

Bonding, Academic Culture and Aggressive Behavior among University Students in Pakistan

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Abstract

Aggression at universities has become a serious problem not only for developed but also for underdeveloped states across the globe. Growing violence at the campus is becoming a routine. Frequent incidences of violent conflicts and even killing in some cases at the campus has drawn the attention of scholars and made it an important area of research and investigation. This study was set out to understand students' violent behavior and factors contributing to their violent behavior at the campus. A sample of 375 students was selected from different faculties of two universities from Islamabad city. The data came through a well-structured questionnaire. Multiple regression analysis was performed to see the effect of bonding and academic culture on aggressive behavior students at the university. Findings show that bonding and academic culture significantly predicts i.e. 16% of aggressive behavior of university students. It is, therefore concluded that low level of bonding and poor academic culture at the university exacerbate violent, aggressive or non-confirmatory behavior among students.

Key Words: Bonding, Academic culture, Aggressive behaviour, University Students

Introduction

Aggression has become a normal behavioural expression among youth, particularly at universities. Frequent incidences of fights, harm, use of weapons, and even killings are drawing the attention of researchers around the world (Sun & Shi, 2017). The growing involvement of youth in violent and criminal acts is becoming a serious challenge to both developed and developing worlds and Pakistan is not the exception. Scholars are widely considering aggressive behaviour as a social problem involving youth at general and university students at particular e.g. (Yang & Wang, 2012; Wang, Shi & Jin, 2019). Campuses are the reflection of a society and violence at campus shows a growing tendency towards a violent society. There is a dire need to look at the issue by putting serious efforts (Whitaker & Polland, 2014).

Aggressive behaviour has been studied from psychological, criminological lenses and many factors were found responsible for it. Substantial empirical literature has identified clinical, psychological causes, and consequences of aggression. Social aggression was also found responsible for aggressive behaviour (Dodge, 1983; Lochman & Dodge, 1998). Many studies predicted violence and criminal outcome as a result of aggressive behavior (Kabasakala & Bas, 2010). Many scholars found aggressive behavior as risk factors for delinquency, school dropout, and substance abuse (Broidy et. al., 2003). Heilbron & Princtien (2008) have pointed out towards physical and mental health consequences, poor academic performance, interpersonal communication, and social adjustment.

Act of intentional harm and aggravation can be perceived as aggression (Anderson & Bushman, 2002). Communities around the world are trying hard to lessen the negative impacts of violent behaviour. They are employing different institutions and approaches to produce favourable and envisaged results. The issue has

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become a challenge and crept into different organization including schools, colleges, and universities. Aggression generally is taken and intension to hurt or harm someone or their assets. [Khawla & Yahya, \(2003\)](#) mentioned that aggression ranges from physical, verbal to symbolic depending upon its nature, characteristics, intention, and level of harm or hurt. It includes the use of force to hurt some to stare or passing negative comments. Looking at the gravity of the issue, it has now been realized to support, strengthened and enhancing the social and political arrangements to ensure normal and non-violent behaviour among citizens. However, factors like academic bonding, academic culture, teacher's behaviour, and administrative staff behaviour have rarely been researched against aggressive behaviour in universities. This research intends to find out the association of bonding and academic culture with aggressive behaviour at university. This research has significant theoretical and practical implications.

Review of Literature

University violence is an act characterized by hurting, vandalism, and harming others physically and morally. This phenomenon is one of the obstacles that stand in the face of the process of reform, progress, and renewal of education. It did not come from a vacuum but is the result of previous circumstances and problems as related to the university environment, such as no availability of places and leisure for students, or a lack of playgrounds and enough yards or a lack of educational atmosphere that brings them to develop their abilities, hobbies, and experiences through participation in extracurricular activities. The scope of the university has reached above to mere transfer of a prescribed and predesigned set of teaching and learning. Now the universities are the innovative spaces of innovation, new skills, and state of the art life skills. They are now providing spaces for social experimentations where the students are encouraged thinking out of the boxes and developing personalities that are more responsible, responsive, informed, and active citizens. They are transformed into personalities with futuristic orientation, vision, and leadership skills. The students are not passive learners and blank sheets anymore. They know how to respond to a local or global challenge.

Universities contribute to inculcate values and practices which affect the behavior of students, but it has been noted with great concern beatings, insults, destruction of the university properties, teachers, and students' personal properties as well. Aggressive students also attack teachers and staff by writing insulting expressions on walls, and sexual harassment towards the other gender. Such conducts have negative impacts on the productivity of young people, and they enhance student's disagreement with their environment. Accordingly, the researcher is much encouraged to identify the level and type of aggression practiced by the students ([Muhammed, 1981](#)).

A study found that aggression was used to enhance social statue, enact social identity, assert pressure, seek justice, and complete a dare. It was also noted that there are many factors involved in shaping of violent behavior of students at the campus. Aggressive behaviour is the result of biological composition, character, familial, economic, and cultural imperatives in the social environment of the aggressor ([Mahee & Muammria, 2004](#)). [Abu Zant \(2002\)](#) pointed out that it should be noted here that the university imparts education and familiarized students with scientific innovations. The university polishes the character of its learners and makes them future leaders. The university taught them to be tolerant and expose them with different and sometimes contrasting beliefs. The university turns the personalities of students to be appreciating and admiring multiculturalism and pluralism instead of being aggressive and violent ([Ashour, 2012](#)).

Students' violence at the campus is a very serious and complicated issue. As the violence is taking place at a university does not mean that only academic issues are responsible for this violence. It is, sometimes the combination of multifarious factors including social, cultural, environmental, intellectual, and psychological. The complexity of the issue needs a comprehensive strategy to overcome the issue ([Almerab, 2017](#)). Youngsters do not consider them the culprits. They justify violence to confront injustice and discrimination. Their heroic actions are supported by the fellows and hardly have they convinced them that others may be right. The gravity of menace proposes a deep-rooted investigation to find out the root cause ([Al Gdha & Dhagar, 2016](#)). The spread of aggressive behaviour among students is also noted in the form of beatings, insults, destruction of the university properties. They destroy teachers' and students' personal properties as well. They also attack teachers and staff by writing insulting expressions on walls ([Muhammed, 1981](#)).

In a research study at American university indicates that though both male and female university employees face violence and harassment however, female members have to face more. Male members have more safety support and they face less numbers of incidences of violence and harassment at the campus ([Bryden & Fletcher, 2007](#)).

[Al-Zubi and Mahafda \(2007\)](#) investigated the relationship of socioeconomic characteristics of university students with their aggression and violence. They came up with the finding that aggression is more fatal to the committer than to the victim. They also find that gender of the students, place of their residence, and academic level helped predict aggression and violence. The study did not find an association between other variables like the type of family and financial status of the family. [Almerab \(2017\)](#) thinks that the absence of religious and moral values, proper counselling for violent students, an ethnic-based grouping of students at the campus, and low academic performance and achievement are also the contributing factors of violence at campus.

In another study conducted by Al-Fokhaa (2001) on violent behaviour of students found that violence was a permanent component of students' personalities. The violent behaviour was found across different groups of students enrolled in different faculties and programs in the university. The study also confirmed the findings of the previous studies e.g. (Al-Zubi & Mahafda, 2007), and found a positive association of cumulative grades, gender, and contact with violent relatives. However, they did not find years of schooling and income of the family as the factors responsible for violence in the students enrolled in the university.

Abu Mustafa and Al-Samiri (2008) in a survey of university students found that sad, painful, worrying, stressful, and upsetting incidences were very important to determine and comprehend the violent behaviour in the study respondents. The respondents showed that they want to hit their unwanted fellows and destroy the department/ faculty assets. They also find the association of years of enrolment and violent intention to cause damage to faculty assets.

The study of Abdallah and Fokaideh (2009) indicated that males show more aggression and violence towards others as compared to female students enrolled in the same departments and university. The study also explored that though violence was there in the male however, this was not at a higher level. The research also pointed out that enrolment and the number of years spent in different faculties did not show any statistical significance to violence. [Ghoneim \(2012\)](#) in research found that college students were less confrontational and stropic. However, there was a considerable difference between male and female, accumulated grades, and the total time spent by students in the college regarding aggression. And there was no statistical difference regarding the department of enrolment and subjects. [Muhafza \(2014\)](#) found that poor admission process, co-curricular activities at campus, political groups of students, academic rules and regulation and ethnic-based political groups are the factors associated with violence at the university campus.

Similar research conducted by Al-Hooley and Khalifa (2004) confirmed the violent behaviour in males. The study was designed to see the influence of drug use on students. The study highlighted the presence of hostility and belligerence in smokers. Smoking was also associated with substance abuse and an indication of antagonistic behavior.

Delinquent peers are one of the very important sources of violent behaviour. Peers are very influential in shaping up the personality of the young. Friends share happiness, sorrows, success, failures, and adventures. Friends' suggestions become bindings and pressurized young to go with their behaviours including violence (Buehler, Cook, & Henson, 2009). Parenting plays a very important role in the shaping up the personalities of the children and develop their attitudes towards different things. It is widely known that the democratic attitude of parents helps develop calm and non-violent children however, the dictatorial style of parenting promotes violence and disobedience in children. It was found that strict parents paved the way for hostile and destructive behaviour in children including young ([Lyons-Ruth, 1996](#)).

[Hassan and Ageed \(2015\)](#) studied violence in university students in Sudan. They highlighted that parental attitude, conflict in the area, weak university administration, lack of academic culture, and psychological issues including anxiety and stress were the common factors causing violence and aggression among university students. They also pointed out that violence brings serious personal, academic, and communal consequences. The violent

students not only pose threats to other students and university teachers but also them. They came up with lower grades and academic achievement and turned into violent and criminal in their later age.

[Almakhreez \(2006\)](#) identified the reasons for students' violence at university in Jordan. He emphasized behaviours of faculty members, overall university policies, rules and regulation, social, political, and psychological factors are among the important reasons for violence at university. In another research conducted by [Tawalbah \(2013\)](#) considers lack of strict action against culprits by the university administration, confusing rules and regulations at campus, and involvement of faculty members are the key reasons behind the violence at the campus.

[Kaufman et al. \(2019\)](#), in their research on gender-based violence at campus, pointed out that violence can be the outcome of peer suggestions, authoritative personality, low self-esteem, substance abuse, and stereotypical beliefs regarding gender, caste, or ethnicity. They also noted that personal failure to acknowledge differences and control aggression or violence can be yet another important reason.

[Mercy \(2002\)](#) said that emotional distress makes people vulnerable to different psychological challenges including hostile and violent behaviour. Emotionally weak persons find it very difficult to take charge of them and drove them to a normal way. This inability restricts them to be at higher moral values and resultantly, lower their social standing and social status in their community. They face decreased trust and avoidance in their daily routines. The review of the literature encapsulates that different social, cultural, psychological political, economic, administrative, and academic factors are responsible for violent and aggressive behaviour of students at school, college, and university. It also points out a research gap in the existing body of literature on aggressive behaviour at campus. None of the studies is found to test bonding and academic culture to predict violent behaviour at the campus.

Methods

A survey was conducted in two universities of Islamabad- the capital of Pakistan. The target population was the students of social science departments of both universities from which a sample of 375 students was selected randomly. A well-designed questionnaire was distributed among selected students of these two universities.

This study was approved by the appropriate boards for its ethical approval. All the students were informed verbally the purpose of this research and the utilization of the data. Before the interview, informed consent was obtained from all the participants.

A well-designed questionnaire comprising different segments was applied to collect the data. It consists of demographic information, subscales including academic bonding, academic culture, teacher's behaviour, administration behaviour and aggressive behaviour. Cronbach's alpha coefficient for all the subscales was within the range of acceptability.

Results and Discussions

The majority of the students 77% ($n = 289$) were aged between 21-30 years. Ethnic affiliation of the students was Punjabi 38% ($n = 143$), Pashtun 33% ($n = 124$), Sindhi 13% ($n = 51$) and Baloch 9% ($n = 34$). The majority of the students were enrolled in BS and MA programs 81% ($n = 304$). Most of the students were living with their families at the time of research 56% ($n = 173$). The majority of the students were affiliated with some of the political parties 55% ($n = 165$).

Table 1. Analysis showing the Effect of Bounding, Academic Culture on Aggressive Behavior ($n = 375$)

Predictors (variables)	Aggressive Behavior	
	Model (Beta)	95% con. Interval L.L, U.L
Bonding	.23***	[0.11, 0.34]
Academic Culture	.23***	[0.14, 0.33]
R^2	.16	
F	17.85***	

*** < .001.

Multiple Regression Analysis (MRA) was run to predict the overall variance in the result variable. Bonding, academic culture was taken as the predictor variable to see the changes in the result variable i.e. aggressive behavior. The .16 value of adjusted R^2 reveals the regression model elucidates 16% variance in the result variable. Results indicated that academic bonding and academic culture significantly predict aggression.

Hypotheses of this research are well supported by the results that low bonding among students and poor academic culture leads them to aggressive behaviour at the university campus. Students at universities are involved in violent behaviour and there is a possibility that they may carry the same behaviour when they are mature and adult. Bonding with fellows either in class or at campus provides a safe and conducive atmosphere for learning. A stream of research clearly indicates that close ties with school/university friends/class fellows, democratic and supportive parenting and friendly behaviour of teachers at the campus can protect students from unhealthy and delinquent behaviour including aggressive and violent behaviour (see e.g. Goldstein & Luthar, 2004; Brookmeyer, Henrich, & Shahar 2005). The role of parents and teachers is very important in shaping up the personalities of the children. It is also emphasized by many research studies for instance (Patterson & Ramsey, 1989; Khawla & Yahya, 2003; Blumstein, 2007; Farrington et al., 2008; Hassan & Ageed, 2015) that parent's involvement in children affairs and sustained guidance through different ways help them develop positive personality traits including respect, care, and conformity. Teacher' behaviour in and outside the classroom motivates many of the learners and inculcate in them the values to lead a good and healthy lifestyle not only at the campus but also outside the campus. Emotional help from parents and teachers protect students from risk-taking and develop a mature and responsible personality.

Many research scholars (see Werner, 1995; Hawkins et. al., 1998; Ghoneim, 2012; Muhafza, 2014; Moffitt, 2017) have elucidated that low academic grades and low level of involvement in school and activities are pushing factors to hostile behaviour. Students with low grades are showing higher tendencies to non-confirmatory behaviour at educational institutes. Bonding with fellows provides a safeguard against the anti-social elements. Students with strong futuristic orientation and career aspirations are proved more law-abiding and less violent at schools and universities. Low levels of commitment and educational aspirations increase the risk of violence. Low academic bonding and lack of interest in education and learning increase the chance of student involvement in violent behaviour.

It was also hypothesized that bad/poor academic culture promotes violent behaviour and aggression in university students. Lack of interest in educational activities and the negative role of student groups at the campus promote aggression in students and fuel the violence on campus. The availability of leisure places for students, playgrounds, and educational atmosphere brings them to develop their abilities, hobbies, and experiences through participation in extracurricular activities (Ashour M., 2012). The university is not just a place of education and information, but it is a rich environment with its ability to satisfy the need for students' cognition and fine-tuning of their personalities. They provide activities infuse the spirit of community, and provide training on leadership, responsibility, and ability to cope up with their problems. Universities contribute to instil values and habits which affect the behaviour of their students. Campuses are the reflection of a society and violence at campus shows a growing tendency towards a violent society. There is a dire need to look at the issue by putting serious efforts (Whitaker & Polland, 2014). Violence brings fatal personal, academic, and communal outcome. The violent students not only pose serious threats to other fellow students and university teachers but also to them. They earn lower grades, poor academic achievement and turned into criminals in their later age.

Conclusion

This research intends to see the role of bonding and academic culture in predicting aggressive behaviour among students at the university in Islamabad. The results through multiple regression analysis, confirmed that bonding and academic culture at the university predicts 16% variation in the aggressive behaviour of students. It is needed to create a rich learning environment at the university to increase learning and innovating, and enhance the bonding among students. This may inculcate the spirits of co-existence and coherence, and help them turn into peaceful and responsible citizens in the society.

Reference

- Abdallah, T., Abu-Fokaitha, J. (2009). Trends of Quds University students about campus Violence, *Journal of the Association of Arab Universities*, (52), 549-599.
- Abu- Zant M. (2002). Manifestations of violence in public schools among elementary students in nablus, master thesis, Al-Najah University.
- Abu-Mustafa N., Al-Sameery N. (2008). Relationship between Stressful Events with Aggressive Behavior among Al-Aqsa University Students, *Islamic University Journal*, 16(1),347-410.
- Al-Fuqaha, I. (2001). The level of the tendency towards violence and aggressive behavior for students at the Philadelphia University. *Dirasat: Educational Sciences*, 28(2), 480-501.
- Al Gdah MA, Dhager D (2016). The reasons for the spread of violence in the Jordanian Universities from the perspective of the university administrations and the role of these administrations in eliminating it. 9(25):165-192.
- Al-Hooly A., Khalifa A., (2004). Manifestations of aggressive behaviour and its relationship with some variables in a sample of students at Kuwait University. *Arabic Educational Journal*, 24(2), 123-170.
- Al-Makhareez L (2006). The phenomenon of violence at public Universities of Jordan: The causes and the role of the students' deanships in dealing with it. An unpublished doctoral dissertation. Amman Arab University for Higher Education, Jordan.
- Almerab, M. (2017). The phenomenon of students' violence at Hail University: Prevalence, causes and suggested solutions from the students' perspective. *International journal of psychology and counselling*, 9(6), 34-41.
- Anderson, C. A., & Bushman, B. J. (2002). Human aggression. *Annual Review of Psychology*, 53(1), 27–51. doi:10.1146/annurev.psych.53.100901.135231
- Ashour M. (2012). University of Violence: *Causes and Solutions*, *Yarmouk Journal*, 9(7), 115-121.
- Atkins, M. S., & Stoff, D. M. (1993). Instrumental and hostile aggression in childhood disruptive behavior disorders. *Journal of Abnormal Child Psychology*, 21(2), 165-178.
- Blumstein, A. & Piquero, A. R., Farrington, D. P. (2007). *Key issues in criminal career research: New analyses of the Cambridge Study in Delinquent Development*. Cambridge University Press.
- Broidy, L. M., Nagin, D. S., Tremblay, R. E., Bates, J. E., Brame, B., Dodge, K. A., et al. (2003). Developmental trajectories of childhood disruptive behaviors and adolescent delinquency: A six-site, cross-national study. *Developmental Psychology*, 39, 222–245. doi:10.1037/0012-1649.39.2.222.
- Bryden P, Fletcher P (2007). Personal safety practices beliefs and attitudes of academic staff on a small university campus: Comparison of males and females. *College Student J*. 41(4):909-917.
- Call, C. (2000). *Sustainable development in Central America: The challenges of violence, injustice and insecurity* (Vol. 8). Institut für Iberoamerika-Kunde.
- Dodge, K. A. (1983). Behavioral antecedents of peer social status. *Child Development*, 54, 1386–1399. doi:10.2307/1129802.
- Dodge, K. A., & Schwartz, D. (1997). Social information processing mechanisms in aggressive behavior.
- Fajnzylber, P., Lederman, D., & Loayza, N. (2002). What causes violent crime?. *European economic review*, 46(7), 1323-1357.
- Farrington, D. P., Loeber, R., Jolliffe, D., & Pardini, D. A. (2008). Promotive and Risk Processes at Deferent Life Stages. In *Violence and serious theft* (pp. 182-242). Rutledge.
- Ferris, C. F. (1996). Serotonin diminishes aggression by suppressing the activity of the vasopressin system.
- Feshbach, S. (1971). Dynamics and morality of violence and aggression: Some psychological considerations. *American Psychologist*, 26(3), 281.
- Ghoneim K. (2012). Attitude of Princess Rahma College Students toward University Violence. *International Education Studies*. 5(3):98-110.
- Hassan, A. E. H., & Ageed, M. E. E. (2015). Student Violence in Universities (Manifestation, Causes, Effects, and Solution's) in Zalingei University-central Darfur State Sudan. *ARPJN journal of science and technology*, 5(2), 80-86.
- Hawkins, J. D., Herrenkohl, T., Farrington, D. P., Brewer, D., Catalano, R. F., & Harachi, T. W. (1998). A review of predictors of youth violence.

- Henrich, C. C., Brookmeyer, K. A., & Shahar, G. (2005). Weapon violence in adolescence: Parent and school connectedness as protective factors. *Journal of Adolescent Health, 37*(4), 306-312.
- Heilbron, N., & Prinstein, M. J. (2008). A review and reconceptualization of social aggression: Adaptive and maladaptive correlates. *Clinical Child and Family Psychology Review, 11*(4), 176–217. doi:10.1007/s10567-008-0037-9
- Kabasakala, Z., & Bas, A. U. (2010). A research on some variables regarding the frequency of violent and aggressive behaviors among elementary school students and their families. *Procedia-Social and Behavioral Sciences, 2*(2), 582–586. doi:10.1016/j.sbspro.2010.03.067
- Khawla & Yahya. (2003). Emotional and behavioural disorders, Dar Alfekerl for publishing and distribution, Amman: Jordan.
- Kaufman, M. R., Williams, A. M., Grilo, G., Marea, C. X., Fentaye, F. W., Gebretsadik, L. A., & Yedenekal, S. A. (2019). “We are responsible for the violence, and prevention is up to us”: a qualitative study of perceived risk factors for gender-based violence among Ethiopian university students. *BMC women's health, 19*(1), 1-10.
- Lochman, J. E., & Dodge, K. A. (1998). Distorted perceptions in dyadic interactions of aggressive and nonaggressive boys: Effect of prior expectations, context, and boys' age. *Development and Psychopathology, 10*, 495–512. doi:10.1017/S0954579498001710.
- Luthar, S. S., & Goldstein, A. (2004). Children's exposure to community violence: Implications for understanding risk and resilience. *Journal of clinical child and adolescent psychology, 33*(3), 499-505.
- Lyons-Ruth, K. (1996). Attachment relationships among children with aggressive behavior problems: The role of disorganized early attachment patterns. *Journal of consulting and clinical psychology, 64*(1), 64.
- Mahafza S., Al- Zubi Z. (2007). Socio-economic and academic factors affecting the tendency toward aggressive Behaviour among the students of the Hashemite University, *Studies, Educational Science, 34*(1), 73-88.
- Mahee I., Muammria B. (2004). Dimensions of aggressive behaviour and its relation with Identity crisis among University Students. *Web of Science Magazine Psychological Arabic, 4*, 14-25.
- Mercy, J. A., Krug, E. G., Dahlberg, L. L., & Zwi, A. B. (2002). The world report on violence and health. *The lancet, 360* (9339), 1083-1088.
- Moffitt, T. E. (2017). Adolescence-limited and life-course-persistent antisocial behaviour: A developmental taxonomy. In *Biosocial theories of crime* (pp. 69-96). Routledge.
- Mohammed A. (1981) Leisure Time in Modern Society, Alexandria: Dar Almarefa Aljamieh for Publication and Distribution.
- Mahafza S (2014). Student Violence in the Jordanian Universities: Causes and Solutions. *Jordan J. Soc. Sci. 7*(1). <http://journals.ju.edu.jo/index.php/JJSS/article/view/6220>.
- Ramsey, E. (1989). Oregon Social Learning Center. A developmental perspective on antisocial behavior. *American Psychologist, 44*, 329-335.
- Sun, S. J., & Shi, Z. Y. (2017). The psychological factors and treatment of school bullying. *Journal of East China Normal University Educational Sciences, 2*, 51–56.
- Tawalbah HM (2013). The reasons for the spread of the phenomenon of students' violence at Yarmouk University and suggestions for possible solutions from the students' viewpoint. *Educational Sciences. University of Jordan. Journal 40*(4):1248-1261.
- Wang, Q., Shi, W., & Jin, G. (2019). Effect of Childhood Emotional Abuse on Aggressive Behavior: A Moderated Mediation Model. *Journal of Aggression, Maltreatment & Trauma, 28*(8), 929-942.
- Werner, E. E. (1995). Resilience in development. *Current directions in psychological science, 4*(3), 81-84.
- Whitaker L, Polland J. (2014). *Campus Violence: Kinds, Causes, and Cures*. London: Routledge.
- Yang, J. P., & Wang, X. C. (2012). Effect of moral disengagement on adolescents' aggressive behavior: Moderated mediating effect. *Acta Psychologica Sinica, 44*(8), 1075–1085. doi:10.3724/SP.J.1041.2012.01075.