

# Exploring the Effects of Technology on the Development of Myopia

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## Abstract

With the ongoing rise of myopia, experts are beginning to question the possible causes of this disease. From a public health perspective, research is conducted to understand possible causes to then implement a change in the population towards healthier eyes and a healthier society. By exploring the causes of myopia and the developmental record of this disease, the cause can be traced back to the overuse of smart devices, screens, and technology. Though there are several factors that affect the onset of myopia, screen time is suspected to play a significant role in the future of declining eyesight. By refuting or supporting this claim, better insight is available to support the onset of myopia, but further research is necessary to confirm these findings.

## Introduction

The rise of technology comes with increased use of screens among individuals. Excess screen time has proved to cause eye strain and dryness, but it may also contribute to an increased rate of myopia development. Myopia, also known as nearsightedness, is a disease defined by the weakened eye muscles and horizontally-elongated shape of the eyes causing blurry vision due to light rays entering the eye and focusing on a point in front of the retina (Mayo Clinic, 2024). A study by Holden, et al. (2016) predicts that 49.8 percent of the world's population will be myopic by 2050. There are several likely causes that, in unison, contribute to the development of myopia as the number of cases rises. According to Verkicharla and Das (2019), the risk factors of the development of myopia can be classified as genetic, optical, structural, and environmental. It is important to acknowledge other risk factors that may affect these rises of nearsightedness. This study and analysis will namely focus on how and if screen time affects the onset of myopia. The eyes become accustomed to shorter focal distances and exposed to artificial light due to tendencies of viewing screens up-close for long periods of time (Balas, et al., 2024). Assuming that screen time affects the onset of myopia, proper measures should be taken to reduce technology and screen usage in order to maintain proper ocular health and reduce this variable eye disease.

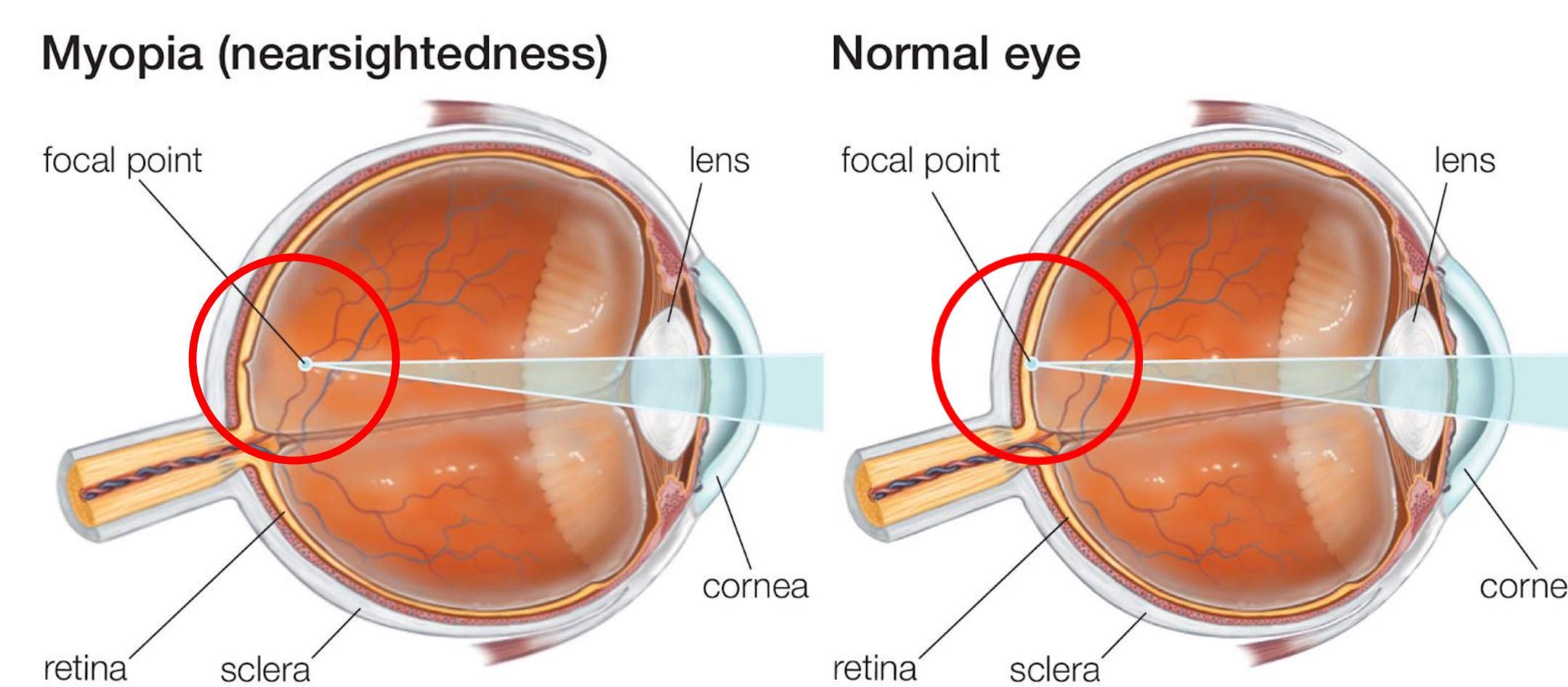
## Hypothesis

An excess of screen time directly correlates to the development of myopia.

## Methods

- Peer-reviewed articles were sourced from FSU Online Library Resources, 10 peer-reviewed articles were studied to define terms and anatomy and review relevant data.
- Articles mentioning improvement of vision from technology and articles dated earlier than 2015 were excluded. Articles mentioning risk factors other than screen time affecting the development of myopia were included.
- Of the 10 articles, 5 of those articles were selected to understand position in research and possible risks of myopia.

Figure 1: The anatomy and ray diagram of a myopic eye with altered vision and an eye representing normal vision.



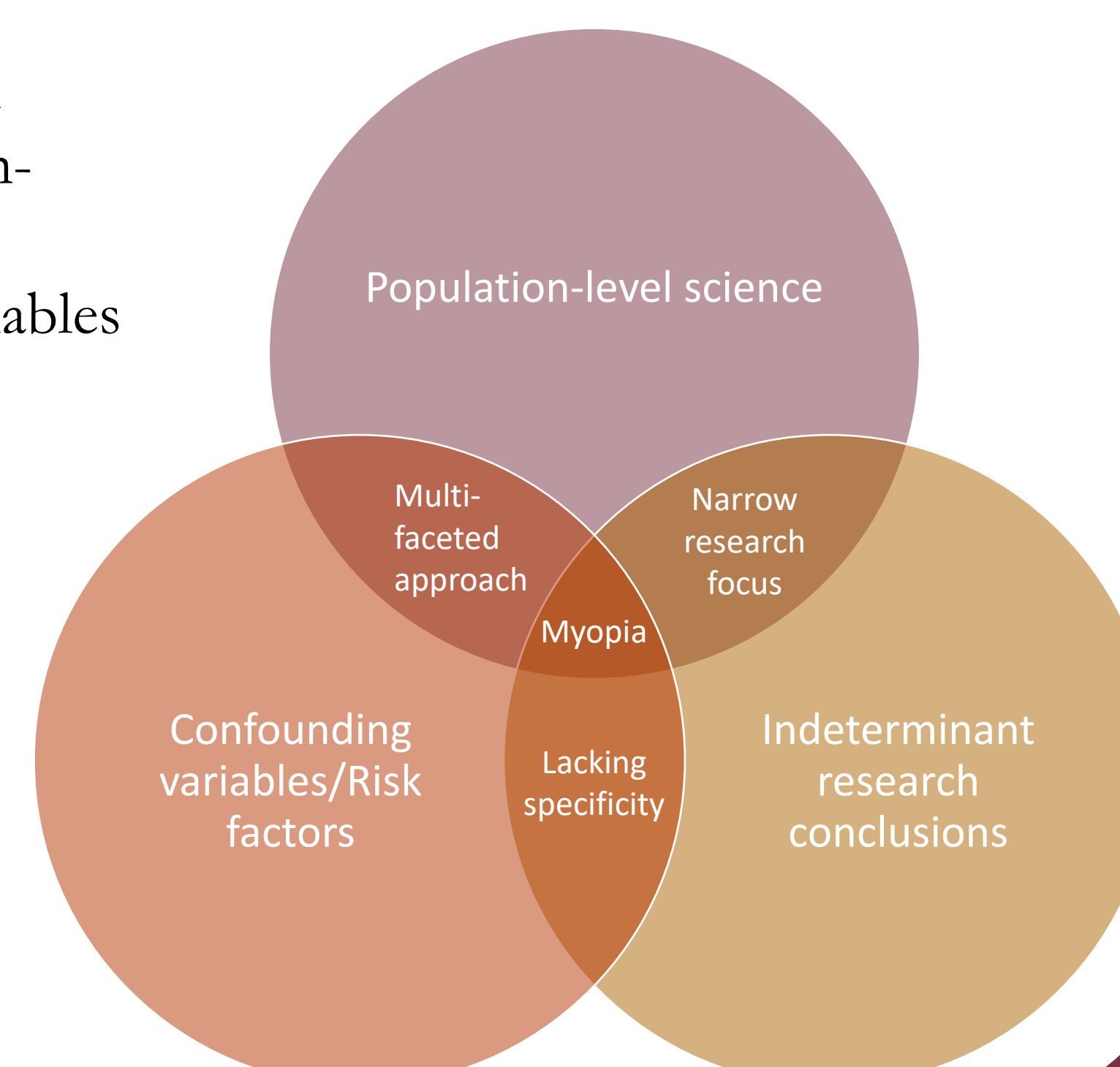
Source: LaserVision Victoria (2017)

## Results

A correlation between rising cases of myopia and increased duration of screen usage is present. However, more research should be conducted to determine the overlap in other causes of myopia and whether screen time plays a more significant role than other factors increasing cases of myopia. The possible indicators for future research are as follows:

- The cause of myopia would require analyzing population-level science.
- Too many confounding variables of risk factors are at play to isolate a single cause.
- Current research was indeterminant and led to a variable conclusion.

Figure 2: Results of the research with prevalence of technology on myopia and the overlaps between each claim.



## Discussion

According to Lanca and Saw (2020), further research and tests would be necessary in order to determine a direct correlation between screen time and myopia after having mixed results with the study conducted. Further research should be conducted to determine if other factors affect ocular health more than screen exposure since there are several risk factors known to be associated with myopic development. A prospective study would provide evidence of myopia developing overtime rather than studying this disease retrospectively, as technology and humanity are constantly evolving in numerous ways. This research was beneficial in understanding one of many causes of myopia to better understand the importance of ocular health. Though this analysis did not rule out other risks as being causes of myopia, much evidence leads to the risk of increased screen time. Understanding the prevalence of myopia from risks such as screen time is the first step to implement measures towards improving ocular health such as reducing screen time and exposure to artificial light. Making changes to improve ocular health will promote a positive change in public health.

## Conclusion

The studies prove a viable association between screentime and the development of myopia. More research is needed to distinguish between cause and correlation of technology with myopia and other potential causes.

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