International Journal of Psychological and Behavioural Research (IJPBR)
Volume.3, Issue.I1 (Dec, 2023)

ISSN (P): 2790-9859 (E) 2790-9867
DOI: https://doi.org/10.37605/ijpbr.v3i2.2

Date of Submission: 02-09-23
Date of Acceptance: 01-11-23
Date of Publication: Dec, 2023

FACTORS AFFECTING ATTENTIONAL VITALITY ON STROOP TASK AMONG UNIVERSITY STUDENTS IN PESHAWAR

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Abstract

Present study was designed to investigate the effect of different factors on the attentional vitality/flexibility of the university students as measured through Stroop task. Objectives of the study were to find out gender differences in general as well as to compare the performance of female students during their menstrual cycle with that of other females without cycle and with the male students. University students (100 male and 100 females), with age range 20 to 25 years enrolled in BS and Masters were included in the study. Convenience sampling technique was used to select these participants. English version of the Stroop Test, designed by Trenerry et al. (1989) was used. t- test was used for data analysis. Significant differences were observed between males and females in general, similarly the performance of females during their menstrual cycle phase was significantly low as compared to other females without cycle.

Key Words*: Stroop task, attentional vitality, gender, menstrual cycle.*

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Introduction

Educated adolescents are usually so skillful at reading in print material that they cannot easily ignore the content of the written words, and it really, is an effortful task to divert your attention towards the color of the word rather than its content. Stroop task is based on the same skill/ ability of educated people to quickly read written material then to focus on its color (Bohlin & Brocki, 2004; Murdoch-Eaton et al., 2003). The Stroop Task is a test used to measure our attentional flexibility and vitality. Naming colors being difficult gives advantage over reading words being easy in Stroop task. A certain color's name if written in another color's ink ; e.g, if green ink is used to write the word blue it will be easier to read the word blue than to tell its color i.e green.

One of the important determining factor of superior performance on Stroop task is gender. Past research indicates that attentional vitality of Kuwaiti women was better as compared to males on color of the word card (Alansari & Baroun, 2006). Another study with children from Mexican schools also found substantial gender differences in the same domain (Armengol, 2002). Similar to attentional vitality, Continued attentional control enables careful attention for a longer period of time on a certain activity and resists all kinds of distraction originating from external or internal sources. It has a great significance in daily life activities and was found to be related with gaps in attention in daily life (Robertson et al., 1997) academic performance (Steinmayr et al., 2010) and driving skill (Schmid et al., 2009). Sustained attentional control in relation to gender show different results in different studies. According to some studies gender has no role in attention related tasks (Chan, 2001) whereas other

suggested men to be more vigilant (Blatter et al., 2006) and females to have greater inhibitory control (Yuan et al., 2008).Similarly on an uninterrupted task of some performance, females were found to be less rash, and more flexible as compared to males (Conners, et al., 2003). Furthermore performance on stroop task may create stress in females (being more stess prone). Research on stress in humans has indicated that stress and its hormones can cause positive as well as negative effects on reasoning and cognition. Numerous studies show that exposure to stress (Duncko et al., 2009; Weerda et al., 2010) or real-life stress (Lewis et al., 2008) enhances short term memory as measured through tests. Some other studies conversely have confirmed that the exposure to similar forms of stress can impair performance on tasks utilizing short term memory (Oei et al., 2006; Luethi et al., 2009 Schoofs et al., 2008). As a final point, another group of researchers found that working memory tasks were performed in an almost similar way under stressful as well as normal conditions (Kuhlmann et al., 2005; Porcelli et al., 2008; Qin et al., 2009)

In conclusion, the whole review of the literature has provided us with varying results on the tests of cognition and attention while investigating gender differences and performance under stressful and normal conditions. Although some studies showed a tendency for a superiority of females over males, but this tendency may decrease during their menstrual cycle phase as a result of the action of certain hormones. McCormick and Teillon (2000) found menstrual cycle related changes as women in their Luteal phase performed poorly on a spatial relations tasks as compared to females in other phases and males. Other results suggest

that estrogen influences implicit memory (Makki et al., 2001). Keeping in view the inconsistent findings in the past and also aiming to explore the phenomena in another context the purpose of the present study was to study gender differences and menstrual cycle related differences in the performance on Stroop task.

Objectives

- To find out gender differences in attentional vitality as measured through Stroop task.
- To compare the performance of females on Stroop task during their menstrual period, with their male counterparts.

Hypotheses

- Females will show better performance as compared to males on Stroop task.
- Attentional vitality in females with cycle will be poor as compared to other females and also their male counterparts.

Method

Population

Early adults in the age range of 20-25yrs were the population of the study.

Sample

Inclusion criteria

200 University students (100 male and 100 females) having age range 20 to 25 years enrolled in BS and Masters Programs were included in the study. Convenience sampling technique was used to select these participants.

Exclusion criteria

Early adults with color blindness, dyslexia and having previous

exposure to Stroop task were excluded from the study.

Instrument

English version of the Stroop Test, designed by Trenerry et al. (1989) was used. This test contained 112 items arranged in four columns having 28 items in each columns, on two pages. Names of the colors Green, Blue. Red and Tan were written in random order in the same four colored ink on both pages, but no word was written in the same color as its name implied. First card was used to make the students read what is written on the card i.e it was a word card, whereas second card required them to tell color of the written word rather than reading the word itself. For every card 120 minutes were given to complete the task .Time taken by the students was recorded with a stop watch.

Procedure

This was an experimental study in which subjects being color blind, dyslexic and those having any prior experience of the Stroop test were excluded from the study. Similarly female students were requested to specifically provide the information if they are going through their menstrual cycle phase. Before starting the experiment all the participants were informed that the experimental study was conducted solely for research purpose. Instructions page, explained, the nature and procedure of t test to the participants. On the first page of the test speed of reading words aloud, was measured. This was the same procedure as adopted by Trenerry et al. (1989) for measuring the time taken by respondents in reading words on these cards .The participants were asked to begin with the left hand side and after completing all the columns in order they had to say “Finish” loudly. Time taken to read a card/page completely was noted by the

experimenter using a stop watch. Next page was also having same instructions but it only replaced the instruction "read the word" by "name the color of the ink". Subjects had to complete each card in 120 seconds. Time taken on the first card which required subjects to read the words, were almost same for all subjects but they showed differences on color of the word card. Results for color of the word card are therefore given in the results section below.

Results

Table 1

Mean Difference, SD and t-value of male and female Students on Stroop Task (N=200)

	Male (n=100)		Female (n=100)		t(198)	p	CI (95%)	
							LL	UL
Stroop Task	M	SD	M	SD				
Color-word task	22.55	22.57	32.10	24.83	-2.84	<.01	-16.16	-2.93

Note: df=2, *=p<.05, **=p<.01&***=p<.001.

Table 1 shows mean differences with respect to gender on the color of the word card of the stroop task. Results show that there are significant gender differences i.e on <.01 level. Female university students show greater attentional vitality (mean vale 32.10) as compared to male university students (mean value 22.55) in telling color of the word on stoop task.

Table 2

Mean Difference, SD and t-value of males and female university students (without cycle) in attentional vitality on Stroop Task (N=174)

	Male (n=100)		Female without cycle(n=74)				CI(95%)	
StroopTask	M	SD	M	SD	t(172)	p	LL	UL
Color word task	22.85	22.41	37.36	25.87	-3.95	<.001	-21.76	-7.26

*Note:*df=2, *=*p*<.05, **=*p*<.01&***=*p*<.001.

Table 2 shows mean differences in the performance on color of the word task between male university students and female university students without cycle. Results show that there are highly significant differences found in the attentional vitality/flexibility between the two groups i.e at <.001 level. Mean value for females is 37.36 whereas for males is 22.41.

Table 3

Mean Difference, SD and t-value of males with female university students (with cycle) in attentional vitality on Stroop Task (N=200)

	Male (n=100)		Female with cycle (n=26)		t(124)	p	CI(95%)	
Stroop Task	M	SD	M	SD			LL	UL
Color word task	22.85	22.41	18.38	13.86	0.96	0.33	-4.67	13.60

Note: df =2, *=*p*<.05, **=*p*<.01&***=*p*<.001.

Table 3 shows mean differences in the performance on color of the word task between male students and female students (with cycle). Results show

that there are differences in the attentional vitality, with a greater mean value, 22.85 for male students and a lower mean value 18.38 for female students (having menstrual cycle) but these differences are not significant.

Table 4

Mean Difference, SD and t-value of female university students with and without cycle in attentional vitality on Stroop Task (N=100)

	Females without cycle (n=74)		Females with cycle (n=26)		t(98)	p	CI(95%)	
							LL	UL
Stroop Task	M	SD	M	SD				
Color word task	36.91	26.07	18.38	13.86	3.44	<.01	7.87	29.19

Note: df=2, **=p<.05, **=p<.01&***=p<.001.*

Table 4 shows mean differences in the performance on color of the word task between female university students without cycle and with cycle. Results show significant differences i.e on <.01 level in the attentional vitality, with a greater mean value ,36.91 for females without cycle and a lower mean value 18.38 for the females with cycle.

Discussion

Current research was conducted to investigate the effect of different factors on the attentional vitality/flexibility of the university students as measured through Stroop task. Its main goals were to investigate differences based on gender, menstrual cycle and any prior stressor with which subjects showed a preoccupation. First hypothesis of the study was that the "females will perform better on stroop task as compared to males". Mean differences in performance of male and female

students were investigated using t test. Significant differences at p <.01 level were found between the two groups. Baroun and Alansari (2006) discovered that females showed significantly better performance as compared to males on all the cards of the Stroop task. Past studies supposed enhanced verbal abilities and greater inhibition among females as causes of such results (Sjoberg et al., 2023). Other studies suggested no differences in the attention and memory of males and females (Solianik,et al., 2016).

Second hypothesis was that attentional vitality in females with cycle will be poor as compared to other females and also to their male counterparts .In order to analyze this hypothesis performance of females (with cycle) were compared with other females (without cycle) as well as with their male counterparts separately using t-test for each analysis. No significant differences were observed in the percentiles on color of the word task between females (with cycle) and males. Differences were however highly significant in the percentiles on the same task between females (with cycle) and those without cycle. Differences in Stroop and memory task performances modulated by gonadal steroid hormones during the menstrual cycle in 30 women having regular cycles were studied using a logical memory task (Wechsler Memory Scale) and the Stroop task. The results showed a significant difference in Stroop task performance between low and high levels of estradiol and progesterone during the menstrual cycle, but no differences were discovered on the memory test (Hatta et el., 2009). Similarly females may experience shame and distress, lack of confidence during their menstraution (Hennegan et al, 2019) leading to stress and poor performance on attentional tasks.

Summary and Conclusion

Aim of the present study was to investigate the effect of different factors on the attentional vitality/flexibility of the university students as measured through Stroop task. Objectives of the study were to find out gender differences in general as well as to compare the performance of female students during their menstrual cycle days with that other females without cycle and with the male students. Similarly the effect of any stressor experienced during the last week was also investigated. 200 University students (100 male and 100 females), age range 20-25 yrs enrolled in BS and Masters Programs were included the study. Convenience sampling technique was used to select these participants. English version of the Stroop Test, designed by Trenerry et al. (1989) was used. t test was used for data analysis **.**

Results suggested that gender, menstruation and stress all effect attentional vitality on Stroop task. No significant differences however were found between females during their cycle and the attentional vitality of males on the stroop task, but their performance was lowered as compared to other females without cycle. To study the effect of stress further studies with clinical populations should be conducted so that this area should be further investigated; e.g we can ascertain that attentional disentanglement can be a symptom of certain stress based clinical disorders. Similarly a main limitation of the study was that, that experiment was conducted on the students usually at the end of their study hours in the university. Females having their menstrual cycle might be experiencing fatigue as an additional factor to affect their performance negatively. Convenience sampling

although was an easy way to collect data on the stroop task but it cannot give us as true results as can be obtained through random sampling.

Implications

Stroop task is a measure of attentional vitality and flexibility. As we know that all academic activities need much attention on the part of the students. Factors like stress and hormones can affect their performance in these activities. Current study has proved the effects of gender and menstruation on the performance on Stroop task. Results of the present study can be used in planning future training programs for students in the area of stress management, and especially for females in the area of coping with mood changes and developing concentration during their menstrual cycle phase. Furthermore it paves the way for future researchers and clinicians to design intervention based studies in order to develop best possible treatments and techniques in this area.

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