IS THERE A CORRELATION BETWEEN THE NUMBER OF HOURS OF SCREEN TIME AND FINE MOTOR SKILLS?

INTRODUCTION

Our Project for BT Young Scientist is, 'Is there a correlation between screen time and fine motor skills of teenagers'. This topic interested us as one of the participants, happens to struggle with the disorder Dyspraxia. This disorder directly affects the fine motor skills (FMS) and gross motor skills of the person. The topic of screen time also interested us as it is a very pressing issue now, with the rise of young children being given access to touch screen devices such as phones, and iPads. We wanted to investigate if there is a connection between the amount of time a teenager spends on a screen and how well developed their fine motor skills are. We expected to see that the more time they spent on screens the poorer their fine motor skills will be. Most of the research we found focused on screen time and fine motor skills of infants, so we concentrated on our peers. To do this we have two different parts to our project, the fine motor skills test (Purdue peg board) and the survey on screen time.

BACKGROUND RESEARCH

Fine motor skills refer to the coordinated and controlled movements the small muscles of the hand and fingers make when picking up a small object, threading a bead or placing a coin into the slot of a piggy bank. An essential component of fine motor skills is to develop a child's pinch grasp. A pinch grasp is made up of the thumb and index/first finger. We continue to practice and improve our fine motor skills throughout our life, but if we are not completing the correct activities our fine motor skills can decrease.

Screen time refers to the amount of time spent on a device that emits light to create an image that can be viewed or interacted with. The time you spend looking at your computer screen, tv, playing games on your games console or browsing and texting on your phone is considered to be screen time. The Pandemic affected the amount of screen time greatly. We were unable to see other people, but screens were a way to stay in touch. As the number of screens that teenagers have access to and the number of hours that they spend using these screens has also increased, it means that they have less time for activities that use their fine motor skills. There has been some research into the effects of screen time on the fine motor skills in young children and they have not found a significant correlation between them. We couldn't find any research focused on teenagers and fine motor skills.

EXPERIMENTAL METHODS

Sample size = 60 Participants
30 :12-14-year-olds
30: 15–18-year-olds

To test the fine motor skills of the volunteers we conducted the test using the Purdue pegboard which is the scientific method of determining how good a person's fine motor skills are. The board consists of 25 holes going down in two lines. These holes are where you place the pegs into the pegboard. The main test is to see how many pegs you can get in the holes in the time given, which is 30 seconds.

We had 5 different tests:

1. Number of pegs with the right hand in 30 sec.
2. Number of pegs with the left hand in 30 sec.
3. Number of pegs with both hands in 30 sec.
4. Number of setups assembled in 1 min.
5. Number of beads strung on a string 30 sec.

Figure 1: A cross section of the olfactory system

We used a survey to find out the screentime usage. In the survey we asked how many hours of screen time a person had recorded in a day and what type of screen time they use the most. We also asked if they played a musical instrument and if so which one and if they played a sport and if so which one. We also asked if they had been diagnosed with dyspraxia or any other fine motor skill issues.

RESULTS AND ANALYSIS

The relationship between the general number of screentime hours and fine motor skills

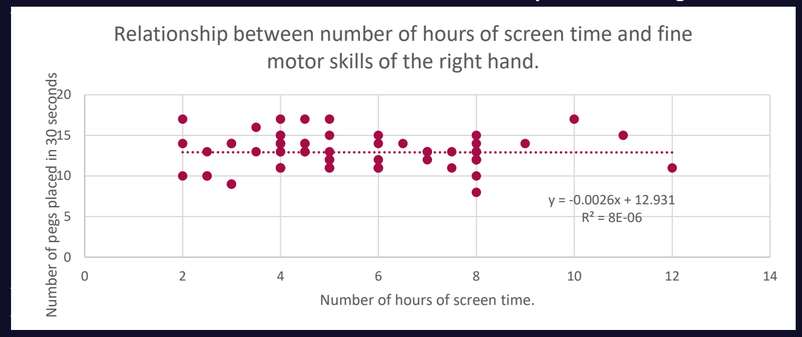

Figure 2: Scatter graph showing relationship between the number of screen time hours and FMS of the RH.

The data is very centralised and there is no clear positive or negative relationship. There is a very low R^2 value reinforcing this. The Spearman coefficient was -0.0136. This indicates that there is no significant correlation between number of hours of screen time and FMS of RH.

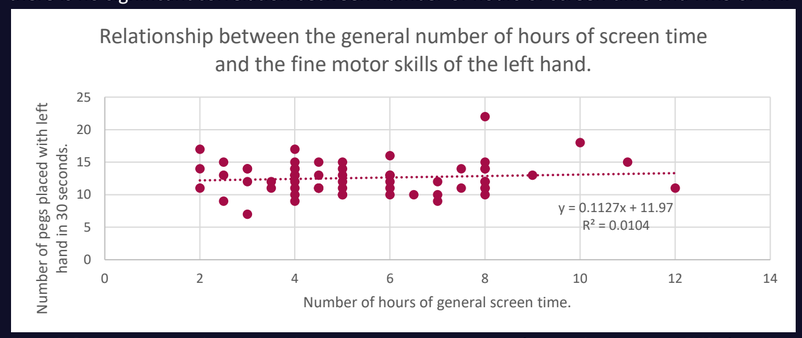

Figure 3: Scatter graph showing relationship between the general number of screen time hours and FMS of the LH.

The data is very centralised and there is no clear positive or negative relationship. There is a very low R^2 value reinforcing this. The Spearman coefficient was $8.47x10^{-5}$.This indicates that there is no significant correlation between number of hours of screen time and FMS of LH.

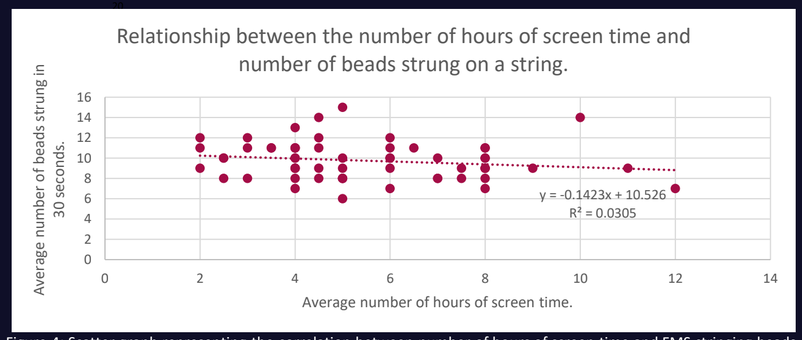

Figure 4: Scatter graph representing the correlation between number of hours of screen time and FMS stringing beads.

The data is very centralised and there is no clear positive or negative relationship. There is a very low R^2 value reinforcing this. The Spearman coefficient was -0.017. This indicates that there is no significant correlation between number of hours of screen time and FMS of beads.

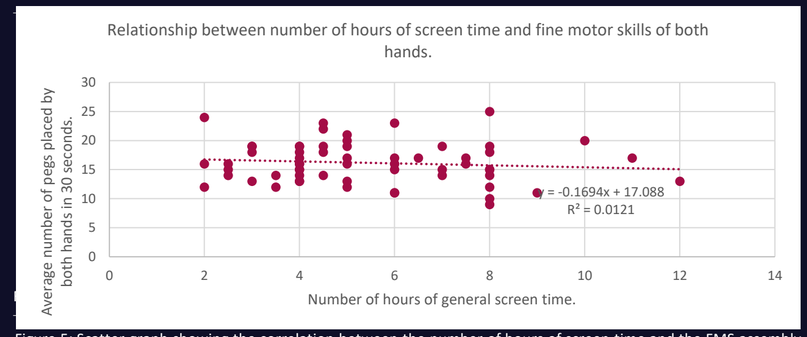

Figure 5: Scatter graph showing the correlation between the number of hours of screen time and the FMS assembly

The data is very centralised and there is no clear positive or negative relationship. There is a very low R^2 value reinforcing this. The Spearman coefficient was 0.21.This indicates that there is a weak positive correlation between number of screen time hours and FMS of both hands.

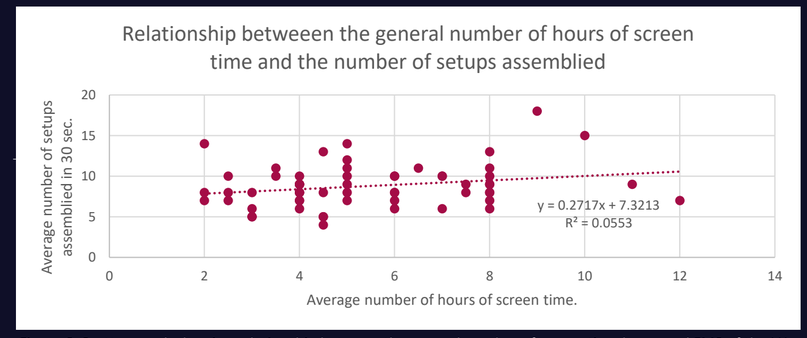

Figure 6: Scatter graph showing relationship between the general number of screen time hours and FMS of the LH.

The data is very centralised and there is no clear positive or negative relationship. There is a very low R^2 value reinforcing this. The Spearman coefficient was -0.188. This indicates that there is a very weak negative correlation between number of screen time hours and FMS of assembling.

	Pearson coefficient	Spearman coefficient
Correlation coefficient of the general number hours of screen time and the number of pegs placed with the right hand.	-0.0027798	-0.0136
Correlation coefficient of the general number hours of screen time and the number of pegs placed with the left hand.	0.1022078	8.47x 10-5
Correlation coefficient of the general number hours of screen time and the number of pegs placed with both hands.	-0.1098738	-0.07228
Correlation coefficient of the general number hours of screen time and the number of setups assembled.	0.2350809	0.2183
Correlation coefficient of the general number hours of screen time and the number of beads strung.	-0.1547589	-0.18872

Figure 7: Correlation coefficients found for the relationships between the screen time hours and the FMS

For each relationship we calculated the Pearson correlation coefficient and Spearman rank-ordered correlation coefficient, which eliminates outliners with can skew the data.

CONCLUSION

Overall using a sample size of 60 participants we found that there is no statistical correlation between number of screen time hours and fine motor skills. We did discover that there is a weak positive correlation between the number of hours of videogame play with a controller and the fine motor skills, this could be due to finger dexterity. We also found that there was a weak negative correlation between the number of screen time hours on a computer typing and the fine motor skills, this suggests that spending less time on a computer improves your fine motor skills. We believe that this relationship is more influenced by external activities, such as playing sports and musical instruments than the lack of computer typing time. This is further reinforced by the fact that the volunteers who scored the highest fine motor skills played one or two sports and a musical instrument. The correlations demonstrated in this experiment need to be further investigated using a larger sample size.