

# The relationship between negative metacognitive beliefs and active procrastination among students of Mashhad university of medical sciences

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## ABSTRACT

Active procrastination is a multidimensional structure including four components: preference for pressure, intentional decision to procrastinate, ability to meet deadlines, and outcome satisfaction. The present study aims to investigate the pathology of active procrastination in students of Mashhad University of Medical Sciences based on positive and negative metacognitive beliefs. This study is methodologically correlational research, in which two Metacognitive Beliefs Scale and Active Procrastination Scale were used to collect data. The statistical population consists of all male and female students of Mashhad University of Medical Sciences with undergraduate and graduate degrees in different faculties and disciplines. The sample group in this study included 246 students of this university who were selected by stratified random sampling among all faculties of Mashhad University of Medical Sciences. The results showed a positive and significant relationship between metacognitive beliefs and active procrastination ( $R^2 = 0.184$ ). Additionally, there is a more direct relationship between negative metacognitive beliefs and active procrastination ( $R^2 = 0.12$ ). According to the regression results, negative metacognitive beliefs contributed and predicted a greater role in the occurrence of active procrastination. Therefore, metacognitive beliefs related to procrastination are also effective in predicting and explaining active procrastination.

**Keywords:** Active procrastination, Procrastination-related metacognitive beliefs, Negative metacognitive beliefs, Students

## Introduction

One of the most important stages of everyone's life is youth coinciding with the entry to university and the beginning of a student's life. Academic achievement is the most fundamental purpose of a student's life, which can be a precursor to further improvements, but sometimes students fail in achieving this objective due to their procrastination.

It is not the case that the active procrastinators are not able to complete the tasks, rather they can perform the tasks under the time pressure and before the deadline and achieve satisfactory outcomes [1].

Metacognitive theories broadly identify two categories of metacognitive beliefs that perpetuate psychological dysfunction: positive and negative metacognitive beliefs. Positive metacognitive beliefs refer to individuals' information about coping strategies that affect cognition and internal states, which may include beliefs such as "Worrying will help me get things sorted out in my mind." Negative metacognitive beliefs are correlated to the implications and consequences of performing certain types of coping strategies and disturbing thoughts and emotions such as "My worry is out of control" or "Mind rumination will damage my brain."

Negative consequences of procrastination in training and educational settings have been reported in a range of low academic performance, lower grades and passive participation in

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classes and discussions, low satisfaction with the academic performance and failure, and even higher general anxiety. Therefore, it seems that metacognition can explain procrastination and its affiliates according to the literature. Regarding the advantages of metacognition, it can be depicted that metacognitive strategies include techniques, which can be used by students to design learning, monitor learning activities, and evaluate the results of learning activities. Besides, these strategies are measures that will contribute to learning and recall. Although these strategies can be learned, some learners are unable to learn them and need to be trained in this area [2]. As a result, metacognitive beliefs themselves can lead to procrastination. As no research has been conducted on the relationship between metacognitive beliefs and a type of procrastination called active procrastination in the country to date, and given the lack of study and investigation of the damages caused by this issue, which can cause serious damage to the country's education sector, particularly at the university level, researchers attempted to weigh this important issue and to solve the problems caused by various types of procrastination. Despite major research on active procrastination [3], the 16-item Active Procrastination Scale (APS) developed by Choi and Moran (2009) is the only standard scale in this area, which has been used in the above researches and has desirable psychometric properties.

### *Theoretical Foundations of Research*

- *Procrastination*

Procrastination is described as a thief of time, and even some people believe that procrastination is the thief of life. Procrastination indicates a lack of self-management, and some mistakenly consider procrastination to be laziness. However, the two are different, as an individual in laziness has no desire to do anything; in procrastination, on the other hand, the individual often does something and keeps herself/himself busy to avoid doing the task that should be done at that time and has priority. The cause of psychological disorders or vice versa the development of positive personality traits and adjusted behaviors all goes back to the person's assessment of environmental stimuli and his internal tendencies towards them. It emerged from a combination of two approaches of behavior therapy (mainly classical conditioning and actor conditioning) and the cognitive approach whether in the context of cognitive therapy or in the context of cognitive psychology. This approach has benefited from Bandura's cognitive-behavioral therapy research and modeling on the importance of observational learning, Seligman's research, and Ellis's rational-emotive behavior therapy. Cognitive-behavioral theories evaluate procrastination from the perspective of beliefs and cognitive processes and emphasize the recognition and discovery of its underlying irrational thinking.

- *Metacognition*

Metacognition is the process of thinking about "thinking", knowing what we know and do not know, and the ability to control your thoughts. It also deals with the psychological structures, knowledge of events, and processes that control, modify, and interpret inclusive thoughts [4]. Metacognition is any kind of knowledge or cognitive process in which there is cognitive evaluation, monitoring, or control. Furthermore, Flavell (1985) provides the following general definition of metacognition: "Any knowledge or cognitive process that takes as its object or regulates an aspect of any cognitive endeavor."

Metacognition is a multidimensional concept. This concept encompasses knowledge, processes, and strategies that evaluate, monitor, or control cognition [5]. In recent studies, metacognition has had two independent but interrelated elements including (i) metacognitive knowledge and (ii) metacognitive control.

Metacognitive knowledge refers to the knowledge and beliefs that an individual has about own cognitive resources in a field, how well he performs in that field, the strategies and methods he can use, and the nature of that field of knowledge. In other words, metacognitive knowledge refers to the knowledge gained about cognitive processes - knowledge that can be used to control cognitive processes. Metacognitive knowledge is expressive and relatively constant allowing one to think about cognitive processes and argue with others, but misleading, unrealistic, or based on naive patterns.

The development of this aspect of thinking is important for the development of students' studying skills and their ability to solve problems. In this regard, Metacognitive knowledge (knowledge toward himself/herself and task) and self-regulation (monitoring comprehension) affect students' ability to understand the meaning of a text, but the question here is what can enable students to have complete control over their metacognitive processes when reading a text.

There are several models in the field of metacognition obtained as a result of a different understanding of metacognition. Some of them have a more general aspect and provide a theoretical framework for metacognition (e.g., Flavell's (1979) and Brown's (1987) metacognitive model) [6, 7]; Others focus on certain aspects of metacognition (e.g., the memory and memory process model [8], metacognitive strategies for self-regulation in the study of the four-dimensional text-learning model [7]).

Metacognitive experience is an effective experience with cognition; i.e., the metacognitive experience is the conscious attention to experiences that are associated with failure and success in learning or in creating cognitive organization. Flavell suggested that many of these metacognitive experiences inevitably occur in the situation in which the individual engages in action. Another interesting argument that Flavell makes in this regard is that these metacognitive experiences can take place at any time, before, after, or during the formation of a cognitive organization, and he concludes that these experiences are more prevalent in situations where consciousness is high, precise consideration and deep thinking apply, e.g., in situations that

require prior planning or in situations where decisions and operations are risky.

- *Metacognition as a Key to Success in Academic Performance*

Individuals' performance depends on the amount of effort made to achieve the goals and the extent to which it is directed by the motivating factor; thus, individual performance is a mechanism that affects motivation [9]. The motivating factor in the self-regulatory sector is intrinsic metacognition. Research shows that using self-regulation or metacognition requires effort, and that effort occurs when people are motivated. Therefore, motivational factors affect the activity of individuals and especially the use of metacognition.

## Materials and Methods

The present study was purposefully practical research and descriptive-correlational research in terms of the data collection method. The statistical population of the present study included male and female students of Mashhad University of Medical Sciences in different fields who were studying in the second semester of the academic year 2019-2020. Considering the first type error 5%, the test power 80% and with the mentioned methodology, the sample size should be 202 people, which will be 252 people considering the 20% drop of the final sample. The sampling method was random multi-stage cluster sampling with selecting samples among all faculties of Mashhad University of Medical Sciences.

### Research Tools

- *Active Procrastination Scale*

The active procrastination scale was developed by Moran and Choi (2009) to measure active procrastination. It is a 16-item psychometric scale that measures the respondent's agreement and disagreement using a five-point Likert scale. This scale consists of four subscales, which are outcome satisfaction, pressure preference, deliberate decision to postpone, and the ability to meet the deadline, respectively. Except for the intentional decision to postpone, all aspects of scoring have reverse scoring. The reliability of these dimensions in the English version is between 0.70 and 0.83 and the total reliability of the tool is reported to be 0.80. The high and low scores in this scale were correlated with active procrastination and passive procrastination, respectively. The validity of the active procrastination scale was calculated by measuring the correlation coefficient with other scales so that the active procrastination score was not related to the passive procrastination score ( $r = 0.07$ ) and the results showed that these two scales were different. This scale has been normalized by Panahipour, Arabzadeh, and Cheraghi (2019) in Iran according to the Iranian student

population [10]. Cronbach's alpha results were obtained for outcome satisfaction 0.71, pressure preference 0.84, intentional decision to postpone 0.64, and the ability to face the deadline 0.75, respectively. In the corresponding study, structural validity, divergent validity, and reliability were performed for preparation and application in students. The results of this study are in line with previous research showing that this scale has desirable psychometric properties [10].

- *Metacognitive Beliefs Scale related to Procrastination*

This scale was designed by Fernie and Spada in 2009. The number of items in the initial version of the test was 22, in all of which participants defined their agreement on a 4-point Likert scale, including strongly disagreed (1 point), almost agreed (2 points), agreed (3 points), and strongly agreed (4 points). Finally, the number of items was reduced to 16 items using factor analysis. The MBPQ has two components: positive metacognitive beliefs (items 1 to 8) and negative metacognitive beliefs (items 9 to 16). In Iran, this scale was standardized by Beitmer and Saed in 2018, in which items 4 and 15 were omitted due to low factor loading in the final analysis, and the reliability of MBPQ was ultimately calculated through Cronbach's alpha internal consistency. The results showed that the reliability coefficient of each component of positive and negative metacognitive beliefs in the main version of the questionnaire were 0.76 and 0.70, and in the normalized version in the Iranian population were 0.77 and 0.74, respectively (the Iranian version had more reliability than the original version of the questionnaire). In addition, the overall Cronbach's alpha coefficient in both questionnaires was 0.65.

### Testing Procedure

To collect data on the variables of the present study, after the required coordination with the officials of Mashhad University of Medical Sciences and obtaining the needed permits, the first 4 faculties and 4 departments from each faculty and then many classes from each department were randomly selected and the questionnaires were distributed among the students present in the classes. Finally, 246 questionnaires remained after removing irrelevant data, of which 130 questionnaires were for female students (52.8%) and 116 questionnaires were for male students (47.2%). The researcher attended the students' classrooms to provide students with a brief explanation about the research objective and the method of responding to the questions and distribute the sorted random questionnaires.

All participants in the study were claimed due to ethical considerations: Participation in this study is voluntary and participants will have the right to withdraw from the study, so a consent form is therefore placed at the end of the questionnaire. So, all participants' information will be kept confidential. Furthermore, the relevant results will be provided to individuals upon request after obtaining the results of the present study.

### Data Analysis Method

A quantitative approach was used in this study due to its nature and the data from Fernie and Spada's (2009) standard questionnaires of active procrastination and metacognitive beliefs were analyzed using SPSS 25 software [11]. The results of this research are analyzed in two sections, including descriptive and inferential statistics. Descriptive indicators such as plotting frequency Table, percentage calculation, average, standard deviation were extracted. Correlation coefficients and regression analysis were used to test the hypotheses.

## Results and Discussion

### Sample Demographic Data

**Table 1. Demographic Data of Individuals**

	Frequency	Percentage
Gender		
Male	116	47.2
Female	130	52.8
Total	246	100
Marital Status		
Single	164	66.7

**Table 2. Descriptive Statistics of Research Dimensions and Variables**

Variable	Dimension	Min.	Max.	Mean	S.D.	Skewness		Kurtosis	
						Statistics	Standard Deviation Error	Statistics	Standard Deviation Error
Procrastination (APS)	Negative Beliefs	7	28	19.898	4.259	-0.131	0.155	-0.288	0.309
	Outcome Satisfaction	4	20	12.232	2.947	-0.105	0.155	0.040	0.309
	Pressure Preference	4	20	12.346	3.505	0.074	0.155	-0.336	0.309
	Deliberate Decision to Postpone	4	20	11.500	2.959	-0.267	0.155	-0.117	0.309
	Ability to Meet the Deadline	4	20	11.301	3.497	0.137	0.155	-0.633	0.309
	Total APS Score		17	74	47.378	8.944	-0.143	0.155	0.325

The values of minimum, maximum, mean, and standard deviation for each of the dimensions and variables of the research were presented in **Table 2**. In addition, the values of skewness and kurtosis statistics of all dimensions and variables are in the

Married	82	33.3
Total	246	100
Year of Education		
1	45	18.3
2	71	28.9
3	63	25.6
4	31	12.6
5	21	8.5
6	10	4.1
7	4	1.6
8	1	0.4
Total	246	100

As shown in **Table 1**, from among the sample, 116 people (47.2%) were male and 130 people (52.8%) were female. Moreover, 164 (66.7%) out of 246 people were single and 82 (33.3%) were married. Besides, they were studying in different educational grades as follows: 45 (18.3%) out of 246 in the first academic year, 71 (28.9%) in the second academic year, 63 (25.6%) in the third academic year, 31 (12.6%) in the fourth academic year, 21 (8.5%) in the fifth academic year, 10 (4.1%) in the sixth academic year, 4 (1.6%) in the seventh academic year, 1 (0.4%) in the eighth academic year.

### Descriptive Statistics

range of (-2, 2); therefore, they have a proper value of skewness and kurtosis.

### Kolmogorov-Smirnov Test

**Table 3. Data Normality Test**

	Negative Beliefs	Outcome Satisfaction	Pressure Preference	Deliberate Decision to Postpone	Ability to Meet the Deadline	Total APS Score
Kolmogorov-Smirnov Statistic	0.069	0.084	0.092	0.091	0.092	0.048
Significant Value	0.007	0.000	0.000	0.000	0.000	0.200

According to the results shown in **Table 3**, only the total APS score (APS variable) has a significant value greater than 0.025, so only this variable is normal and all other variables are all abnormal.

### Analytical Findings

Are metacognitive beliefs effective in determining the degree of active procrastination among students and is there any correlation between them?

**Table 4. Correlation Study of the Main Research Question using Spearman Test**

	Procrastination	Negative Beliefs

Procrastination	Correlation Coefficient	1	0.283
	Significant Value	-	0
Negative Beliefs	Correlation Coefficient	0.283	1
	Significant Value	0	-

According to **Table 4**, the significance of the correlation coefficient between procrastination and negative beliefs is 0.000,

which is significant at  $P = 0.05$ , and its correlation coefficient is 0.283, which is a relatively moderate value. Given the accepted relationship between procrastination and (negative) metacognitive beliefs, we must use multivariate linear regression to evaluate the predictability of metacognitive beliefs (both positive and negative).

**Table 5. Investigation of  $\beta$  Coefficients of Metacognitive Beliefs Model Predicting Active Procrastination**

Model	Non-standard Factors		Standard Factors	T	Sig.	Collinearity Statistics	
	B	Standard Error	$\beta$			Tolerance	VIF
(Constant Value)	21.082	3.674		5.738	0.000		
Positive Beliefs	0.58	0.133	0.257	4.359	0.000	0.964	1.038
Negative Beliefs	0.83	0.124	0.124	6.695	0.000	0.964	1.038

The standardized  $\beta$  for evaluating the contribution of each of the variables in the model provides a measure of the standard deviation. The  $\beta$  predicted modification in the standard deviation of the variable is the criterion for changing a standard deviation in the predictor variable. Therefore, if the positive beliefs of a standard deviation increase, we can predict that active procrastination will increase by 0.257 standard deviations, and if the negative beliefs of a standard deviation increase, we can predict that active procrastination will increase by 0.395 standard deviations. (**Table 5**)

### *What is the relationship between active procrastination and negative metacognitive beliefs?*

As the results of the Spearman test in the main hypothesis test showed, the significance of the correlation coefficient between procrastination and negative metacognitive beliefs is 0.000, which is significant at  $P = 0.05$ , and its correlation coefficient is 0.283, which is a relatively moderate value. Given the accepted relationship between procrastination and negative metacognitive beliefs, we should use simple linear regression to assess the predictability of negative metacognitive beliefs. Regression assumptions were examined in some cases in the main research question, which the specific cases of this question are provided below:

**Table 6. Summary of the Model of the Relationship between Negative Metacognitive Beliefs and Active Procrastination**

R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Standard Estimation Error	Durbin-Watson
0.346	0.12	0.116	8.408	1.735

The adjusted  $R^2$  value shows that 11.6% of the modifications in the procrastination variable are predicted by (negative) metacognitive beliefs, which is a moderate value (**Table 6**). In addition, according to the results of the ANOVA model, it

evaluates the relationship between metacognitive beliefs and active procrastination to analyze the significant variance of the whole model. Since the significance value is  $<0.05$ , so the model is significant at  $P = 0.05$ . In other words, there is a significant relationship between negative metacognitive beliefs and active procrastination, and negative metacognitive beliefs predict active procrastination.

**Table 7. Study of  $\beta$  Coefficients of Negative Metacognitive Beliefs Model Predicting Active Procrastination**

Model	Non-standard Factors		Standard Factors	T	Sig.	Collinearity Statistics	
	B	Standard error	$\beta$			Tolerance	VIF
(Constant Value)	32.91	2.566		12.824	0.000		
Positive Beliefs	0.727	0.126	0.346	5.765	0.000	1	1

The standardized  $\beta$  coefficient in **Table 7** shows that if the negative beliefs of a standard deviation increase, we can predict that active procrastination will increase by 0.346 standard deviations.

## Conclusion

This study aimed to investigate the relationship between negative metacognitive beliefs and active procrastination in students of Mashhad University of Medical Sciences. The results are as follows:

### *Hypothesis 1: Investigating the Relationship between Active Procrastination and related Metacognitive Beliefs:*

The results of the relationship between active procrastination and metacognitive beliefs revealed that the regression rate between active procrastination and metacognitive beliefs is equal to  $R^2 = 0.184$ . Furthermore, the adjusted  $R^2$  value is equal to 0.177, which shows that 17.7% of the modifications in the

procrastination variable are predicted by metacognitive beliefs (positive and negative), which is a moderate value. This means that there is a significant relationship between metacognitive beliefs and active procrastination, as the more metacognitive beliefs related to procrastination, the more active procrastination is expected.

The findings are consistent with previous literature. Ellis and Knaus (2001) defined procrastination as the lack of self-regulatory function and the delay in behavior that is required to achieve the objective [12]. Procrastination can occur in different areas of each individual's life, such as personal care or protection, self-fulfillment or self-development, as well as respecting and adhering to the obligations to others. In the cognitive approach, the basis of procrastination is misconceptions and misbeliefs about how the conditions and results of activities can be. A common feature of such beliefs is their irrationality and the common treatment in this view is rational-emotional behavior therapy. According to this perspective, the main reason for permanent procrastination is that rigid people are clinging to a set of beliefs or attitudes that force them to postpone what is in their best interest for today to tomorrow (Dryden, translated by Noorsalehi, 2010) [13]. There is also a special type of procrastination called active procrastination, which can be defined as active procrastinators do not intend to procrastinate, but they often postpone their tasks due to their inability to make quick decisions and slow pace of action; they decide to leave work so that they can maximize their resources and abilities to complete the work; they freely and deliberately reorganize their activities to respond to external modifications; they have an accurate estimate of the minimum time required to complete a task, and even achieve their goals by pushing themselves and putting pressure on themselves. In addition, these individuals rely on pressure-based task-oriented strategies

Flavell (1985) provided the following definition of metacognition:

*"Any knowledge or cognitive process that takes as its object or regulates an aspect of any cognitive endeavor."*

Metacognition, with the concept that has been proposed in the new cognitive psychology as one of the important components of cognition and also its relationship with learning and academic achievement, has always attracted the attention of researchers and some related concepts have gradually entered the field of research variables in studies related to education and learning. Metacognitive knowledge is a combination of schema theories and data processing theory emphasizing the cognitions that an individual has about their processing system, usually identifies an individual's beliefs about their cognitive processing, and leads to the choice of high-level strategies. "From the perspective of data processing theory, Wool Folk (2004) considers metacognition as executive control processes (e.g., attention, review and practice, organization, and data manipulation); and the stronger the executive control processes in people, the better the data processing in their memory" [14]. As a result, procrastination, especially active procrastination, can be reduced in students and students' capacity can be increased for planning in the field of

education, work, and personal life by applying the metacognitive approach and its various components and techniques.

### *Study of the Relationship between Active Procrastination and Negative Metacognitive Beliefs related to Procrastination:*

The results of the relationship between active procrastination and positive metacognitive beliefs showed that the regression rate between active procrastination and negative metacognitive beliefs was equal to  $R^2 = 0.12$ . Furthermore, the adjusted  $R^2$  value was equal to 0.116, which indicates that 11.6% of the modifications in the active procrastination variable are predicted by negative metacognitive beliefs, which are moderate values. In other words, there is a significant relationship between negative metacognitive beliefs and active procrastination, and the more negative metacognitive beliefs related to procrastination, the more active procrastination will be. In this regard, Zarei and Khashoei (2016) conducted a study to find the relationship between academic procrastination and negative metacognitive beliefs, emotion regulation, and tolerance of ambiguity [15]. Their finding revealed that there is a significant positive relationship between general academic procrastination and procrastination due to physical-mental fatigue (more procrastination) and negative metacognitive beliefs, emotion regulation (difficulty in emotion regulation), and ambiguity tolerance (low ambiguity tolerance) which is consistent with the results of this study. According to the mentioned results, it can be concluded that metacognitive beliefs are also related to active procrastination and play an important role in reducing or increasing active procrastination. On the other hand, negative metacognitive beliefs lead to greater active procrastination than positive metacognitive beliefs, which in itself confirms more attention to metacognitive beliefs, especially negative beliefs to reduce the educational, personal, and social harms of active procrastination, and it is required to use these strategies by clinical psychologists and counselors to identify the severity of active procrastination and ultimately accelerate the treatment process of clients and students involved with this problem.

### *Research Suggestions*

1. Holding workshops on metacognitive processes for students to learn various metacognitive strategies and use them to reduce the phenomenon of active procrastination as well as other related issues
2. Conducting similar research with this study in other universities and different students to achieve a constant and stable result throughout the country
3. Conducting research to use metacognitive therapy and measure its effectiveness on active procrastination

### *Research Limitations*

- Possible bias and cautious responses from some volunteers to maintain a good image of themselves
- Lack of accuracy and sufficient attention in completing the questionnaire by some candidates.

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