EXECUTIVE SUMMARY

Vigilance as a cognitive aspect has interested researchers for decades. But the spotlight regarding the concept of vigilance somehow was limited to the defense service and national security. With the increased complexities of human life styles, exposure to numerous stimuli at any given point of time, it seems that successful accomplishment of cognitive tasks on regular basis demand individuals to be more vigilant than ever. Starting from crossing a busy road to attend a complex classroom lecture, to understand an individual’s exact personality pattern amongst his/her apparent behavioral complexities, to be successful in a debate competition, individuals not only require sustained attention but they are required to be extremely vigilant to successfully accomplish the cognitive processes.

Considering obsession as preoccupation with precision and vigilance as successful detection of rarely occurring stimulus during a prolonged period of wait, it’s assumed that individuals high on non-clinical obsession-compulsion as a personality trait will be more successful in accomplishing vigilance task than their counterparts. The present study aims to explore whether obsession as a characteristic preoccupation with finer details (not as a pathology) enhance vigilance task performance. Does the compulsive behavior pattern contribute in detection of target stimulus during performance of vigilance task? Obsession compulsion has been considered as a continuum in the study, from order to disorder. With the increasing levels of obsession compulsion whether vigilance improves? The study attempts to answer these questions.

There is a plethora of research on whether the non-impaired organs of individuals with sensory impairment compensate for their impaired sense organ and increase cross modal performance. The study attempts to clarify in individuals with sensory impairment can perform better as compared to their control counterparts in particularly a cross modal vigilance tasks.

An automated warning system is a sensory stimulation meant to reduce errors in highly loaded cognitive tasks. Previous research findings suggest that performance efficiency is uninfluenced by warning (Helton et. al., 2008) or a higher error of omission reported in the
presence of warning signals (Helton et. al., 2011) or introduction of warning signals reduced RT (Ponsford & KInsella, 1992; Van Zomeren et. al., 1984). With the increase in automation, the concept of automated warning had been increasingly used in industrial setup. But how it affects cognitive process like vigilance, particularly for persons with disability is rarely been explored. The present study attempts to throw light on the interrelationship of vigilance and automated warning and aims to reveal if warning actually reduces performance decrement, or decreases performance accuracy inducing anxiety for clinically normals as well as for the clinical group.

Traditionally positive emotion has proved to improve performance of individuals, whereas negative mood is believed to narrow down the sphere of attention. But how individuals perform in vigilance with an environment led by positive or negative emotions is rarely being explored. Hence, another section of the present study explores how positive and negative affect influence vigilance. It further aims to see how it works for patients with obsessive compulsive disorder.

Overall, the study attempts to elicit how vigilance is influenced by cognitive, affective stimulation, or with different personality symptoms.

Participants were 311 adult individuals of West Bengal, India. Among which there were two groups with Sensory Impairment (Visual Impairment and Hearing Impairment), one group of OCD patients and three normal control group corresponding to each experimental groups. Participants were instructed adequately and were briefed about the nature of the study. Written permission was taken from the institutions they belonged to, at the same time participant’s individual consent was also taken. Participants were given an Information schedule to record the demographic variables, a General Health Questionnaire (Goldberg, 1972), Leyton Obsessional Inventory (Cooper, 1970) to assess prevalence of obsession-compulsion symptoms, Slosson Intelligence test (Slosson, 1998) or Standard Progressive Matrices (Ravens, 1938) to assess the intelligence level and working memory functioning of the samples and DAT Clerical Speed & Accuracy (Bennett et. al., 1947) subtest only. Finally, the participants were given a vigilance task using a software program developed for this particular research (Panda et. al., 2011). They were asked to detect a
target stimulus among randomly occurring buffer and distractor stimuli. The target stimulus was discriminable from the non-target ones. Participants were asked to press a particular key on computer whenever they heard a target stimulus to occur. Whenever participants made two consecutive errors in target stimulus detection, a warning signal occurred. For the individuals with Visual Impairment the warning was auditory in nature and for individuals with Hearing Impairments, OCD and their corresponding control groups the warning signal was visual in nature. Further, two video clips were used specific to the culture the samples belong to, one depicting a positive emotion – happiness and the other a negative emotion – sadness. The video clips were shown to the control group only before performance of vigilance task. The responses of the participants were measured in terms of successful detection of target stimuli (hit) and response given to buffer stimuli in lieu of target stimuli (false alarm).

Results indicate a significant trend in levels of obsession with vigilance, where individuals with low non-clinical obsession performed best in vigilance. Further, there was a significant difference between the performance of OCD patients and their control counterparts. Automated warning is found to improve vigilance performance in normal controls and for individuals with hearing impairment. But, no such effect of warning is observed in individuals with VI. Intellectual capacity and Speed and Accuracy are found to be correlated with vigilance for individuals with sensory impairment, OCD groups and their normal counterparts. Finally, application of a positive affective stimuli depicting happiness improved performance in vigilance for clinically normal group.

The findings of the present study indicate that heightened preoccupation with precision, even when it is non-pathological actually deteriorates vigilance performance. Thus, involvement of people with high non-clinical obsession in professional setting has to be done with caution. Incorporation of warning signal heightens the cortical arousal level of individuals with hearing impairment and their normal counterparts. Outcomes of the present study will definitely help in rehabilitation of the individuals with sensory impairment. At the same time it can be used more widely during vigilance tasks performed by individual with sensory impairment as well as for clinically normals or suggestions can
be made regarding more cautious use of automated warning during cognitive tasks of individuals with visual impairment.

The present research is a very novel attempt in Indian research in the field of vigilance. Even there are very few reported studies with the variables explored in relation to vigilance. Hence, this study claims replications to generalize the findings beyond reasonable doubt.