًےکبوٹسکـبسیہد ًیں سکیپبتـے۔	2
					سبم عےتعلق ہ فـوجـش ًوص یبدِ ًیں سکـہیپتـے۔	3
					یہد ًیں سکیپھبتـےکـکـغی حـوث کـبمکـش ًے کـے لیےکـویںچیضوں /ہلوکـےضشوستـ ہوی ہـے۔	4
					ثھلوجبتـےکہیہ کـبم یں اعتعبل ہوًےولاکوئی چیضکہبیں سکھ دی ہـے؟ مثلاً [اشتیچش ، دوئیورکـے sampleوًٹظ، فِن ، آلاتعتب ًے وغیش۔]	5
					پش ہوجوپیغبہبتـکـو یکھبثھلو جبتـے یں۔ ًوٹظوسڈ اوس ای یل/Sms	6
					یبتـکـو کـولطوسپش ًیعپبتـے۔	7
					جتـکغیکـیبت عُبضشوسی ہوتو ںیلی ُتً یں کھو جبتـے یں۔	8
					جبتکی عگشیوں یں کـولتوجہ ًیں دےپبتـے۔	9
					قبئیس کـی ہوجوگی کـی وجہےکـبپشتوجہ	11

	ھنسو ص گوش پ بت ے۔					
11	چب ً کچی ضری رگش ا ھت ے ی ں۔					
12	چوی ضری رپ ھ ّ ک ھت ے ی ں جوکہ sample ، ًوٹظ سکہ ّی ہوتی ی ں۔ ہشلاً]لشٹری چ ں ، دوطئ ورک ے ق ن ، آلات ع ت ب ً ے و غ ش[					
13	و عش وں ع ےی و ضچی ں کہہ ھت ے ی ں جیکب لصل قصذ وِ ًی ں توب جو آپکہ ُبج بت ے ی ں۔					
14	غش لس ادی طو س پش آلات]کہ وی ٹش، ہ ئی ّو ں ف ث لجی[ک ے چلاً ے او س تکنش ً ے وال ے عجوئ ث ب ھت ے ی ں۔					
15	تشبق ً آلات]کہ وی وٹش ، ہئی ّو ں ف ث لجی[ک ے ع ظ ن ی چل ئے ی ب تکنش ھت ے ی ں۔					

Appendix-I

Urdu Version of Chakder Fatigue Scale

ٌفشِجہری لحبست بکلیفق عچ پچھلے ھیِ کے دوسلی آپ کو ہیٌت فلکب وٹ اوس طبقت کی کوی عے ہے۔ ہجفبست کو ی عے پڑ تے ہوئے آگے دیے گئے ہجتا ھیں عے کےغی اک پش { ✓ } اُتی لگبئیں۔

معمول سے بہت زیادہ	معمول سے زیادہ	معمول جیسا	معمول سے کم	بیانات	نمبر شمار
				یب آپ کو تھکبوٹ کی وجہ عے ہغبئل ہیں؟	1.
				یب آپ کو صوی ب ِآسام کی ضشوسث پڑتی ہے۔	2.
				یب آپ کو ٌیٌذ ی ب خو اة آلود ہحغ وط ستے ہیں؟	3.
				یب آپ کو کب ھو کو ئی ش و ع کشتے ہوئے ھغکل پیل آتب ہے؟	4.
				یب آپ خود ھی تَوابئی کی کوی ہحغ وط ستے ہیں؟	5.
				یب آپ کو پٹھوں ھیں طبقت کی کوی ہحغ وط ہوتی ہے؟	6.
				کیب آ خو ںکو کوضوس ہحغو طکشتے ہیں؟	7.

				یب آپکوتوجہکفوصکیش ً ے ییں ہ لیہ رتب ہے؟	8.
				یثببگشت ے ہوئے آپکی صرشبوھیغلتی ہے؟	9.
				یب آپکےلیےشببگشت ے ہوئےدسعت قبع لاتگیشًب ہیکلوتب ہے؟	10.
ہعوول عے شہتتشی	ہعوول عےشی	ہعوول جیغی	ہعوول عےتتش		
				پآ کیھیدئکیغی ہے؟	11.

Appendix-J

Urdu Version of Mental Toughness Questionnaire-18

ہدایات: کے نیچے دیئے گئے بیانات کو پڑھئے اور اپنے متعلق جواب کی نشاندہی کیجئے۔ ہر بیان کے آگے دیئے ہوئے خانوں میں سے کسی ایک پر { ✓ } کا نشان لگائیں۔

کـول طوس پـش نفـق	نفـق	غـیش جـبّجلس	غـیش نفـق	کـول طوس ن غـیش نفـق	یبانات	وّجش وبس
					نفیشبوکی حبالت یورشھی یوریپش عکـوہستبا/ ستی ہوں۔	1
					یوریجضوکے وقبوغ یش ہوٗے عکھسی پہلے ہی اُوکـ یہثبس ے یوریشپریعتی ہوٗے لگتب/لگتی ہوں۔	2
					ہجھے قفشکیب ہورکـوکشٗ کیے لیے جوکٹو جزثہ پیکلشٗے یں ہکیکـلوعتی ہے۔	3
					ووبٗ یںسوٗیہوٗے ولی ہکیکـلاتکب وگـی عے عبہٗبکنیلن ببولتی ہوں۔	4
					ووبٗ یں ہحغو طکشتبہورکـہ یں لیکـقیثلقنس ٗاغبی ہوں۔	5
					ہجھثبلکـل ہلوم ٗیوتب ےکـکمہبں ع ےئشوع کشوں ہی ہ احغ ط ہجھے ووبٗ ا ط قت ہوتب ہے جت ہجھے لیکـوقت یوریشہت عکےبمکلٹھ کیـشٗ ے کـو دےعدے جبئیں۔	6
					ہجھے جتک چھکـہٗب ہو یںرکـابطہ ثشمالطہبسکشتب/ شتی ہوں۔	7
					جت ہجھ عےغلطی ہو جبئےتو ہیکی یئ دیتک بھوریبیہستبا/ ستی ہوں۔	8

					ہں دوساں اُچھحثکغی ہضکسےثبس ےہں ضجوط ہوقفہو ًےکشےبوجو د اکطلبظہبسکش ًے عے ںیضکشںتبنگتیہوں۔	9
					ہجھے بہطوپش خود پشقبثو ستبہ ہے۔	11
					بںشہیشی خولہکپسبتیہ ہےکہ ہوُںطِب صًذگیکے بسہیں پہلےعے جبہیکغب/ ٰعتی۔	11
					نکھبوٹ کیصروسِت ہوںہیشےلیےبہکجبس ے سکُھب ہوکیکلہونبہب ہے۔	12
					اچب ًککچھہو ًےکیصروسِت ہں ، ہں فوسیطوس بشسد ولکقِبثلہوتب /وتیہوں۔	13
					یضروُرکتُی ہیشُ یکیوں ًہوں ہجھکےلنگتب ےے کہ بثِولآخش بقجت طشُیقے عے حلہو جبئیں گی۔	14
					ہں ووبصًگیکےسوئیپلوپش ًظسکہفب/ سکھتیہوں۔	15
					ہش ےلیےپشُ ہکوی سبہی ووبہً ہوکیکلہوتبہے۔	16
					تھبوٹکیصوسِت ہں ہجھےرہُی ہوقت ہوقبً ہوکیکلگتی ہے۔	17
					گش ہجھے لگ ےکہکوئیغلطیپش ہےتو اط عے ثحبگش ًے عے ًہیںڈستب/ڈستی۔	18

Appendix-K

Permission Emails of Instruments

10/14/21, 10:10 AM National Institute of Psychology(NIP), Quaid-i-Azam University, Islamabad Mail - RE: Permission for WCFS for PhD Research

NIP

Arooj Mujeeb <aroojmujeeb@nip.edu.pk>

RE: Permission for WCFS for PhD Research

Gilad Chen <giladchen@rhsmith.umd.edu> Sun, Apr 15, 2018 at 6:29 PM
To: Arooj Mujeeb <aroojphd14@nip.edu.pk>

Yes, no problem

Gilad Chen, Ph.D.
Robert H. Smith Chair in Organizational Behavior
Editor, *Journal of Applied Psychology*
Robert H. Smith School of Business
4536 Van Munching Hall
University of Maryland
College Park, MD 20742-1815
Phone: 301-405-0923
Email: giladchen@rhsmith.umd.edu
Website: http://www.rhsmith.umd.edu/directory/gilad-chen

From: Arooj Mujeeb <aroojphd14@nip.edu.pk>
Sent: April 15, 2018 9:27 AM
To: giladchen@rhsmith.umd.edu
Subject: Permission for WCFS for PhD Research

Dear Chen,

I am Arooj Mujeeb from National Institute of Psychology, Quaid-I-Azam University, Islamabad. I am conducting Research on job demand-control model and want to see its applicability in pharmaceutical companies employee. I am taking cognitive failures as an outcome in the study and your scale seems to be the most relevant in that work setting. Can you please grant me permission for its translation, adaptation, and usage with Pakistani population? Waiting for your affirmative response anxiously.

https://mail.google.com/mail/u/0?ik=39e89e60c1&view=pt&search=all&permmsgid=msg-f%3A1597819043280913985&simpl=msg-f%3A15978190432... 1/2

NIP

Arooj Mujeeb <aroojmujeeb@nip.edu.pk>

Permission for using CFS in PhD Research

Chalder, Trudie <trudie.chalder@kcl.ac.uk> Tue, Aug 2, 2016 at 9:52 PM
To: Arooj Mujeeb <aroojmujeeb@nip.edu.pk>

Dear Arooj

Please find attached the FQ and related information.

Kind regards Trudie

Trudie Chalder PhD

Professor of Cognitive Behavioural Psychotherapy,

Department of Psychological Medicine,

King's College London,

Weston Education Centre,

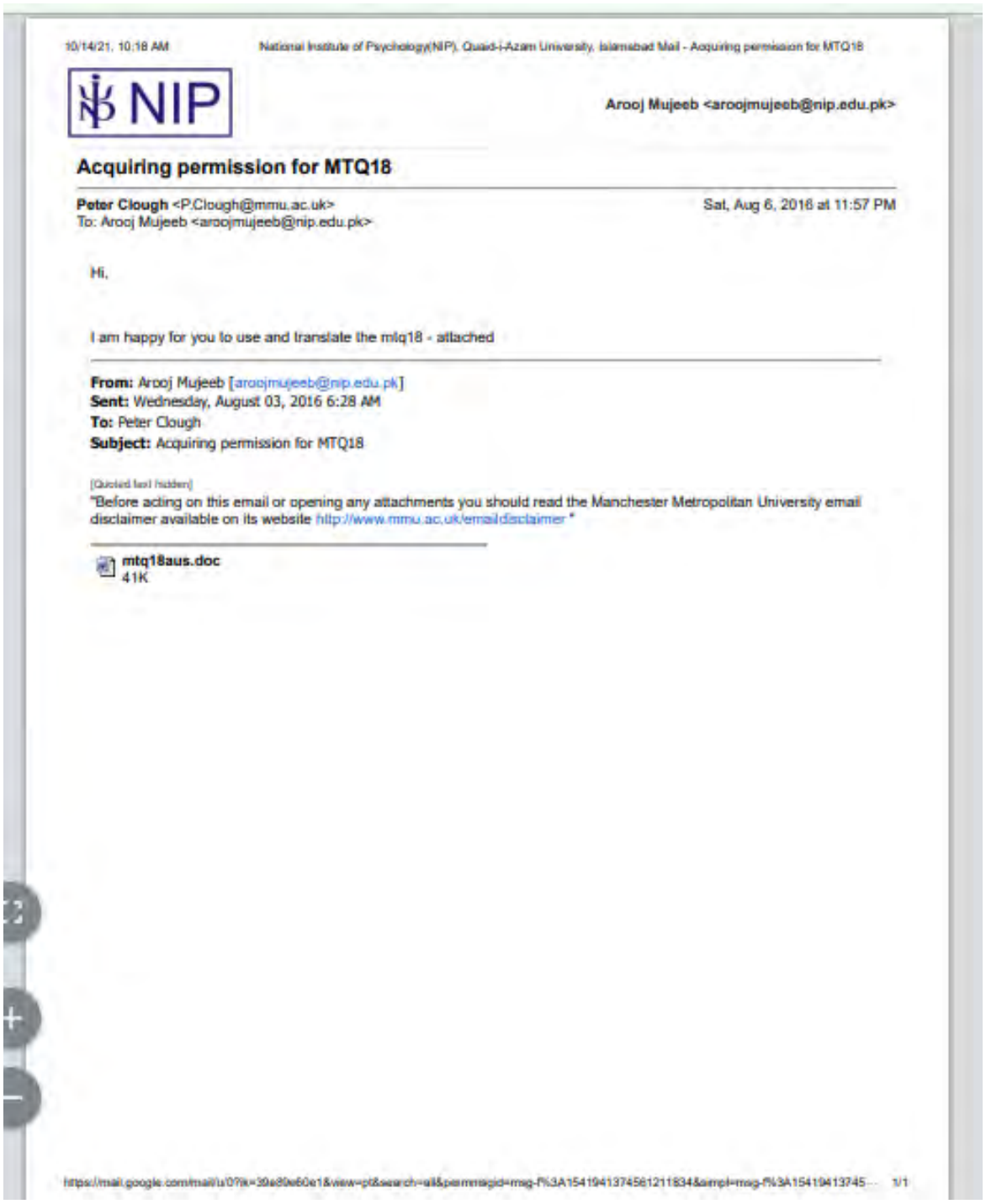
Cutcombe Road,

London

SE5 9RJ

[Quoted text hidden]

Fatigue Q and description.rtf
105K



10/14/21, 10:18 AM National Institute of Psychology(NIP), Quaid-i-Azam University, Islamabad Mail - Acquiring permission for MTQ18

NIP

Arooj Mujeeb <aroojmujeeb@nip.edu.pk>

Acquiring permission for MTQ18

Peter Clough <P.Clough@mmu.ac.uk> Sat, Aug 6, 2016 at 11:57 PM
To: Arooj Mujeeb <aroojmujeeb@nip.edu.pk>

Hi,

I am happy for you to use and translate the mtq18 - attached

From: Arooj Mujeeb [aroojmujeeb@nip.edu.pk]
Sent: Wednesday, August 03, 2016 6:28 AM
To: Peter Clough
Subject: Acquiring permission for MTQ18

[Quoted text hidden]
"Before acting on this email or opening any attachments you should read the Manchester Metropolitan University email disclaimer available on its website http://www.mmu.ac.uk/emaildisclaimer "

mtq18aus.doc
41K

https://mail.google.com/mail/u/0?ik=39e89e60e1&view=pt&search=all&permmsgid=msg-f%3A1541941374561211834&simpl=msg-f%3A15419413745... 1/1