How does the color display of a phone affect the user's screen time?

Question:

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Reason behind the Question:

I thought of this question because my mom and sister and I were listening to the radio in the car on the way to school, and there was a John Tesh Radio Show "random piece of knowledge". He shared that the color display of a phone might impact how much screen time a person might have. There was no data or experiment to lead to this information and I was immediately curious if it was something that I could test!

Research

I researched screen time. While there is a lot of research about screen time and children, my project focuses on phone users, so I steered my research towards two age groups of phone users ("young adults" or 18-35, and "adults" 36-55). I learned that screen time has increased in these two age groups from nearly 5 hours daily in 2015 to almost 7 hours daily in 2025. I also learned that factors affecting adult screen time can include screen addiction, psychological impacts from social media, or demands from work. Screen addiction is a more recent term describing people who have dopamine and other brain responses to a screen similar to how they would with other addictive things!

I did not find direct research about display settings and screen time, but I did read about how color and other things in the same category as display can affect the mood or interest of a person. In advertising and other types of media, color is heavily thought about as it can draw viewers in and helps people gravitate towards products or messages. Color can also, alternatively, cause more eye strain.

Hypothesis:

Based on my research, I am predicting that a grayscale display will decrease screen time.

I think this because my research showed that color is used strategically all the time to advertise products or ideas, and that colors add more visual interest. I think that this concept is enough to have differences in color display on a phone sway a user's screen time, even in the face of work demands, screen addiction, or other factors I researched.

Procedures:

Controls: I am using a mixed group of 34 adults, with an even ratio of male to female and near even ratio of two targeted age groups (18-36 and 37-55). My participants live across 8 different states, and are from varied cultural backgrounds. I am testing 3 weeks of color display (normal display) as my control. I am using 3 weeks to rule out changes in screen time that might have been specific to a single week. I am also having people in the experiment record if there were other factors or changes to normal routine during each week. This way I can rule out if there would be anything else affecting data.

Variants:
I am testing 3 week of grayscale display. In the same manner as normal display is tested.

Procedures Continued

1. Participants ensure their phone display is on the correct setting for each experiment week by sending me a picture. The first 3 weeks the phone is in regular display (color), and the second 3 weeks the phone is in grayscale.

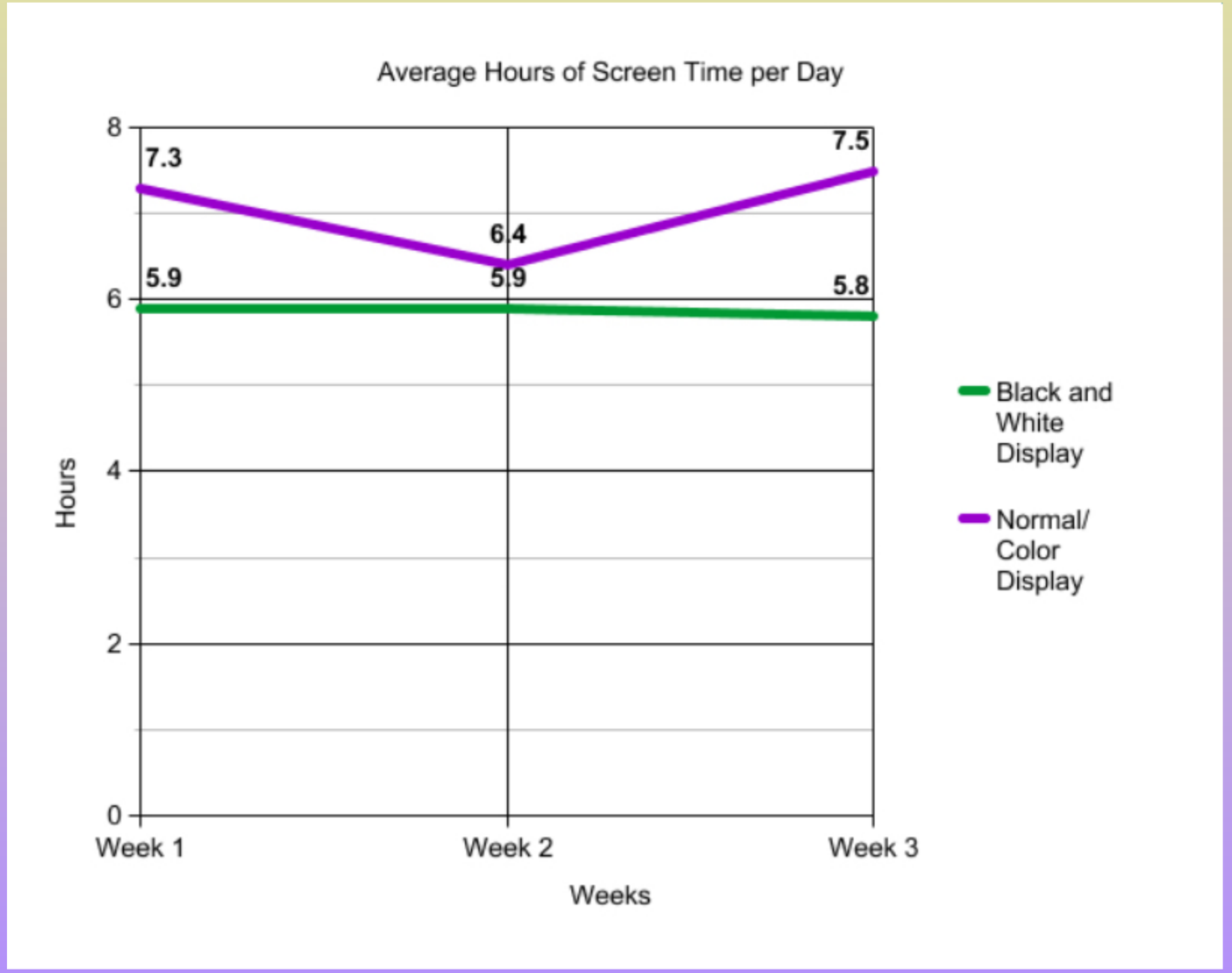
2. Participants use their phone as they normally would and complete a survey each Sunday reporting their weekly screen time report (which gives an average hours per day for that week).

3. I analyze the data after the 6 weeks and look for trends in screen time usage.

Results in a Chart

	Young Adults Average Screen Time Hours per Day	Young Adults Changes to Routine?	Adults Average Screen Time Hours per Day	Adults Changes to Routine?	Combined Averages In Screen Time Hours per Day
Week 1- Normal Color Display	8.1	No	6.5	No	7.3
Week 2- Normal Color Display	7.4	Yes	5.4	Yes	6.4
Week 3- Normal Color Display	8.4	No	6.6	No	7.5
Week 4- Grayscale Display	7.1	No	4.8	No	5.9
Week 5- Grayscale Display	7.2	No	4.7	No	5.9
Week 6- Grayscale Display	6.9	No	4.7	No	5.8

Results in a Graph



Results Discussion

The average across all three weeks and both participant groups for color/normal display was 7.1 hours. If I throw out the week that participants reported changes in routine (a week during Hanukkah, Christmas, winter breaks, etc), then the average for this component is 7.4 hours of screen time per day.

The average across all three weeks and both participant groups for grayscale display was 5.9 hours of screen time per day. This is a 20% decrease in screen time usage from color/normal display to grayscale display.

There were not significant differences in data among genders, but there was a general decrease in screen time usage from "young adult" to "adult". "Adults" averaged 20% less screen time than the "young adult" group in both color/normal display and grayscale display.

Conclusion

My hypothesis was correct! I found that grayscale lowers screen time usage significantly (20% in my experiment).

What's Next?

My experiment makes me wonder about other population groups such as users under 18, users over 55, non-American groups, results by profession, and results by different interest groups (athletes, dancers, visual artists, etc.). I also wonder about populations with impairments (vision or hearing), color-blind populations, or people with sensory needs who might experience visuals differently. I am excited to continue researching this area of science!

References

Howard, B. Screen Time Overload. (2021). Wulrich Press.

Nhin, M. Unplugged. (2023). Scholastic.

https://nces.ed.gov "Create-a-Graph"