

# Role of Executive Functions in Procrastination among High School Students

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### Abstract

The objective of the present study was to examine the role of executive functioning in procrastination among high school students. It was hypothesized that procrastination would be negatively correlated with behavioral regulation and metacognition, the components of executive functioning. Secondly, it was hypothesized that males would be higher on procrastination than females. Males would demonstrate poor executive functioning as compared to females. For these purpose, 200 high school students in the age range of 15-18 years were administered Behavior Rating Inventory of Executive Functions-Self-Report (BRIEF-SR, Guy et al., 2004) and Procrastination Assessment Scale Students (PASS, Solomon and Rothblum, 1984) in a group setting. Obtained data was subjected to correlations and t-statistics. Results revealed that procrastination was positively associated with metacognition and behavioral regulation components of executive functions .Further, it was found that males were higher on procrastination and demonstrated poor executive functions as compared to females.

**Keywords:** Procrastination, Behavioral Regulation, Metacognition.

### Introduction

Student life coincides with adolescence period where students need to perform excellently and to cope with various challenges effectively. At this phase of critical development the major focus is on academic affairs especially at the senior secondary level. They need to perform at the optimum level in academics because better performance in it determines the path of career success. However, due to various reasons like academic stress, performance anxiety and parental pressure students starts putting off things. Though occasional postponements are acceptable and may sometimes be advantageous also, but habit to perform the activity 'later on' is a major barrier in academic success at this crucial time. Delay in completion or initiation of tasks like writing term papers, reading weekly assignments and preparing for exams influence well being and academic performance of students negatively.

### Review of Literature

Although procrastination is a common behavior in contemporary societies, but its occurrence is highly prevalent during student life. For instance, it has been shown that 57 % Canadian, 59% Singaporean college students reported that they spent three hours a day on average procrastination(Paultiski,2010).It has been estimated that 70% of adolescent students procrastinate in academic related tasks and others considered it to be as high as 95% among adolescents( Schouwenburg 2004, Klassen et al., 2011). The rise in statistics of this troublesome behavior that holds negative consequences in academic realm has drawn the attention of researchers. Recent researchers have analyzed this common issue from various angles among school, college and university students. A large number of researches indicate detrimental effects of procrastination on academic performance like lower grades (Balkis & Duru, 2007), poor classroom attendance (Knaus, 1998 ) and higher course withdrawals and dropouts(Gupta et al., 2012). From a behavioral perspective, rushing around at the last minute to complete important and necessary tasks can be stressful.

Keeping in view the negative effect of procrastination on physical and mental health of students, the present study was designed to gain insight into this troublesome behavior.

## Aims of The Study

1. To examine the relationship between executive functions and procrastination in high school students.
2. To see the gender differences in executive functions and procrastination among adolescents.

Various researchers have proposed cognitive, emotional and personality variables as leading factors in procrastination. To understand the cause of procrastination, Solomon and Rothblum (1984) found that people avoid tasks that they found unpleasant to engage themselves. These people have deficit in regulating their cognitions and they do not make use of learning strategies (Howell & Watson; Walters, 2003). Lack of sufficient knowledge 'how to carry out' a task or time misperceptions encourage procrastination (Kelly, 2003). Moreover, when they believe that they lack the ability to achieve a task successfully, delay in completion or initiation of task occurs. Consequently, they indulge themselves in various time consuming activities e.g. watching videos on YouTube, playing video games and hanging out in virtual social networks. These distractions can cause serious procrastination (Patzek et al, 2012 and Zeenath & Orcullo , 2012) that involve failure in self-regulation. The other critical predictors of academic procrastination are attribution style, self-esteem, social phobia (Ferrari, 1989), intrinsic motivation (Senecal et al., 1995) self-handicapping strategies, self-regulation (Tuckman, 2002b), fear of failure and task aversion (Solomon and Rothblum, 1984), cognitive functioning and motivation (Wolter, 2003). There is emerging evidence that the stress associated with procrastination may also arise from the intra-personal processes linked to the negative self-judgments that procrastinators inflict upon themselves when dealing with difficult tasks as well as during the aftermath of unnecessary delay (Flett, et al., 2012; Sirois & Stout, 2011; Sirois & Tosti, 2012).

Similarly, Rabin and his colleagues (2011) consider academic procrastination as a problem of executive functioning. Executive function is a set of cognitive abilities that help in the regulation of overt and covert behaviors related with learning tasks. It encompasses behavioral and metacognitive processes that enable efficient planning, execution, verification and regulation of goal directed behavior. These functions mediate in learning processes and control of emotions (Rabin et al, 2011, Fikke et al, 2011, Fox and calkin 2003) in diverse age groups. For instance, in children executive functions are linked to school readiness, at adolescence these predict academic achievement and social functioning. Moreover these higher order skills help students to think, organize and plan effectively to deal with academic difficulties. During academic activities, students adopt strategies that represent their cognitive engagement e.g. by inhibiting responses to irrelevant stimuli helps them to stay on task. For effective learning, students need to be aware of task requirements and be able to exert control over cognitive processes used to meet these requirements (Biggs, 1985). It is exclusively important for the

situations which require a rapid and flexible adjustment of behavior to the changing demands of the environment.

A child with strong behavioral regulation can remember and follow rules, such as waiting for their turn at the water fountain, rather than using a most dominant response like cutting in line. Attention, working memory and inhibitory control individually and collectively contribute to behavioral regulation which contributes in school success of young students. In addition, behavior regulation accounts for the developmental changes in children's performance over the school years (Janelle J. Montroy, 2014). Although executive functioning plays a significant role in initiation and accomplishment of complex behaviors, very little research examines association of executive functioning with procrastination in Indian context. The present study is an attempt to gain a better understanding on procrastinating behavior in academics by analyzing its relationship with executive functions.

The literature concerning gender differences in academic procrastination and executive functions is somewhat mixed. While some studies have indicated no significant gender differences in the incidence of procrastination (Ferrari, Özer, & Demir, 2009; Solomon & Rothblum, 1984; Steel, 2007), other studies have reported that men are more at risk for being procrastinators than women (Milgram, Marshevsky, & Sadeh, 1995; Özer, Demir, & Ferrari, 2009; Prohaska, Morrill, Atilas, & Perez, 2000). On the other hand, another group of studies reported that females are higher on procrastination (Özer, Demir & Ferrari, 2009, Stuart, 2013, Washington 2004; Rodarte-Luna & Sherry, 2008). Whereby a study by Sharma & Kaur (2011) suggested that females were in higher risk of procrastinating due to fear of failure.

In context of executive functioning, Anderson (2001) concludes the executive processes develop at the same rate in both boys and girls. No gender differences were observed on tests of executive function (Welsh et al, 1991). Contrarily, girls have been found on verbal tasks (Levin et al, 1991) and boys performed better on specific spatial tasks (Krikoria and Bartok 1998). Similarly, Hussain and Ali (2016), found that male adolescent students were significantly higher on global executive functions and its domains as compared to female adolescent students. Keeping in view the mixed findings, the present research was aimed at examining the gender difference in academic procrastination and executive functions.

On the basis of review of literature, following hypotheses were formulated:

1. Procrastination will be negatively correlated with metacognition and behavioral regulation among adolescents.
2. Males would be higher on procrastination and executive functions as compared to females.

## Methodology

### Sample

The sample for the present study comprised of 200 adolescents in the age range of 15-18 years

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(Mean=16.5; SD=.84). Participants were randomly selected from various public schools of Punjab.

**Tools**

Following tools were used to assess academic procrastination and executive functions of adolescents.

Procrastination Assessment Scale- Students (PASS) (Solomon and Rothblum, 1984). It contains 44 items on 5-point ratings divided into two parts. The first part of the scale assesses the extent to which students delay in their academic tasks, the extent to which they want to decrease this tendency, and the extent to which this tendency is problematic for them. Students rate each of these three items for six academic related tasks (Writing a term paper, Studying for an exam, Keeping up with weekly reading assignments, Performing administrative tasks, Attending meetings, Performing academic tasks in general), yielding a 18-item scale. The second part consists of 26 items that assess why students delay academic activities. More specifically, these items measure fear of failure and task avoidance (Ferrari et al., 1995; Solomon & Rothblum, 1984). Internal consistency reliability estimates of .84 and .85 on the fear of failure subscale and of .74 and .76 on the aversiveness of tasks subscale. Higher score on all dimensions represent higher on procrastination.

The Behavior Rating Inventory of Executive Function—Self Report Version (BRIEF-SR) (Guy et al., 2004). This inventory consists of 80 questions rated on a 1-3 Likert Scale (1 = Never, 2 = Sometimes, 3 = Often). It includes two indices i.e. metacognition Index (working memory, plan/organize, organization of materials and task completion), and behavioral regulation index (inhibit, shift, emotional control and monitor). These two indices combine to create a global executive composite (GEC) score, measuring overall executive functioning. Internal consistency is moderate to high (.72 - .96) for individual subscales full assessment (r or  $\alpha$  = .96; Guy et al., 2004). (r or  $\alpha$  = .72). Higher score on metacognition index and behavioral regulation index means poor executive functions. A total score range from 80 to 240, with higher scores indicating poor executive functions.

**Procedure**

To achieve the objective of the present study 215 adolescents in age range of 15 to 18 years were

randomly selected from various public schools of Patiala district of Punjab. A prior consent was taken from the concerning authorities of the schools and the subjects. All students were contacted during school hours. During rapport building sessions, students were informed about the purpose and significance of the study as well as confidentiality of their responses was assured. Further, the participants were provided with the appropriate conditions to respond to the questionnaires. The questionnaires were administered in the group settings. Each group consisted of 10-12 participants. For the administration of PASS, students were instructed as follows:

“This questionnaire consists of 44 items you will respond on five point likert scale. All the statements in the questionnaire are related to your day- to-day life. Read the statements carefully and answer to these honestly as per your first thought. There is no time limit for the completion of the questionnaires but completes it as soon as possible”.

After a break of ten minutes, students were administered Behavior Rating Inventory of Executive Function—Self Report Version (BRIEF-SR) and instructed as, “Now, this is an 80 items inventory relating to your executive functions. Read the statements carefully and answer them honestly on 3 point likert scale. Again, there is no time limit for this test but try to complete it as early as you can”. After completion of both sessions, the data was gathered from the participants and thanked for their participation. The questionnaires were scored as per the guidelines in the respective manuals.

Out of 215 subjects who scored higher on procrastination (n=120) were considered for the analysis of gender differences in academic procrastination and executive functioning. Correlational analysis was applied on the data of 200 subjects and data for 15 subjects was discarded due to incomplete responses on both the questionnaires.

**Results**

In order to examine the relationship between executive functions and procrastination Product moment co relational analysis was applied. For analyzing gender differences in procrastination and executive functions, t-test was used. Obtained results are presented in Table No.1 and Table No. 2.

**Table 1: Showing Correlation Coefficient among Procrastination, Behavioral Regulation and Metacognition and Global Executive Functions**

P Procrastination	Behavioral Regulation Index					Metacognition Index					GEC
	I	S	EC	M	BRI	WM	P	O	TC	MI	
	.158*	.255**	.192**	.245**	.286**	.194**	.227**	.270**	.212**	.300**	.299**

\*I: Inhibit, S: Shift, EC: Emotional Control, M: Monitor

\*WM: Working Memory, P: Plan, O: Organization of material, TC: Task Completion.

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**Table 2 Means, SDs and t-values for Procrastination and Its Causes i.e. Fear of Failure and Task Aversiveness and Executive Functions i.e. Behavioral Regulation Index, Metacognition Index and Global Executive Composite**

	Gender	N	Mean	SD	t-value
<b>PRO</b>	Female	50	32.52	6.44	3.308**
	Male	70	35.83	4.52	
<b>FOF</b>	Female	50	6.68	2.26	13.765**
	Male	70	14.77	4.13	
<b>AOT</b>	Female	50	5.92	2.34	6.281**
	Male	70	8.93	2.90	
<b>BRI</b>	Female	50	61.14	9.92	3.490**
	Male	70	67.50	9.73	
<b>MI</b>	Female	50	68.18	12.32	5.335**
	Male	70	80.56	12.82	
<b>GEC</b>	Female	50	129.14	20.30	5.294**
	Male	70	148.93	20.03	

Table No. 1 presents coefficients of correlations between the variables of procrastination and general executive functions and its dimensions. There was a significant and positive association between behavioral regulation and its components i.e. inhibit, shift, emotional control and monitor. Similarly, metacognition and its components i.e. working memory, plan, and organization of material and task completion were positively related with procrastination. Higher score on procrastination scale presents high on procrastination whereas high score on behavioral regulation and metacognition indicate poor or lower on executive functioning. The findings of the present study revealed a positive association between procrastination and executive functions which shows that individuals who procrastinate are lower on executive functions. Table 2 depicts significant gender differences for procrastination and its causes i.e. fear of failure and task aversiveness. Males were found higher on procrastination and its primary reasons i.e. fear of failure and aversiveness of task as compared to females. In context of executive functioning, significant gender differences were observed on metacognition and behavioral regulation and general composite score. Males scored higher on all dimensions of executive functions as compared to females. It means that males demonstrated poor executive functions as they scored higher on metacognition index and behavioral index as compared to females.

**Discussion**

The purpose of the present study was to examine the relationship of procrastination with executive functions. Perusal of Table 1 shows that the relationship between procrastination and global executive function is significant and positive. This means that the high school students who procrastinate are poor on executive functions. The findings lend support to the hypothesis that all components of executive functioning will be

associated negatively and significantly with procrastination.

Executive functions are composed of self-regulatory and metacognitive processes (Rabin et al., 2011; Wolters 2003) which are necessary for increasing flexible control over thinking. People with low self-regulation cannot use internal and external cues to determine initiation, maintenance and termination of goal directed actions efficiently (Senecal et al, 1995). The present findings are in line with previous researches which revealed that the ability to maintain one’s focus in distracting situations is inversely related with procrastination (Rakes and Dunn, 2010). Researches (Sadeghi, 2014; Morrison, 2002) in this regard, suggested that due to obstinate thinking, people lose their power of controlling their environment and this lack of control results in procrastination. The findings can also be explained on the basis of physiological functioning. In researches, the role of prefrontal cortex which is the anterior part of the frontal lobes is considered in generating procrastination. Because this area of brain is responsible for various functions such as planning, attention and impulsive control.

Further, findings revealed that males and females differed significantly on procrastination and its reasons i.e. fear of failure and task aversiveness. Males are found higher on the postponement of educational tasks as compared to females. The reasons reported by males for procrastinating behavior are fear of failure and task aversiveness. Empirical evidences in this regard indicate that students with a high level of fear of failure encounter anxiety as a task deadline approaches. As a way of relieving anxiety, the student procrastinates on the task, thereby reinforcing avoidance behavior. Other researches emphasized that males procrastinate due to poor time management skills, study habits, lower achievement motivation and higher levels of impulsivity and difficulty in multi-drafting behavior (Sarid and Peled, 2010). Besides this, male’s higher

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level of perfectionism is considered as a cause of procrastination. Because individuals with high perfectionism delay the immediate gratification of finishing up the task which results in procrastinating behaviors (Flett et al, 1992). Apart from lending support to the hypotheses, the findings get support from previous researches which have shown that male students procrastinate more in academic tasks than females (Van, Erde, 2003; Steel 2007; Ozler and Ferrai, 2009). It has been shown that males procrastinate due to lack of effortful control, intrinsic motivation and dissatisfaction with the assigned task (Vahedi S, Farrokhi F, Gahramani F, and Issazadegan A, 2012, Brownlow and Reasinger 2000). External rewards are found as motivator for males in completion of the tasks.

A significant difference between males and females on global executive functions and its dimensions i.e. behavioral regulation and metacognition was observed. Males were found to be higher on global executive composite than females. This difference can be seen in terms of greater self-control among women in general (Van Erde, 2003; Else-Cruest et al, 2006). While dealing with difficult assignments girls make higher use of self-regulation as compared to boys (Zimmerman 1998). They have better control over their cognitive and emotional states and overcome distracters effectively. There was an inverse relationship between self-regulatory skill of effort regulation, or the ability to maintain one's focus in distracting situations among graduate students (Rakes and Dunn 2010). In the same way, Ferrari (2001) depicts that chronic procrastinators have difficulty in regulating their accuracy and performance speed in high demand situations, such as tasks that involve high levels of cognitive load.

## Conclusion

The findings point out that the likelihood of procrastinate in academic activities is affected by poor executive functions as compared to females. Males who procrastinate demonstrated poor executive functions. This suggests that female students are better able to schedule and execute the tasks in academic settings. This research has significant implications for educationists, counselors and researchers. In the light of these findings counselors should develop training programs in order to decrease level of procrastination especially targeting male students. Psycho educational workshops can be conducted specifically to gain strategies for dealing with troublesome behavior and its correlates among male adolescents. Teachers can identify academic areas in which students demonstrate more procrastination. For prevention making assignments interesting and better teaching strategies can benefit. Although the present study has garnered crucial observations regarding student's behavior in handling academic tasks, it carries certain identifiable limitations. The sample used in this study limits its application to a broader population of students. Findings of the present study are based on self-report measures alone which might have influenced the results. Future research should incorporate some

contextual and task related variables for meaningful understanding of procrastination and its correlates. Further research needs to explore the reasons of gender differences in executive functioning.

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