

The vigilance
decrement reflects
limitations in effortful
attention, not
mindless...



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The chosen article for this critique is “ The Vigilance Decrement Reflects Limitations in Effortful Attention, Not Mindlessness” by Grier and colleagues (2003). This study on sustained attention was published in the Human Factors and Ergonomics Journal. This is a peer-reviewed journal that publishes high-quality studies.

Title

The title of this current article: “ The Vigilance Decrement Reflects Limitations in Effortful Attention, Not Mindlessness” is clear and conveys to its readers exactly what the study involves, as well as the relationship of the variables being used.

Abstract

A positive aspect of the abstract from the present study includes some essential information regarding the paper’s content such as background literature, results, conclusions and applications of the findings. However, this section lacks key information that allows the reader to decide on the relevance of the article. This abstract lacks information on the sample, design and the purpose of the paper. A poorly written article can sometimes indicate that a poor study will follow.

Introduction

The topic regards vigilance and how poor performance on this variable is due to an overload of attention resources rather than a lack of consciousness.

The researchers start with a short summary of the history of the vigilance task and its many different types.

They then go on to describe empirical research that strengthens their ideas that vigilance tasks are overburdening on an individual's attention and stress levels and consequently on cognitive interference levels. Next, they describe previous theories on attention that explain the phenomenon.

The authors of this present study infer that individuals are alert during vigilance tasks and that the main causes of vigilance decrement are due over-burden of attention over time as well as the stress associated with this. The authors clearly indicate gaps in the literature and that past research lacks validity. They argue that the present study should add validity to this line of research by experimentally comparing workload and stress data in both the classic and modified versions of the vigilance task. The authors proposed that workload and stress levels would be similar for the modified vigilance and standard vigilance group. They suggest that these findings could add to the literature on Resource Depletion Theory.

Methods

The authors had recruited 64 U. S. college students, from which 32 were male and 32 were female. The researchers ensured that all the participants were visually capable of participating in the study. An equal number of males and females were randomly allocated to either the standard-vigilance or modified -vigilance group. The students were not informed as to the true nature of the study.

Images of three dots on a grey background were displayed to the participants. These images were of two categories, either “good parts” or “damaged parts”. The images in the good parts category contained side dots, which were of an equivalent distance from the circle in the centre of the image. Images from the damaged parts category were similar to those of the good parts; however, one of the two side dots in these images differed slightly from the other dot in its distance from the middle circle. In many instances, the difference between the dots was minuscule and hard to identify, which was what made the task challenging. The damaged parts images were considered the critical signal, whereas the good parts were considered the non-target stimuli.

The standard vigilance group were instructed to only press the keyboard button when the target stimuli appeared on the screen. This version is considered a classic vigilance task. The modified vigilance group were instructed to repeatedly press the button for the non-target stimuli and to avoid pressing the button when the critical stimuli appeared, known as the damaged parts images. The aim of this was to boost levels of mindlessness by getting the participants to constantly respond to the non-target stimuli and only rarely repress responses for the target stimuli. The notion behind this is that the monotony of such a task would cause a deterioration of attention levels and distract the individual from the task.

The participants’ mental workload was also measured in order to decipher what the participants were, in fact, experiencing during such tasks. The NASA-TLX self-report questionnaire helped to identify if the volunteers’ attention was being overworked as opposed to just daydreaming. In addition, <https://assignbuster.com/the-vigilance-decrement-reflects-limitations-in-effortful-attention-not-mindlessness/>

the Dundee Stress State Questionnaire (DSSQ) detected stress levels associated with sustained attention.

The authors used a card-sort task as a control condition. Here a different sample of 64 participants organised cards into their according order. This task was not as demanding upon the volunteers' attention as the previous tasks. Upon completion, half of the participants were administered the NASA-TLX questionnaire and the other half the DSSQ.

A positive aspect of the methods section in this study is that the authors have verified that all the volunteers had close to normal vision and were visually capable of completing the tasks. This was step vital as the vigilance tasks were performed on a digital screen and the participants needed to be able to visually interpret what was on the screen.

Conversely, there are also many negative aspects of the methods used in this research.

Firstly, when recruiting the participants, the authors did not take into consideration certain medical conditions, which could have moderated the results of the study, such as Attention Deficit Hyperactivity Disorder (ADHD), depression or hypertension.

As stated in the DSM-V, a primary symptom of ADHD includes the inability to sustain attention (DSM V: APA, 2013). Several research studies support this notion and conclude that ADHD patients exhibit poorer performance on executive tasks, which include response inhibition and sustained attention

tasks (Johnson et al., 2007; Barkley, 1997; Brown, 2009; Huang-Pollock, Karalunas, Tam & Moore, 2012; Cubillo, Halari, Smith, Taylor & Rubia, 2012).

Another psychopathology that the DSM-V associated with attentional control deficits is Major Depressive Disorder (DSM V: APA, 2013). Numerous studies have proved and demonstrated this association between depression and difficulties in attentional control (Naim-Feil et al., 2016; Deng, Li & Tang, 2014; Rock, Roiser, Riedel & Blackwell, 2014)

By excluding individuals with such psychopathologies from the study, the authors could have reduced the risk of such confounding variables moderating the results.

In addition, studies show that medical conditions such as hypertension are associated with lower performance on cognitive tasks (Brown, Sollers III, Thayer, Zonderman & Waldstein, 2009; Bucur & Madden, 2010). Moreover, it is believed that that caffeine significantly increases blood pressure and that it consequently influences cognitive performance (Mitchell et al., 2011) and more specifically, attention (Smith, Christopher & Sutherland, 2013). The authors of the current study did not instruct the participants to restrain from consumption of caffeine products. However, a problem with this might be that abstinence may result in withdrawal symptoms such as decreased alertness, migraines or fatigue (Juliano & Griffiths, 2004). Usually, these symptoms last between 2-9 days (Juliano & Griffiths, 2004), which would mean that the authors should instruct the participants to abstain from consumption for at least nine days before the experiment. This would ensure

that all participants would exhibit similar baseline measures when entering the lab.

Another variable, which is believed to effect cognitive functioning, is an individual's stress levels. Mika et al. (2012) have found that chronic stress deteriorates not only one's ability to withhold responses but also their working memory levels. However, the authors of the current study only measure the effects of the vigilance task has on the students' stress levels and they do not give any significance to the effect that stress might have on vigilance task performance. According to Campbell, Labelle, Bacon, Faris and Carlson (2012), mindfulness-based meditation helps to reduce stress and blood pressure levels. The authors of the current study could have instructed the volunteers to incorporate 30 minutes of mindfulness exercises into their daily routine for a week prior to participating in the experiment.

Results and Conclusions

With regards to correct detections, results from this current study reveal deteriorating performance over time for both the standard and modified vigilance groups. However, the standard vigilance group displayed a relatively steeper decrease in performance. This implies that occasionally pressing the button for the rare stimuli only, causes a decline in one's ability to correctly respond to detections. It is possible that having to constantly press the button for the non-target stimuli causes one to be alert to the task at hand.

Analysis of the false alarm percentages showed that the standard vigilance group made fewer incorrect detections compared to the modified vigilance
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group. In contrast, the modified vigilance group displayed a relatively higher percentage of false alarms. Perhaps, a reason for this is that they are simply withholding a higher number of responses over time and therefore, restraining their responses for the non-targets as well. Consequently, it might just be the simple action of withholding responses that predisposes one to respond incorrectly.

Findings from the stress questionnaire show that the students in both vigilance groups were significantly more stressed after the task compared to the control group. However, a fall in engagement had been observed for the groups that performed the more demanding, challenging tasks and reported less task engagement than the control group. In addition, workload scores were similar for both the vigilance groups.

With regards to cognitive interference scores, these increase at a similar rate for both vigilance groups. This suggests that the type of vigilance task performed did not moderate the degree of cognitive interference. The authors suggest that these findings broaden knowledge on Resource Depletion Theory and could aid in developing procedures that make monotonous tasks less of a burden on attention and stress levels.

In conclusion, the current study demonstrates that a decrease in vigilance task performance is not due to absent-mindedness, but rather an overburden on attentional resources. Future research could attempt to investigate this association using a longitudinal design to verify if the effects of attentional overload on vigilance and stress over longer periods of time. Caution must

be taken when interpreting the present results as the many methodological limitations could have influenced the outcomes of this study.

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