| Research Article |

The Mediating Role of Metacognition in the Relationship between Self-efficacy and Self-handicapping on Academic Achievement among University Undergraduates

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Abstract

Academic success is one of the most critical challenges and concerns in academic institutions as well as in student's life, as different factors are contributing to this process. This study aimed to determine the impact of self-efficacy and self-handicapping behavior mediated by metacognition on academic achievement. The sample included 271 (male=109 and female=162) university students' approach from Islamia University of Bahawalpur, both main and sub-campus, through random sampling technique to collect data. The period of study was from January 2023 to May 2023. The assessment included the self-efficacy scale, the academic self-handicapping scale, and the cognitive and metacognitive strategies scale were used in the study. Academic achievement was measured through the CGPA of students. For results analysis, descriptive (frequency, percentage, and mean) and inferential statistics (Pearson correlation, mediation path analysis, and t-test were applied. Findings of the path analysis showed the partial mediating effect of metacognition on self-efficacy and academic achievement. They showed a total effect on self-handicapping behavior and academic achievement among students.

Keywords: Self-efficacy, Self-handicapping, Metacognition, Academic Achievement, Students

Introduction

Academic achievement refers to the level of success or achievement a student or individual attains in their educational pursuits, typically within an academic institution such as a school, college, or university. It is often measured through various indicators, including grades, test scores, class rank, and completion of educational milestones like degrees, certificates, or diplomas (Namoun and Alshanqiti, 2021). Academic achievement is crucial for educational and professional success and plays a significant role in developing qualified human resources that can be effective in the socioeconomic development of a country (Flashman, 2012). One of the most essential factors is a lack of motivation in students. Instructors often report this problem as students show the slightest interest in studies and given projects.

Perceived self-efficacy is an essential feature interlinked with academic achievement. Self-efficacy plays a crucial role in shaping students' beliefs, attitudes, and behaviors in the academic context. When individuals have confidence in their abilities, they are more likely to set and achieve academic goals, persist in the face of challenges, and view setbacks as opportunities for growth. As a result, self-efficacy can positively impact academic achievement and overall academic success (Kadivar, 2003; Aarabian et al., 2005). According to Bandura's social learning theory, self-efficacy is the essential element of achievement and is considered a course of action crucial to attaining a goal by concerning one's capabilities in the implementation of a task (Bandura, 1997). For successful performance, self-efficacy is an important aspect, and it determines abilities to regulate thoughts, feelings, and behavior (Halper and Vancouver, 2016). It is evidenced that people who believe in themselves to complete the assigned tasks show better performance than those who do not believe in themselves. Self-efficacy encourages students to put effort into the learning process (Bandura et al., 2003).

Self-handicapping, self-efficacy, and academic achievement are interconnected in a complex manner. Self-handicapping can be the result of low self-efficacy, and it often leads to lower academic achievement. Self-handicapping, first defined by (Berglas and Jones 1978), is another important factor that has an inverse effect on students' academic achievement. Self-handicapping behavior is a choice of performance that can enhance the

externalized failures and internalize the success by reasonably accepting the credit. It reflects a defensive response to the fear of failure, where learners try to protect their self-image by creating excuses or obstacles. Individuals with self-handicapping behavior decrease their responsibility for their losses to protect their self-esteem and societal reputation (Ahmed et al., 2013). Most of the time, students actively use self-handicapping as a strategy to impose their failures on external conditions rather than accepting the internal factors that contribute towards failures, such as lack of motivation and procrastination, as they do not want to perceive themselves as unskillful and incompetent. In several fields, self-handicapping behavior is practiced, such as in management, sports, workplace, and especially in education, in the form of illness, shyness, lack of interest, excuses, spending time with friends in different activities as well as the use of drugs and alcohol (Atoum et al., 2019; Bobo et al., 2013; Schwinger and Stiensmeier-Pelster, 2011; Alesi et al., 2012).

In essence, metacognition is crucial in facilitating adaptive learning and cognitive strategies. It empowers individuals to take control of their learning processes, set realistic goals, monitor their progress, and make adjustments as necessary. By enhancing metacognitive skills, individuals can bridge the gap between their self-efficacy beliefs and self-handicapping tendencies, and helpful in improving academic achievement. Metacognition enables students to optimize their learning approaches, overcome obstacles, and perform at their highest potential. Students with high levels of self-efficacy tend to apply several cognitive and metacognitive learning strategies to control their motivational enthusiasm. Metacognition and self-efficacy are similar constructs and measured levels of academic achievement. Both relate to an individual's ability to perform a task by problem-solving, acquiring new skills, and improving the learning task performance (Akar et al., 2018). Metacognition is a part of cognitive processing and is responsible for higher mental functioning, such as evaluating, planning, analyzing, and monitoring cognitive reasoning (Fernie et al., 2017). For controlling self-handicapping behaviors with emotions and thoughts, metacognition configures the evaluations and

uses strategies. It strengthens cognition and helps students to be aware of their cognitive system (Roelle et al., 2017).

Therefore, self-efficacy, self-handicapping, and metacognition are essential factors in academic achievement for students because they influence how students approach their learning, cope with challenges, and regulate their behavior and performance. Students with high self-efficacy are more motivated to take on complex academic tasks, persist in the face of setbacks, and engage in active learning. Self-efficacy influences students' motivation, effort, and goal setting, while self-handicapping can negatively impact their performance and self-esteem. Metacognition, however, empowers students to develop effective learning strategies and adapt their approaches to different academic tasks. These three factors shape students' academic achievement and overall success in their educational journey (Gupta and Geetika, 2020). Numerous studies have indicated the relationship among metacognition, self-handicapping, and self-efficacy. Studies showed a negative association between self-efficacy and self-handicapping behavior (Nosenko et al., 2014; Kuczka and Treasure, 2005; Pulford, Johnson and Awaida, 2005). Self-efficacy has a significant role in student's achievement and performance in academics. University students often blame their failure or bad results on external factors. They justify their failure or low grades by making excuses, hindrances, and issues. One of these reasons behind student's behavior is self-handicapping.

Student perceived lack of self-efficacy also increased the self-handicapping in the students. A metacognitive strategy is the way to acquire information, process it, and store it in the mind. From the Pakistani perspective, the current study will be helpful and play an essential role in understanding and increasing awareness for students, teachers, and parents to get rid of behavior related to self-handicapping. The present study aimed to investigate and understand how metacognition plays a directly and indirectly, mediating role in self-efficacy and self-handicapping and how it impacts academic achievement among students. Although there are many studies (Blad, 2017; Prpa, 2017; Kalyon et al., 2016; Sarwat and Frasat, 2014; Schwinger et al., 2014; Hutuleac, 2014; Kazem et al., 2013; Barzegar and Khezri, 2012) which examines the relationship between self-efficacy and

self-handicapping with academic achievement, there are hardly any studies examining the mediating role of metacognition in the relationship between self-efficacy and self-handicapping on academic achievement. However, these relationships have not been tested in Pakistani university undergraduates. In this direction, the present study investigates the mediating role of metacognition in the relationship between self-efficacy and self-handicapping on academic achievement among University Undergraduates. We also investigate whether there are differences in the mediating effect of metacognition on male and female students.

Material and Methods

The method of this research is descriptive-correlation. The data gathered in this research were analyzed using descriptive statistics (mean, frequency, and standard deviation) and inferential statistics (Pearson correlation coefficient, mediation analysis, and t-test). The population of this study was (109 male (40.2%) and 162 female (59.8%) students of Islamia University of Bahawalpur from January 2023 to May 2023. The researchers used simple random sampling to collect a sample of 300 participants, from which only 271 completed questionnaires were collected.

Self-efficacy Scale. The self-efficacy scale was developed by (Schwarzer et al., 1995)—20-item scale comprised of two subscales: general self-efficacy and Social self-efficacy. The population of the scale is both adolescents and adults. The scale assessed the belief of individuals to what extent they can perform novel and difficult tasks and cope with adversities. The scoring range of the scale is from 1 (totally unlike me) to 4 (totally like me). The total score range is from 10 to 40. Cronbach's alpha of the scale was .82.

Metacognitive awareness inventory: the tool was prepared and standardized by (Schraw and Dennison (1994).The scale comprised 30 items with a format of 5-point Likert scale. Scale assessed two levels of knowledge and regulation. The reliability coefficient of the scale is high at 0.742.

Self-handicapping scale. The self-handicapping scale was developed by (Jones and Rhodewalt, 1882). The scale consisted of 25 self-report items to assess the individual's tendencies of self-handicapping behaviors such as lack of effort, procrastination, stress,

and anxiety about the progress. The scale is based on 6-point Likert format ranging from 5 (strongly agree) to 0 (strongly disagree). Higher scores indicate more self-handicapping. Cronbach Alpha is 0.91.

Academic achievement. The CGPA of the students was considered as their academic achievement.

Procedure

Written informed consent was obtained from the participants before the commencement of the study as well participants were debriefed about the study. Participants voluntarily took part in the research and were informed to leave the study if they felt inconvenienced at any point. A booklet consisting of tools such as self-efficacy, self-handicapping, and metacognition, along with a demographics sheet, was provided to participants to fill out the questionnaires. It was ensured to participants that their confidentiality would remain intact.

Results

Table 1: Descriptive statistics for study variables

Variables	Category	Frequency (%)/Mean±SD
Gender	Male	109 (40.2%)
	Female	162 (59.8%)
Education Group	Science	134 (49.4)
	Arts	137 (50.6)
CGPA	2.00-2.50	1 (.4)
	2.51-3.00	45 (16.6)
	3.01-3.50	124 (45.8)
	3.51-4.00	101 (37.3)
Self-Efficacy	-	25.24±3.65
Self-Handicap	-	62.85±8.36
Metacognition	-	74.86±6.31
Academic Achievement	-	3.20±.72

Table 1 presents the frequencies and percentages of the demographic variable also mean and standard deviation of the main study variables.

Table 2: Correlation between Self-efficacy, Self-handicapping, Metacognition and Academic Achievement

Variables	M±SD	SEF	SHC	MCC	AA
SEF	25.24±3.65	1			
SHC	62.85±8.36	-.743**	1		
MC	74.86±6.31	.610**	-.754**	1	
AA	3.20±.72	.650**	-.628**	.833**	1

*Note: SEF: Self-Efficacy; SHC: Self-Handicap; MC: Metacognition: AA: Academic Achievement; ** Significant at the 0.01 level (2-tailed).*

Table 2 indicates the correlations between self-efficacy, self-handicap, metacognition, and academic achievement. The findings reveal that self-efficacy significantly negatively correlated with self-handicap, whereas it significantly and positively correlated with metacognition and academic achievement. Similarly, self-handicap was significantly and negatively correlated with metacognition and academic achievement. Furthermore, metacognition and academic achievement are significantly and positively correlated with each other.

Table 3: Regression analysis, using metacognition as a mediator and academic achievement as an outcome

Predictors	Path Coefficients				*a* * *b* (95% CI)	R^2
	A	*B*	*C*	*c'*		
Self-Efficacy (SEF)	1.055***	.079***	.128***	.044***	.083 (.071, .098)	.726
Self-Handicap (SHC)	-.570***	.095***	-.054***	.001	.054 (-.061, -.049)	.694

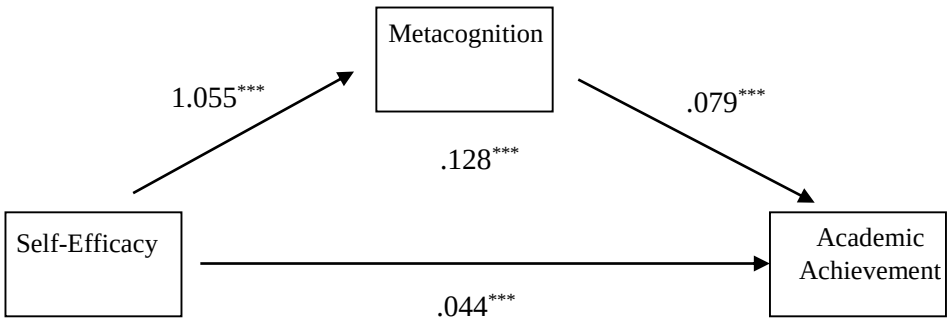

Figure 1: The mediation effect of metacognition between self-efficacy and academic achievement

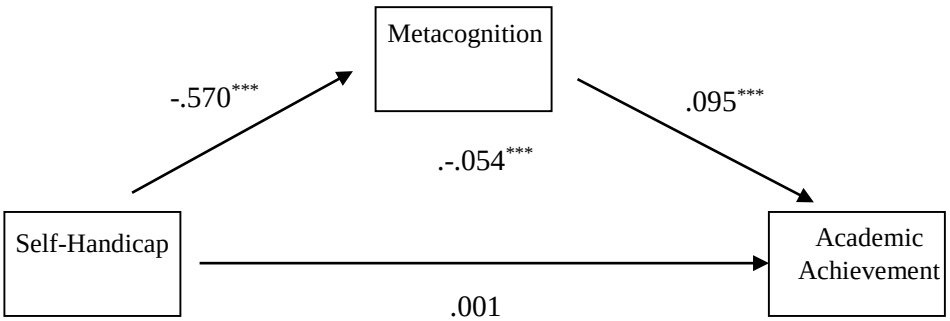

Figure 2: The mediation effect of metacognition between self-handicap and academic achievement

Table 3 and figure 1 and 2 shows the regression analysis results with metacognition as the mediator variable and academic achievement as an outcome variable, intending to investigate the influence of metacognition relationship between self-efficacy and self-handicap (as independent variables) with metacognition (dependent variable). From the results, we see that self-efficacy was significantly and positively associated with metacognition (from path *a*). Similarly, metacognition was significantly and positively associated with academic achievement (from path b). As for direct effect of self-efficacy was significantly and positively associated with academic achievement (from path *c*). When metacognition was involved in the model as a mediator, the indirect pathway between self-efficacy and academic achievement remained statistically significant (from

path *c*'), which showed that metacognition partially mediates the relationship between self-efficacy and academic achievement. Furthermore, self-handicap was significantly and negatively associated with metacognition (from path *a*). Similarly, metacognition was significantly and positively associated with academic achievement (from path b). As for direct effect of self-handicap was significantly and negatively associated with academic achievement (from path *c*). When metacognition was involved in the model as a mediator, the indirect pathway between self-handicap and academic achievement was not statistically significant (from path *c*'), which showed that metacognition fully mediates the relationship between self-handicap and academic achievement.

Table 4: The comparison of self-efficacy, self-handicapping behavior, metacognition, and academic achievement between male and female respondents

Variables	*M* ± *SD*		t	P	95% CI	
	Male (n=109)	Female (n=162)			LL	UL
Self-Efficacy	23.99±2.93	26.07±4.58	-4.797	.000	-2.94	-1.23
Self-Handicap	64.72±8.12	61.60±8.30	3.057	.001	1.11	5.12
Metacognition	72.16±5.07	76.69±2.49	-6.180	.000	-2.97	-3.09
Academic Achievement	3.04±.69	3.31±2.14	-3.105	.001	-.44	-.10

Table 4 represents results for comparing self-efficacy, self-handicap, metacognition, and academic achievement between male and female respondents. From the results, we conclude that the level of self-efficacy, metacognition, and academic achievement is higher in female students than in male students. In comparison, the level of self-handicap is higher in male students than in female students.

Table 5: The comparison of self-efficacy, self-handicap, metacognition, and academic achievement between students of science and arts groups

Variables	*M* ± *SD*		t	P	95% CI	
	Science (n=134)	Arts (n=137)			LL	LL

Self-Efficacy	25.09±3.37	25.38±3.90	-.654	.257	-1.16	.58
Self-Handicapping Behavior	61.91±6.75	63.77±9.61	-1.844	.033	-3.85	-.12
Metacognition	74.69±5.82	75.04±6.77	-.456	.228	-1.86	1.162
Academic Achievement	3.23±.76	3.17±.68	.727	.364	-.11	.24

Table 5 represents results for comparing self-efficacy, self-handicap, metacognition and academic achievement between students of science and arts groups. From the results, we conclude that the level of self-handicap is higher in students of the arts group than that of science. Furthermore, no significant differences were found in the levels of self-efficacy, self-handicap, metacognition, and academic achievement between students of science and arts groups.

Discussion

The current study explores the association and impact of self-efficacy, self-handicapping, and metacognition with academic achievement among university students. Table 1 presents the frequencies and percentages of the demographic variables and main study variables. The demographics of the participants' male students were 109(40.2%), and female students were 162(59.8%), whereas, in the education group, 134(49.4%) belonged to the science group, and 137(50.6%) students belonged to the arts group. As academic achievement was assessed through students' performance, it was observed that 1(4%) student had a CGPA in the range of 2.00 to 2.50, 45(16.6%) students obtained a 2.51 to 3.00 CGPA, 124(45.8%) students had CGPA from 3.01to 3.50 and 101(37.3%) scored CGPA in range of 3.51 to 4.00.

Table 2 indicates the correlations between self-efficacy, self-handicap, metacognition, and academic achievement. The findings reveal that self-efficacy significantly negatively correlated with self-handicap, whereas it significantly and positively correlated with metacognition and academic achievement. Various studies indicate the findings following the current study conducted by (Valle et al., 2009) and (Abedini et al., 2010) showed an inverse association between self-efficacy and self-

handicapping. A similar (Kadivar 2003) found a positive relationship between self-efficacy, metacognition, and academic achievement. Academic success in students increased as their belief of self-efficacy increased. The findings of (Aarabian et al., 2004) also concluded consistent results that metacognition increases self-efficacy and influences on students' learning outcomes as well as mental health. In other words, more handicapping behavior in students leads to low belief in their self-efficacy potential. (Ghonsooly et al., 2014) revealed similarly that self-efficacy was positively associated with metacognition.

Similarly, self-handicap was significantly and negatively correlated with metacognition and academic achievement. The findings of the study are also consistent with different research that indicates the negative relationship of self-handicapping with metacognition and learning performance in students. A study conducted by (Akar and Dogan, 2018) revealed that self-handicapping and academic achievement have significantly negative associations. Furthermore, metacognition and academic achievement are significantly and positively correlated. A study finding (Javanmard et al., 2013) showed consistently that metacognition plays a positive role in increasing academic performance. Students who use metacognitive learning strategies are more likely to succeed academically. Another study finding by (Morton, 2008) and (Alonso and Vovides, 2007) revealed the positive role of metacognition in learning. The current study's finding is also in line with (Kummin and Rahman, 2010; Parviz and Sharifi, 2011), that positive relation was found between these two constructs and that the application of meta-cognition by students in academics increases their performance.

Table 3 and figure 1 and 2 shows the results of regression analysis with metacognition as the mediator variable and academic achievement as an outcome variable, with the aim of investigating the influence of metacognition relationship between self-efficacy and self-handicap (as independent variables) with metacognition (dependent variable). From the results, we see that self-efficacy was significantly and positively associated with metacognition (from path *a*). Similarly, metacognition was

significantly and positively associated with academic achievement (from path b). As for direct effect of self-efficacy was significantly and positively associated with academic achievement (from path *c*). When metacognition was involved in the model as a mediator, the indirect pathway between self-efficacy and academic achievement remained statistically significant (from path *c*'), which showed that metacognition partially mediates the relationship between self-efficacy and academic achievement. A study found in support of our study findings that self-efficacy has a positive influence on academic achievement if it is mediated by metacognition (Artino et al., 2012). (Hayat et al., 2020) also concluded in a similar way that students who use metacognition in material to be learned are found to be more optimistic and self-efficacious in their studies and better academic performances, as well as experience positive emotions in their learning process. Furthermore, self-handicap was significantly and negatively associated with metacognition (from path *a*). Similarly, metacognition was significantly and positively associated with academic achievement (from path b). As for direct effect of self-handicap was significantly and negatively associated with academic achievement (from path *c*). When metacognition was involved in the model as a mediator, the indirect pathway between self-handicap and academic achievement not statistically significant (from path *c*'), which showed that metacognition fully mediates the relationship between self-handicap and academic achievement. A study conducted by (Dehghani and Fard 2020) showed consistent results with our findings that learning performance is possible to improve through providing metacognitive skills training and appropriate teaching methods. The study provides directions to control self-handicapping behavior by adding metacognition to the academic process. Another finding by (Edalatjoo et al., 2019) showed similar results that self-handicapping directly showed no significant results, but mediated by metacognition showed an increase in the likelihood of academic achievement in students. Metacognition showed both direct and indirect effects on academic performance. So, it is evidenced that teaching metacognitive abilities will help in the reduction of self-handicapping behavior and increase the performance of the students.

Table 4 compares self-efficacy, self-handicap, metacognition, and academic achievement between male and female respondents. From the results, we conclude that the level of self-efficacy, metacognition, and academic achievement is higher in female students than that of male students. In comparison, the level of self-handicap is higher in male students than that of female students. Previous studies have found contradictory findings in gender differences in metacognition. Conversely, some research findings explore the relation and differences on gender basis. Study findings by (Akin, 2016) showed consistent results that metacognition is associated with gender differences, as females are better in metacognition than males. Similar findings shared differences in metacognition as it prevails more in females (Al- Hilawani, 2001; Ciascai and Lavinia, 2011; Woldia and Kassaw, 2017). This was in line with the current findings that gender differences were significant in self-efficacy and academic achievement among students, as self-efficacy and CGPA of male students were low in general academics as compared to female students.

On the other hand, a study conducted by (Kazem, Javady and Masoud, 2013) showed consistency with the findings that male sufferers from self-handicapping behavior were higher on average than females, and academic self-efficacy was higher in female students. (Lucas et al., 2007) conducted a study from the perspective of gender, and the results also supports the finding's as self-handicapping behavior was more in male participants as compared to females. Male students often adopt self-handicapping behavior to protect their self-esteem. It is a significant reason for increasing self-handicapping behavior in male students as it may provide them face-saving and preserve their positive self-image.

Table 5 represents results for comparing self-efficacy, self-handicap, metacognition, and academic achievement between students of science and arts groups. From the results, we conclude that the level of self-handicap is higher in arts group students than in science. Furthermore, no significant differences were found in the levels of self-efficacy, self-handicap, metacognition, and academic achievement between students of science and arts groups. Similarly, a study by (Cao and Lin, 2020) found no

significant difference in using metacognition in math, science, and arts students. Moreover, the study also revealed consistent findings that students who were studying in different disciplines were not significantly other in academic self-efficacy and academic achievement.

Contrary to our findings, students of various fields have more or less the same level of self-handicapping in students. The reason for the contrary result is that the students of arts discipline most of the time engaged in self-handicapping behavior as they perceived less burden of the studies and competition, so they tend to spend less time in study. Moreover, students in Pakistani culture adopt self-handicapping to secure their positive sense of self, so they make excuses in advance to defend their low academic grades.

Conclusion

It is concluded that self-efficacy, academic achievement, and metacognition correlate positively. On the other hand, self-handicapping behavior is negatively associated with academic achievement and metacognition skills. Findings also provide the directions that metacognition as a mediator play a significant positive role and is a crucial predictor of increasing academic achievement as it determines a partial mediating effect in self-efficacy and a full mediating role and total impact in self-handicapping behavior. From a gender perspective, self-efficacy, metacognition, and academic achievement were higher in females than males. Self-handicapping behavior was more in males as compared to female students. Furthermore, a significant difference was shown in self-handicapping behavior in arts group students compared to the science group, whereas no significant difference was found in self-efficacy, academic achievement, and metacognition among students of science and arts disciplines.

Implications. The present study uncovered the hidden factors affecting students' learning and performance. Self-handicapping behavior is increasing in students. It often leads to psychological disturbances due to poor academic achievement in students. Teachers in academic institutions can improve students' performances by providing them with support, encouragement, and positive emotions. Teaching learning methods should

be based on class activities, and student-focused, interactive approaches in the classroom may adopted. Active involvement in the learning process will reduce self-handicapping in students and boost their self-efficacy; there must be training on metacognitive skills to improve academic performance practiced by the students. This training provides help in reducing self-handicapping in students. Positive feedback with verbal or instrumental reinforcement is helpful in building focused, concentrating, and self-officious tendencies in university students.

Limitation

Here are some limitations of the study. A large sample size is recommended to achieve more reliable and valid outcomes. The study was limited to the cross-sectional method, so casual inferences were challenging to establish. Data collection were limited to some universities in Punjab.

Future research directions

Future research may use other methods, such as experimental, to determine the causal inferences. Metacognition may be used as an evidence-based skills training program to evaluate its effects on outcome variables such as self-efficacy, self-handicapping, academic achievement, and performance. Finally, the study may be replicated by adding other related variables such as learning difficulties, type of knowledge, memory-related variables, and other psychosocial factors that lead to a negative impact on students learning and academic achievements.

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