

Executive Functioning and Distress Tolerance: A Moderating Role of Age and Family System

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The current research was aimed to explore the moderating role of age and family system in the association with deficits in executive functioning and distress tolerance in university students. The cross-sectional research design was used and a stratified sample of 170 university students was taken in terms of gender, family system, and age. Barkley Deficit in Executive Functioning Scale (Barkley, 2012) and Distress Tolerance Scale (Azhar et al., 2018) was given to participants with a demographics sheet. The result of the study claimed that deficits in executive functioning, age and family system were significant positive predictors of distress tolerance in university students. Moreover, in early adulthood, the conditional effect of deficits in executive functioning on distress tolerance was more statistically significant than in middle adulthood. However, the effect was nonsignificant in late adulthood. Furthermore, the conditional effect of deficits in executive functioning on distress tolerance is significant in university students from nuclear family system and non-significant in students from joint family system. The study would be helpful to understand the issues of university students and to provide counselling to them. Besides, early and timely identification of risk and protective factors of deficits in executive functioning would prevent serious consequences in university students.

Keywords. Deficits in executive functioning, distress tolerance, sensation seeking, university students

University era is the most important and crucial phase of student's life where different new challenges are confronted to the students which demands higher level of tolerance and effective

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executive skills (Deveau et al., 2014; Jacob & Parkinson, 2015; Pasek et al., 2015). Inclusive of different curricular and extracurricular tasks causes distress in students which demands high level of self-control and self-regulation (Diamond, 2013). Different studies in Pakistani culture suggested that in universities competition is quite tough where every student try to beat the other and every student want to ensure good CGPA (Best & Miller, 2010; Chein & Morrison, 2010; Mahmood & Saleem, 2013). In such scenario, different counsellors working in different universities of Pakistan reported that a vast ratio of students consulted them with issues like lack of distress tolerance or frustration intolerance which subsequently further leads to several other health compromising behaviors in them (Aftab et al., 2020; Barki et al., 2020; Kratovic et al., 2021).

In this regard, distress tolerance is a construct which is least explored in nonclinical population and referred as the ability to withstand with negative and worse condition which demands high level of self-control (Azhar et al., 2018; Fush et al., 2014). Different theories of distress tolerance highlighted that distress tolerance in university students enhances their quality of life and increases goal oriented behavior in them (Romer et al., 2011; Zelazo et al., 2013). Lack of distress tolerance is a construct not well-explored yet however, there are a number of studies that significantly claimed that university students used to exhibit intolerance to academic and interpersonal distress in there university years which gives direction to an in depth investigation of its exploration in university students (Dahl, 2004). Different researches also claimed that inability to tolerate distress is a pathogenic cause of different health compromising behaviors such as drug addiction (Khattak et al., 2012), excessive smoking (Zaman & Hassan, 2015), rule breaking behavior (Usman et al., 2017), anti social tendencies (Sullivan et al., 2002) and suicidal ideation (Gulliver et al., 2019). Therefore, it is needed to investigate distress tolerance and its predictors thoroughly.

Moreover, multiple studies conducted in the past highlighted that university students who exhibited lack of distress tolerance used to have lack of self-control and self-regulation in them which directly relate deficits in executive functioning with distress tolerance and give direction to future research regarding it (Said, 2013). Not only this, deficits in executive function such as self-monitoring, inhibition and lack of problem solving also linked with distress tolerance through different research (Loosli et al., 2012). However, executive functioning is a construct originated from neuropsychological studies and it included an array of skills needed for higher order functioning such as planning, construction and implementation of new goals,

organizing needed resource and accomplishment of affective strategies (Reynolds et al., 2007). Besides, deficits in executive functioning are also reported commonly in university students and taken as risk factors of different psychological, social, interpersonal, academic, and behavioral problems (Morris et al., 2014; Shamosh et al., 2008).

Therefore, review of past literature on executive functioning and distress tolerance revealed the nature of relationship between both variables in a way as deficits in executive functioning has a significant positive correlation with distress intolerance and inverse relationship with distress tolerance as the students who used to exhibit deficits in executive functioning also used to possess lack of ability to tolerate distress (Azhar et al., 2018). In this regard, distress tolerance is directly linked with deficits in executive functioning and causes several negative consequences in a long turn (Diamond & Ling, 2016). Not only this, different leading consequences is attached with ineffective executive function in university students such as drug consumption in uncontrollable conditions (Bialystok & Barac, 2012) academic downfall (Barker et al., 2014; Chevalier et al., 2015) boredom proneness (Davis et al., 2011) sensation seeking behavior, lack of time management and lack of emotional control (Nessa et al., 2008). All these researches highlighted the risk factors attached with deficits in executive functioning in relation to intolerance to survive in distressed conditions.

However, review of the existing literature links the role of different demographic variables such as age and family system with executive skills such as self-control, self-regulation and distress tolerance which give direction to the current research to study these demographic variables in university students in relevance to deficits in executive functioning and distress tolerance (Saleem et al., 2013). In this regard, age and family system are two significant constructs to explore their moderating role on deficits in executive functioning and distress tolerance because few research conducted in past linked that lack of self-control and self-regulation is usually observed more significantly in early years (Rabia et al., 2019). Not only this, but distress tolerance is also linked with aging in few researches (Bukhari & Khanam, 2015). Besides, family systems in terms of nuclear and joint families are one of the significant factors that affect interpersonal, academic, social, and psychological life of the young living in Pakistan (Azhar et al., 2020) which also directs this research to explore family system as a moderator of distress tolerance and executive functioning.

One such research reported that these skills gradually develop in the lifespan of an individual and can be best exhibited with the

passage of time but they are mostly expressed and utilized in adulthood where need of self monitoring and emotional regulation is increased with increase in social circle of university students (Cohen, 2006; Selby & Azrin, 2008). Moreover, it is suggested that early adulthood is marked with more deficits in skills like problem solving and self-regulation but gradually till late adulthood it became polished where role of experience played a pivotal part in it (Espy et al., 2011). Review of the previous literature also suggested that deficits in executive functioning are more prominent in early adulthood such as self-control is least observed and intolerance to frustration is mostly expressed in early year university students (Gioia et al., 2000).

Not only this, other empirical evidence suggested the role of family system and home environment in expression of deficits in self controlling, problem solving, self monitoring and emotional regulation (Vohs & Schmeichel, 2003; Wibrowski et al., 2016). In this regard, research suggested that those students who belonged to joint families usually exhibit lack of self-control and intolerance to distress than those who belong to nuclear families (Azhar et al., 2020; Tull et al., 2007). Multiple studies in this context highlighted the significance of the present study as on such research by Huizinga and his colleagues (2006) significantly relate the role of family system with indecisiveness of the students and claimed that those students who belonged to nuclear families usually make their decisions independently but the students who have been brought up in joint families used to show indecisive behavior (Huizinga et al., 2006). However, the results of the study by Huizinga is on decision making is quite relatable to the present research because decision making is included in a higher order skills and representative of the executive functioning in students. Another empirical study by Kishiyama and his colleagues (2009) relate self-controlling and disciplined behavior with family system and suggested that people who belonged to nuclear family system used to show more self-controlling behavior than those who belongs to joint families which is because if the presence of elderly grandparents that supports and pampered the young in early age (Kishiyama et al., 2009). Moreover, role of family system is also linked with distress tolerance through the multiple researches conducted in the past as the results of one such study claimed that students from nuclear family systems used to show tolerance to stressed conditions in most of the crises situations and keep their morale high but students from collectivistic family culture face more hardships in their daily lives and used to feel more trusted and give up earlier than those who have been from nuclear families (Lakes et al., 2004).

Another such research on young adults suggested that family system plays a significant role in self formation of the young where higher order executive tasks are polished, and independence is nurtured relatively in higher degree in young adults from nuclear families. However, in joint family's support is always provided to the early adults by multiple family members therefore higher order functioning is usually less developed in adults from joint families (Lan et al., 2011; Lee et al., 2013). Moreover, age also significantly impact the development of executive skills in University Students where it is suggested through the past researches that students enrolled in early years in universities shows lack of self-control and distressed behavior than in later years where more self-controlling and regulatory behavior in observed in them (Rabia et al., 2019).

The rationale behind conducting the present research on university students was highlighted through the review of previous literature which stated that university students are in the growing phase of their life where they used to face more difficulties such as sudden exposure of independence and inclusion of new goals in their life which demands high level of self-control and tolerance to withstand in adverse circumstances (Adesope et al., 2010; Barnett et al., 2008; Reynold et al., 2007). Moreover, previous literature significantly claims age and family system as significant moderators of executive skills as self-control, self-regulation, and ability to survive in distressed situation in the lives of university students. This highlighted the need to conduct an in-depth study to investigate the role of age and family system on executive skills and the ability to tolerate distress in university students. Therefore, it is hypothesized that age and family system are the significant moderators of deficits in executive functioning and distress tolerance in university students. Objective of the study is mainly to highlight the role of age and family system in executive functioning and distress tolerance of university students mainly students of which age group shows more deficits in executive skills and ability to tolerate distress. Furthermore, it is aimed to explore the role nuclear or joint family systems in polishing executive skills and tolerance to survive in distress situation in university students.

Method

Participants

Sample of 170 (81 men that were 48% and 89 women that were 52%) university students was selected through a stratified sampling technique. Data was taken from three private universities of Lahore, Pakistan. Strata were made in terms of age and family system to

maintain a level of the homogeneous sample. All students were enrolled in BS degree program (semester 1 to 8). No specific department was specified for this purpose. Participants were having an age range of 20 to 26 years ($M = 22.78$, $SD = 1.75$). Those participants who were above and below the age range decided for the study was excluded from the research. However, physically disabled or any sensory disabled individuals were also excluded due to not meeting the criteria of the research.

Measures

Barkley Deficits in Executive Functioning Scale

Barkley Deficits in Executive Functioning Scale (BDEFS; [Barkley, 2012](#)) was used to find out the deficits in executive functioning of participants. There was a total of 89 items of BDEFS with 4-point Likert scale as 0 (*never*) and 3 (*being very often*). A participant could not score higher than 356. The higher the score revealed, the more deficits in executive Functioning and lower scores showed expression of executive Functioning in daily life. Moreover, there were a total of five factors of the scale including self-management to time, self-organization, self-restrained, self-motivated, and self-regulation of emotions. The first factor self-management to time contains 17 items with $\alpha = .87$, self-organization contained 19 item with $\alpha = .90$, self-restrained behavior contained 15 items with $\alpha = .82$, self-motivation with items eighteen and $\alpha = .91$ and emotional regulation with items twenty and $\alpha = .88$. However, Barkley Deficits in Executive Functioning Scale ([Barkley, 2012](#)) is referred to as a reliable tool for measuring deficits in executive functioning of adults with the value of ($\alpha = .93$). Moreover, higher scores are interpreted as indicating greater deficits in executive functioning and the scoring range was 0 to 264 in other indigenous studies.

Distress Tolerance Scale

To assess the manifestation and expression of distress tolerance and intolerance in university students Distress Tolerance Scale ([Azhar et al., 2018](#)) was used. The scale consisted of 49 items based on a 4-point Likert scale where 0 was *never* and 3 *being very often*. Participants who scored high on the scale revealed their ability to withstand distressed conditions and who scored low showed themselves being distress intolerant. Moreover, Distress Tolerance Scale ([Azhar et al., 2018](#)) consisted of two factors namely lack emotional regulation and negative appraisal. Factor one namely lack

emotional regulation contained 31 items and factor two namely negative appraisals contained 18 items. The distress tolerance Scale (Azhar et al., 2018) was also found reliable with Cronbach alpha value of ($\alpha = .90$). Furthermore, the scoring range of the distress tolerance scale was 0 to 147 with greater scores showing greater intolerance.

Ethical Considerations

While conducting the study certain ethical considerations were followed. Permissions were sought from the authors of the scales that were used to gather data. Furthermore, before handing out the questionnaires, consent was taken from each of the participants. Moreover, participants were also briefed regarding the privacy and confidentiality of the data taken from them. Finally, the right to withdraw from the research at anytime without any penalty was explained to all the participants.

Procedure

After getting approval from Institutional Review Board (IRB), participants were approached individually and informed about the aims and objectives of the research. Verbal informed consent was taken and ethical issues were explained to all of the participants. Before handing out the research protocol, detailed instruction regarding research was given to the participants. Participants nearly took 10-15 minutes to fill out the entire questionnaire. The participants were encouraged to ask a question regarding any confusion.

Results

Hayes (2018) bootstrapping approach was used to investigate the moderating role of age and family system in the association of deficits in executive functioning and distress tolerance. Results presented in Table 1 indicate that deficits in executive functioning and age were found significant positive predictors of distress tolerance. Moreover, the interaction effect of deficits in executive functioning and age was also significant. Therefore, the conditional effects of deficits in executive functioning on distress tolerance at different levels of age were analyzed, where at early adulthood the association of deficits in executive functioning and distress tolerance is high level of mental health problems as compared to middle adulthood. However, during late adulthood the association of deficits in executive functioning and distress tolerance becomes non-significant. The interaction plot is also given with the Table.

Table 1

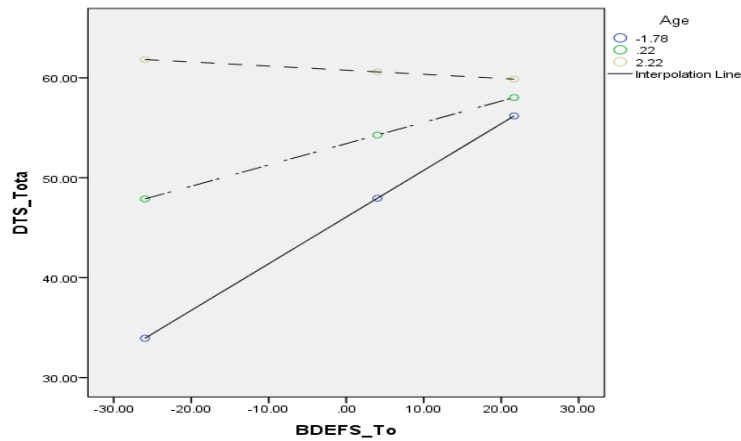
Regression Analysis Examining the Interaction Effect of Deficits in Executive Functioning and Age on Distress Tolerance (N = 170)

Variables	Distress Tolerance			
	β	SEE	95% CI	
			LL	UL
Constant	52.59	1.10	50.42	1.10
Deficits in Executive Functioning	.24***	.06	.13	.06
Age	3.67***	.64	2.42	.64
Deficits in Executive Functioning x Age	-.13***	.03	-.19	.03
Early Adults	.47***	.07	.33	.07
Middle Adults	.22***	.06	.10	.06
Late Adults	-.04	.10	-.24	.10
R^2	.36			
F	31.14***			

*** $p < .001$.

Figure 1

Interaction Plot of Age in association of Deficits in Executive Functioning and Distress Tolerance in University Students



The figure above significantly depicts the contrast of various age groups of the university students namely early adulthood, middle adulthood and late adulthood.

The interpretation line depicts the conditional effects of deficits in executive functioning on distress tolerance at early adulthood significantly.

Table 2

Regression Analysis Examining the Interaction Effect of Deficits in Executive Functioning and Family System on Distress Tolerance (N = 170)

Variables	Distress Tolerance			
	β	SE	95% CI	
			LL	UL
Constant	53.45***	1.14	51.19	55.70
Deficits in Executive Functioning	.19**	.06	.07	.30
Family System	12.93***	2.29	8.42	17.44
Deficits in Executive Functioning x Family System	-.49***	.11	-.71	-.27
Nuclear Family System	.44***	.07	.30	.58
Joint Family System	.48	.09	-.22	.12
R^2	.38			
F	33.91***			

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

Table 2 indicates that deficits in executive functioning and family system were found significant positive predictors of distress tolerance. Moreover, the interaction effect of deficits in executive functioning and family system was also significant. In nuclear family systems the association of deficits in executive functioning and distress tolerance was significant. However, in joint family systems the association of deficits in executive functioning and distress tolerance becomes nonsignificant.

Figure 2

Interaction Plot of Family System in Association of Deficits in Executive Functioning and Distress Tolerance in University Students

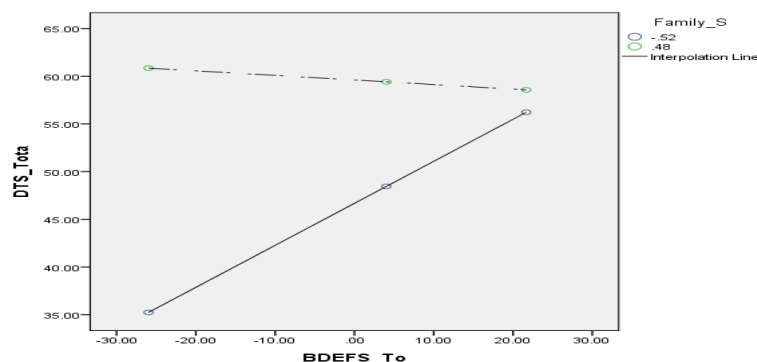


Figure 2 significantly depicts the contrast of both nuclear and joint family system of the university students in reference to deficits in executive functioning and distress tolerance. Moreover, the interpretation line depicts the conditional effects of nuclear family system on deficits in executive functioning and distress tolerance of university students.

Discussion

The research under discussion was conducted to explore the role of age and family system as significant moderators of deficits in executive functioning and distress tolerance among university students. However, the results of the study revealed the significant role of age and family system as significant moderators of deficits in executive functioning and distress tolerance among university students where more significant results were found in early adults than middle adults. Besides, the results were insignificant for late adults which showed that university students who fall in the age of early adulthood exhibit lack of distress tolerance due to deficits in their executive functioning than students who were in age range of middle adulthood. Moreover, the results of the study significantly claim nuclear family system as moderator of distress tolerance along with deficits in executive functioning in University Students.

In this regard, review of the previous literature revealed that there is multiple studies conducted in the past that indirectly refer to the relationship of deficits in executive functioning and distress tolerance among university students and role of age and family system as significant moderators of deficits in executive functioning and distress tolerance among university students which were the results of the current study. Here, the current research is supported by the study conducted indigenously by [Azhar et al. \(2020\)](#) supports the results of present study in a manner as it also claimed the role of age and family system when explains distress tolerance. It is claimed in the study that home environment, role of parents and age of the university students significantly impact the mental health of the students as well as their ability to withstand distressed conditions ([Azhar et al., 2020](#)).

Another such work on deficits in executive skills such as self control, self monitoring, time management and problem solving are commonly reported in university students which directly linked with their age as in early years of university. The results of the study reported that the students in early years of university show lack of self-control, emotion dysregulation and lacks in problem solving skills which supports the results if the present study ([Bettis et al., 2017](#)). The

results of the present finding also supported the previous research and claimed that deficits in executive functioning are the significant predictors of distress tolerance in university students which was previously explored by a research conducted by [Orcutt and Bardeen \(2013\)](#) who highlighted the role of age and ability to survive in stressful environment where they observed adults at workplace and claimed that employees with growing age works better with the distress oat workplace than the young employees. The work by Orcutt and Bardeen also supports the current study because the results significantly claimed that early adulthood is a significant moderator of distress tolerance among universities students than middle or late adults ([Orcutt & Bardeen, 2013](#)).

Moreover, another such study explores the relationship between frustration intolerance and lack of self-controlling behavior by [Webb et al. \(2020\)](#). The result of the study supports the present study in a way as the results of the present study also suggest role of executive functioning in predicting distress tolerance and also suggested the role of age as a significant moderator of distress tolerance of university student ([Webb et al., 2020](#)). Furthermore, a comprehensive work by Romer and his colleagues (2009) supports the results of the present research where the researcher explored the role of family system as extended and small family system as predictors of mental health problems in adults including distress ([Romer et al., 2009](#)). Not only this, different other researches also supported the present research that adults who belonged to joint families used to exhibit lack of self-control and impulsive behaviors they express rage in distressed conditions and posses lack of problem solving skills ([Casey et al., 2005](#); [Feldner, 2006](#); [Moffitt et al., 2011](#)). In one way or the other, empirical data conducted in past supports the results of the present study and significantly highlighted the role of age and family system as moderator on distress tolerance of university students ([Carlson & Meltzoff, 2008](#)).

Conclusion

The current research is a groundbreaking work which highlighted that deficits in executive functioning, age and family system are significant positive predictors of distress tolerance in university students. Moreover, university students that fall in the criteria of early adulthood used to have high level of distress intolerance than those who fall in the criteria of middle adulthood. However, results are non-significant in late adulthood university students. Furthermore, family system is also a significant predictor of distress tolerance deficits in

association of deficits in executive functioning. University students who belonged to nuclear family system are statistically more distress tolerant than students from joint family system in association of deficits in executive functioning.

Limitations and Suggestions

Despite the novelty of the topic the sample size is too small to generalize its results at the national level. A larger sample size is recommended for future researches so that the findings of the study would be generalized in future on university students. It is also suggested to conduct researches on executive functioning and distress tolerance of the adolescents and college level students too so that a better understanding of the age as a significant moderator would be created. Moreover, data was collected from only Lahore city and it might be possible that university students of other cities show different expressions. Therefore, in the future, more researches would be conducted to see if university students of other cities also show the same results. Besides, other than age and family system, there are other moderators too that impacts the level of distress tolerance in University Students. Therefore, it is recommended to future researchers to work on more influential moderators so that the intolerance of distress would be reduced in students enrolled at university level,

Implications

The study will help the university students, family and teachers to understand the predictive role of deficits in executive functioning, age and family system on distress tolerance of university students. Moreover, it will help parents to understand the role of family system in terms of nuclear and joint family system in executive functioning and distress tolerance of the university going students. The current research will help the educational institutes to create understanding about the nature of the problems of university students as how their demographics such as age and family system can predict lack of self-control and self-regulation in distressed condition in students.

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