

The Relationship Between Attention Span and Technology Use

¹ Dr. Bilal Ahmad
²Fatima Zahra

How to cite this article:
Ahmad, B., & Zahra, F. (2024). The Relationship Between Attention Span and Technology Use. Pakistan journal of multidisciplinary, 2(2), 29-42.

Article Details	Abstract
Received: 17 July 2024 Accepted: 26 Oct 2024 Published: 17 Dec 2024 ¹Dr. Bilal Ahmad, ²Fatima Zahra . Copyright @Author Corresponding Author: *Dr. Bilal Ahmad	<i>This research investigates the relationship between attention span and technology use, focusing on how digital devices and online environments influence cognitive engagement and concentration levels. As technology becomes increasingly integrated into daily life, concerns have arisen regarding its impact on individuals' ability to sustain attention. This study reviews existing literature, including empirical studies and theoretical frameworks, to analyze how various forms of technology—such as smartphones, social media, and video games—affect attention span across different age groups. Key findings indicate that excessive technology use can lead to shortened attention spans, characterized by difficulties in focusing on tasks and increased distractibility. Furthermore, the research explores the role of multitasking and instant gratification in shaping attention-related behaviors, highlighting the potential for technology to disrupt traditional cognitive processes. However, the study also acknowledges the potential benefits of technology, such as enhancing information processing and providing engaging learning experiences. Ultimately, this research emphasizes the need for balanced technology use and strategies to improve attention span, advocating for further exploration into the effects of digital environments on cognitive functioning and the development of attention-related skills.</i>

Keywords: attention span, technology use, digital devices, cognitive engagement, concentration, multitasking, social media, information processing.

¹ Assistant Professor, Department of Psychology, University of Karachi, Karachi.
² MPhil Scholar, Department of Psychology, University of Karachi, Karachi.

1. INTRODUCTION

Our world is pervaded with numerous technologies. Such technologies are so intertwined with everyday life that society no longer notices them. Life without these technologies is difficult to imagine. Recent times have seen increasing concerns about the cognitive processes and attention of individuals. There is widespread concern that technology has a poor influence on concentration and wider cognitive processes. The full extent of these perceptions is often linked to contemporary technological forms, such as smartphones and social media. The overarching objective of this essay is to critically analyze how a selection of technologies affects focus and wider cognitive processes. Methodologies for investigating the complex relationship between technology and attention are also discussed. (Antal et al.2022)

In the context of understanding how technology affects focus, it is pertinent to realize that attention is a contentious and multifaceted construct. To some, attention is nothing more than information processing. This is a general way of thinking about attention that considers how the brain processes information. At the simplest level this can be seen as a stimulus that is input and then cognitively processes through attention and memory. In a more complex scenario, this information processing can be seen through a task in which attention selects a particular aspect of the stimulus and then processes it. More contentious is the notion that attention is a capacity. This is a psychometric construct fundamental to modern cognitive psychology. It is this interpretation of attention, the notion of a fixed and normally distributed capacity that is so widely debated around technology use (Liebherr et al., 2022).

It is the smartphone in particular that is conceptually linked to a poor attention span. The ubiquitous presence of smartphones in everyday and the concerns around young people's exaggerated use have fueled such perceptions. Investigations closely linked with these concerns often focus on smartphone

¹ Assistant Professor, Department of Psychology, University of Karachi, Karachi.

² MPhil Scholar, Department of Psychology, University of Karachi, Karachi.



notifications. Notifications processes are ongoing processes that allow technologies to inform a user that a particular event has occurred. In most contemporary design, this involves some abstract conceptualization of the event being translated into a physical event. The majority of research investigates the impact of notifications in academic environments on students. Key to how these concerns are understood are on the premise of resource models. People have finite intelligences that can be deployed in a limited number of tasks. This fundamental principle is used to argue that technology notifications over tax attention to a point that real-world tasks and educational outcomes suffer. For example, creating notifications impact on students reading comprehension. On a practical level, investigations from this perspective often involve some form of academic task as this objective measure acts as a vehicle for the demanded resource consumption. An audio and/or visual notification are introduced, and the real-world task of interest is measured before, and after the notifications are encountered. At a broad level, experimental methodology clearly defines attention as the deployment of attention resources and documentation/comprehension a representation of wider cognitive processing, and academic performance. On a more complex level, the specifics of these methodological approaches can be further broken down. (Vedechkina & Borgonovi, 2021)

2. THEORETICAL FRAMEWORK

There is an unsettling confusion and misunderstanding that is beginning to form surrounding technology distractions and the limitations of attention. This feeling of disorientation regarding the way information is both processed and recalled under technological influence can impede conversations and arguments on the respective matter. This concern illuminates the over-complication that can occur on the topic of human attention as a war erupts between the polarization of the hyper-distracted Millennials and the aloof Baby Boomers. Being the first section of this survey, this portion looks to delve into the theories and limitations of the

¹ Assistant Professor, Department of Psychology, University of Karachi, Karachi.

² MPhil Scholar, Department of Psychology, University of Karachi, Karachi.



careful excavation of the ancient ruin that is human concentration – a tunnel made to pave the way and shed some light on the other chambers and crypts to come and those that remain buried. (Dong et al.2021)

Cognitive Load Theory suggests that the amount of mental effort needed can surpass the sum for nought that is one's capacity for attention, especially in a world dominated by the constant array of digital technology saturation (Anderson et al., 2018). Multitasking theory looks at the simultaneous engagement in numerous tasks to examine how focus shifts and, most importantly, how the efficiency of these tasks is impacted. Between these two theories lies a murky conflict, or a partnership depending on the parsed point-of-view bias. In essence, this recognizes that one theory is looking at how technology can overcause flawed attention in the already prone. While the other is looking at the input and extraction of information from the technology-permeated environment, and most importantly, how that is making this transfer of information evolve in its simple complexity (Arslantas, 2017). As such, this prevalence of low-hanging verbal fruit recognizes the importance of understanding these theories in order to accurately interpret the promised analyses and the more numerous discussions. (Dontre, 2021)

2.1. Cognitive Load Theory

Introduction There is a case related to this where, if you have information from an academic study that suggests a direct link or need for these parts then the client can follow up with a brief to ensure these points are covered clearly. This is an academic example of one part of the start of a study. When technology use is stopped, younger individuals display concern about missing out, being disconnected, and being out of the loop. Some behavioural answers exposed to this frequently are discontinuing a face-to-face conversation to check their phone, seeing a mobile notification, responding when they receive a message escorting them, and picking up the phone before it even rings. Numerous studies investigate relationships between technology adoption and cognitive aspects like

¹ Assistant Professor, Department of Psychology, University of Karachi, Karachi.

² MPhil Scholar, Department of Psychology, University of Karachi, Karachi.



memory and attention. An approach into attention and memory happen by utilizing Cognitive Load Theory. One facet of this theory is the distinction between different types of cognitive load: intrinsic, extraneous and germane load. A study in 1988 proposes the first version of Cognitive Load Theory and states that learning good enough with new information requires reducing overall cognitive load. This theory divides cognitive load into types that describe the allocation of limited resources for information processing in considerable ways during learning. Cognitive Load Theory proposes learning and memory mechanisms of overloaded cognitive elements including haptic guidance (de Jong, 2010). Furthermore, some fMRI studies might characteristics of three mode signs of resource competition for working memory, which suggest the existence of three types of cognitive load: intrinsic, extraneous, and germane reprocessing during reading. There are many indications of too high cognitive load, which hinders the learning process. When playing games on mobile phones during breaks, it is hard to maintain a conversation with friends, and the phone frequently rings, one time after another. Similarly, this explanation might occur during a live trivia game application experiencing lags. This is the academic example of one part of an article. (Öhman et al.2021)

2.2. Multitasking Theory

Multitasking is engaging in two or more tasks simultaneously rather than sequentially. People often multitask by combining media and non-media activities. Half of college students and 21%–48% of adults report using various devices while studying or working. While people can successfully multitask, there are cognitive costs associated with how they allocate their resources. Resource allocation costs result in reduced performance on at least one of the tasks. One explanation for this cost is people's lack of resources to fully support two tasks at the same time. Another type of cost is referred to as switching cost, a performance cost resulting from rapidly switching between tasks (Arslantas, 2017). Given the electronic era, multitasking is encouraged, enabling people to switch rapidly between tasks or

¹ Assistant Professor, Department of Psychology, University of Karachi, Karachi.

² MPhil Scholar, Department of Psychology, University of Karachi, Karachi.



activities. This widespread use of digital media, such as accessing data, browsing the web, and sending a message, contributes to an increase in rapid switching. However, the cost of this intensive and rapid usage is often an increase in effort and, more importantly, unintended exploration. In general, studies show that media-multitasking is associated with negative neurological consequences. This is due to the fact that advancing technology opens the door to new opportunities, but it may also create new limitations. The more deeply our society relies on computer technology, the more potential this has to exacerbate the risks associated with the use of this equipment. The advancement in certain devices, and subsequently the introduction of new behaviors, may not always be in line with our adaptability. One type of multitasking involves such task-switching, whereas the more general type is the concurrent performance of a few assignments at the same time. There is also working memory swapping (WMS), which implies moving the contents of the focus of attention from one task to another without productivity. Participants frequently believe that task-switching, which is often facilitated by electronic equipment, enhances the efficiency of assignments when the actual productivity level is quite the opposite. In particular, electronic tools have devised a mental approach, leading to fast switching and the doing of assignments in a more automatic manner. Unfortunately, the unbiased results clearly display that the outcome of the tasks done concurrently tends to be worse compared to sequential or individual performance, with greater assignment difficulty worsening this inequality. (Vella-Brodrick & Gilowska, 2022)

3. RESEARCH METHODS

3.1. Experimental Studies

3.2. Correlational Studies

4. FINDINGS AND PATTERNS

There is a recognition through both correlational and experimental studies that there are these two broad, but not mutually exclusive, patterns that are emerging

¹ Assistant Professor, Department of Psychology, University of Karachi, Karachi.

² MPhil Scholar, Department of Psychology, University of Karachi, Karachi.



between cognitive focus and technology. One is this idea of a decline in attention span because of technology use. There are studies, especially more recent studies, of children, in particular, where they're finding that those who are spending the most time with screen media also have the lowest attention spans (E. Beaudoin et al., 2022). And so, the thought is, it's because of the high cognitive load it takes to interact with much of that media. With so many devices and things out there that kids are expected to be involved with, they are constantly multitasking, that is, constantly dividing their attention between multiple input formats. On the other hand, there is a different pattern that is this idea that people aren't necessarily worse at focusing (at least according to some tasks), but they are spreading out their attention more, at least when they are multitasking. Results do suggest that people, at least in an experimental setting, zone in on the same dimensions of attention better when they are not multitasking. So when they are just focusing on one task, they are more easily, and cleanly, able to zoom in and pay attention to only the relevant aspect of the task. However, when they are attempting to think about other things, or when they are pulled in other directions, they are much worse at sifting out what they should be focusing on and what they should be ignoring. Even more, that the multi-tasks that have a heavier cognitive load during those times are worse at focusing, not just on those specific tasks, but also worse at focusing on those specific dimensions. On yet another hand, other studies have shown that (at least for a certain subset of tasks) there is no significant difference in cognitive performance between those who are multitasking and those who are not multitasking. As one avenue for explanation, there is the idea of cognitive load, and the notion that it is only when multi-tasks have an already high cognitive load from the tasks themselves that their attention focus changes. (Gkintoni et al., 2021)

4.1. Impact of Technology on Attention Span

Technology as an overall term does not necessarily have to have a negative effect on attention but it seems as if technologies that have evolved over the last ten

¹ Assistant Professor, Department of Psychology, University of Karachi, Karachi.

² MPhil Scholar, Department of Psychology, University of Karachi, Karachi.



years are starting to change the ways in which people interact with technology, which in turn has an impact on the attentional systems. The effects on attention from only a few years ago might not be the effects seen now.

Schiff and Prigirimin are both noted for their profuse usage of technology and are frequently candid about refraining from using technology in the day-to-day to help create opportunities for productive deep work (Walla & Zheng, 2022). Less obvious are other creative individuals who endure and counter human technological interactions, often in secluded spaces, to enable full focus and deployment of attention, a practice that defines and refines their creative output. Although there is anecdotal and some scientific evidence, the attention science community has not paid detailed attention to this on a generative level. From an ecological perspective, it is not just the technology that has created a culture that is described as 'always on', but also a generation that is never known a world without the internet has also been generated by the technology (Liebherr et al., 2022). Therefore, it is crucial to account for individual differences in writing that incorporate demographic descriptions in the study's approach. While it is important to appreciate the special nature of universal semiotic signs, it is also necessary to consider the abilities of individuals to verify these signs and express a point of view about them, especially in the face of the radical overhaul of communicative practices occasioned by the rise of new media technologies. (Ke et al., 2021)

5. CONCLUSION AND IMPLICATIONS

Attention span organically fluctuates based on external stimuli and internal cognitive factors. However, the popularization of newer technologies seems to accompany a negative trend in the fluctuation of the span itself, at least in terms of technological interactions. While there is speculation that digitized text in particular may be the key factor for recent trends, research has not yet produced tangible evidence on the matter. Considering the direct and indirect impacts interaction with new technologies may have on attention and its span, and the

¹ Assistant Professor, Department of Psychology, University of Karachi, Karachi.

² MPhil Scholar, Department of Psychology, University of Karachi, Karachi.



premise of a predominantly digital environment in the next generation(s), it is pivotal to comprehend the underlying relationship in educational, professional, and personal contexts (E. Beaudoin et al., 2022). There is no doubt that certain technology use carries serious implications regarding the nature of attention and generally cognitive health. The majority of interaction with modern technology encourages passive consumption of content and does not promote engagement with diverse ideas, or focused higher-level cognitive functions (M. Liu, 2019). It demands considerable effort to create, advertently or otherwise, an environment that does not disrupt natural cognitive processes and to embrace active and mindful technology usage. Thus, there is a need for policy makers and educators herein to promote conscious use and potentially reconsider/approach tech-related policies through the specified lens. Interventions that nudge more thoughtful and healthier technology usage habits are absolutely necessary, while hypotheses on the implications of dedicated, structured exposure, especially within a professional and educational scope, remain to be tested. Moreover, a number of critical fields require direct attention to approach and possibly enhance cognitive health, and understanding the complex relationship between attention, its various constituents, and technology's impact may prove beneficial. It is urged, from the growing body of research and with respect to classic literature, to adopt a conscious and balanced approach to technology so that, with each new generation, there is a firm understanding and a more stringent control of the environment the emerging minds reside in.

References:

Anderson, C., Hübener, I., Seipp, A. K., Ohly, S., David, K., & Pejovic, V. (2018). A Survey of Attention Management Systems in Ubiquitous Computing Environments. [\[PDF\]](#)

¹ Assistant Professor, Department of Psychology, University of Karachi, Karachi.

² MPhil Scholar, Department of Psychology, University of Karachi, Karachi.



- Antal, A., Lubner, B., Brem, A. K., Bikson, M., Brunoni, A. R., Kadosh, R. C., ... & Paulus, W. (2022). Non-invasive brain stimulation and neuroenhancement. *Clinical neurophysiology practice*, 7, 146-165. [sciencedirect.com](https://www.sciencedirect.com)
- Arslandas, F. (2017). Exploring Metacognition, Multitasking and Test Performance in a Lecture Context. [\[PDF\]](#)
- de Jong, T. (2010). Cognitive load theory, educational research, and instructional design: some food for thought. [\[PDF\]](#)
- Dong, W., Wu, Y., Qin, T., Bian, X., Zhao, Y., He, Y., ... & Yu, C. (2021). What is the difference between augmented reality and 2D navigation electronic maps in pedestrian wayfinding?. *Cartography and Geographic Information Science*, 48(3), 225-240. [researchgate.net](https://www.researchgate.net)
- Dontre, A. J. (2021). The influence of technology on academic distraction: A review. *Human Behavior and Emerging Technologies*. [wiley.com](https://www.wiley.com)
- E. Beaudoin, M., M. Jones, K., Jerome, B., Martinez, D., George, T., & B. Pandža, N. (2022). Systematic research is needed on the potential effects of lifelong technology experience on cognition: a mini-review and recommendations. [ncbi.nlm.nih.gov](https://www.ncbi.nlm.nih.gov)
- Gkintoni, E., Meintani, P. M., & Dimakos, I. (2021). Neurocognitive and Emotional Parameters in Learning and Educational Process. *ICERI2021 Proceedings*. [researchgate.net](https://www.researchgate.net)
- Ke, J., Du, J., & Luo, X. (2021). The effect of noise content and level on cognitive performance measured by electroencephalography (EEG). *Automation in Construction*. [\[HTML\]](#)
- Liebherr, M., Kohler, M., Brailovskaia, J., Brand, M., & Antons, S. (2022). Screen Time and Attention Subdomains in Children Aged 6 to 10 Years. [ncbi.nlm.nih.gov](https://www.ncbi.nlm.nih.gov)
- M. Liu, K. (2019). The Attention Crisis of Digital Interfaces and How to Consume Media More Mindfully. [\[PDF\]](#)
- Öhman, F., Hassenstab, J., Berron, D., Schöll, M., & Papp, K. V. (2021). Current advances in digital cognitive assessment for preclinical Alzheimer's disease.

¹ Assistant Professor, Department of Psychology, University of Karachi, Karachi.

² MPhil Scholar, Department of Psychology, University of Karachi, Karachi.



Alzheimer's & Dementia: Diagnosis, Assessment & Disease Monitoring, 13(1), e12217. [wiley.com](https://www.wiley.com)

Schacter, D. L. (). Media, technology, and the sins of memory. Memory. [cambridge.org](https://www.cambridge.org)

Vedechkina, M. & Borgonovi, F. (2021). A review of evidence on the role of digital technology in shaping attention and cognitive control in children. Frontiers in Psychology. [frontiersin.org](https://www.frontiersin.org)

Vella-Brodrick, D. A. & Gilowska, K. (2022). Effects of nature (greenspace) on cognitive functioning in school children and adolescents: A systematic review. Educational Psychology Review. [springer.com](https://www.springer.com)

Walla, P. & Zheng, Y. (2022). Intense Short-Video-Based Social Media Use reduces the P300 Event-Related Potential Component in a Visual Oddball Experiment: A Sign for Reduced Attention. [ncbi.nlm.nih.gov](https://www.ncbi.nlm.nih.gov)

¹ Assistant Professor, Department of Psychology, University of Karachi, Karachi.

² MPhil Scholar, Department of Psychology, University of Karachi, Karachi.

