

OFFICIAL ABSTRACT and CERTIFICATION

The Effect of the Presence of a Smartphone and Smartphone Usage on Concentration Levels and Academic Performance in High School Students

Julia Kindler

The use of smartphones worldwide is increasing at an exponential rate. In 2011, just 35% of Americans owned a smartphone whereas in 2018, 75% do. With the recent increase in smartphone usage there are changes in the way humans live, especially in how they complete tasks. In the study, Brain drain: The mere presence of one's own smartphone reduces available cognitive capacity, Adrian F. Ward, Kristen Duke, Ayelet Gneezy, and Maarten W. Bos studied the correlation between the presence of a smartphone and available cognitive capacity. The professors found that the mere presence of a smartphone did in fact lower cognitive capacity. Additionally, professors at the Wannan Medical College in China studied the correlation between gender and risk of obtaining a smartphone addiction in college students. They found that males were slightly more likely to obtain a smartphone addiction (30.3%) whereas the female risk was 29.3%. While these results allow professionals to make some conclusions about the effect of smartphones, there are still gaps in research pertaining to the relationship between smartphone distraction and gender. No known research has been conducted on the relationship between these variables and I plan to conduct this research because it has real life implications. The results of my experiment have the possibility to help people understand why their smartphone is a distraction and what they can do to prohibit this distraction.

Category
Pick one only—
mark an "X" in
box at right

- Animal Sciences ☐
- Behavioral and Social Science ☒
- Biochemistry ☐
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- Physics and Astronomy ☐
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1. As a part of this research project, the student directly handled, manipulated, or interacted with (check ALL that apply):

- ☒ human subjects ☐ potentially hazardous biological agents
☐ vertebrate animals ☐ microorganisms ☐ rDNA ☐ tissue

2. This abstract describes only procedures performed by me/us, reflects my/our own independent research, and represents one year's work only ☒ Yes ☐ No

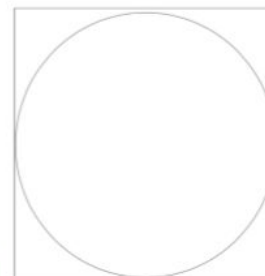
3. I/we worked or used equipment in a regulated research institution or industrial setting: ☐ Yes ☒ No

4. This project is a continuation of previous research. ☐ Yes ☒ No

5. My display board includes non-published photographs/visual depictions of humans (other than myself): ☐ Yes ☒ No

6. I/we hereby certify that the abstract and responses to the above statements are correct and properly reflect my/our own work. ☒ Yes ☐ No

This stamp or embossed seal attests that this project is in compliance with all federal and state laws and regulations and that all appropriate reviews and approvals have been obtained including the final clearance by the Scientific Review Committee.



Continuation/Research Progression Projects Form (7)

Required for projects that are a continuation/progression in the same field of study as a previous project.

This form must be accompanied by the previous year's abstract and Research Plan/Project Summary.

Student's Name(s) Julia Kindler

To be completed by Student Researcher: List all components of the current project that make it new and different from previous research. The information must be on the form; use an additional form for previous year and earlier projects.

Components	Current Research Project	Previous Research Project: Year: _____
1. Title	The Effect of the Presence of a Smartphone and Smartphone Usage on Concentration Levels and Academic Performance in High School Students	The Effect of the Presence of a Smartphone on Concentration Levels of Males vs. Females
2. Change in goal/purpose/objective	Determine if academic performance is affected by smartphone usage.	Determine if concentration levels are affected by the presence of a smartphone.
3. Changes in methodology	Academic performance was determined by a participant's in- class test score, smartphone usage was reported by teachers.	Concentration tests were given to participants with varying levels of smartphone usage.
4. Variable studied	Academic performance	Concentration levels
5. Additional changes	N/A	N/A

Attached are:

☒ Abstract and Research Plan/Project Summary, Year 2019

Julia Kindler

A. Rationale:

In France, a law was recently passed banning the use of cellphones in school. The article *Test Scores Rise After Cell Phones Banned From Schools* states that French test scores already have climbed by 6%. In our society today, the use of smartphones are increasing exponentially. They are used during school various times a day, sometimes even to better the learning environment. According to Pew Internet, in 2011, just 35% of Americans owned a smartphone whereas in 2018, 75% do. 91% of these smartphone users will not leave the house without it. In 2017, scientists at the University of Chicago studied how the presence of a smartphone affects working memory capacity and fluid intelligence. In another study done by Lepp, A., Barkley, J. E., & Karpinski, A. C. (n.d.). in *The relationship between cell phone use and academic performance in a sample of U.S. college students*, it was found that college GPA and smartphone use have a significant negative correlation. Weng, Y., Wang, L., Ying, X., Ding, S., Lui, F., & Chen, B. in *Gender differences in factors associated with smartphone addictions: a cross-sectional study among medical college students*, studied the potential for developing a smartphone addiction in females and males. They found that males were slightly more likely to develop a smartphone addiction, therefore causing me to believe that males will be more likely to be distracted by the presence of a smartphone. My study would have societal uses because it can possibly inform society on the role smartphones are playing in our daily lives and if they should continue to be used in schools and during tasks that require concentration.

B. RESEARCH QUESTION(S), HYPOTHESIS(ES), ENGINEERING GOALS), EXPECTED OUTCOMES:

- **Research Question:** Do smartphones cause distraction resulting in decreased ability to focus?
- Are males and females equally affected by smartphones?

- **Hypothesis:**

- Access to cell phones while completing a concentration based task will cause increased levels of distraction and decreased levels of performance.
- Male participants will experience more distraction with the presence of a smartphone however both genders will complete tasks at a slower rate and performance worse.

C. Describe the following in detail:

- **Procedures:**

1. All participants will be given a survey with questions that ask about their approximate smartphone usage, why they use their smartphone, if they think it effects their concentration, etc...
2. Participants will have to wait with their smartphones before completing the concentration test.
3. Participants' phone will be taken and placed in a bin in front of the room.
4. Participants are given a set of concentration tests to complete without their phone.
5. Participants will get their phones back.
6. Participants will then complete another set of concentration tests with their phone present.
7. After the participants complete the concentration test, participants will complete a survey about what they thought of the test and how they think the location of their phone affected them.
8. Analyze data to determine if males or females were more distracted with the presence of a smartphone.

- **Data Analysis**

- Perform a T Test to test if there is significance between the two groups

D. Bibliography

Andrew, L., Jacob, B. E., & Aryn, K. C. (n.d.). The relationship between cell phone use and academic performance in a sample of U.S. college students. *Sage*.

Carr, N. (2017, October 6). How smartphones hijack our minds. *Wall Street Journal*. Retrieved from <https://www.wsj.com/articles/how-smartphones-hijack-our-minds-1507307811>

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Gregoire, C. (2015, October 9). The Internet May Be Changing Your Brain In Ways You've Never Imagined. *Huffington Post*. Retrieved from https://www.huffingtonpost.com/entry/internet-changing-brain-nicholas-carr_us_5614037de4b0368a1a613e96

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Kedmey, D. (2015, May 12). Test scores rise after cell phones banned from schools. Retrieved September 26, 2018, from Time website:

<http://time.com/3855257/cell-phone-ban-school-test-score/>

Lepp, A., Barkley, J. E., & Karpinski, A. C. (n.d.). The relationship between cell phone use and academic performance in a sample of U.S. college students. *Sage Journals*. Retrieved from <http://journals.sagepub.com/doi/abs/10.1177/2158244015573169>

B. Recruitment:

- I will recruit my participants by going to science research classrooms in Harrison High School and any other students willing to participate students and have them fill out a consent form if they are interested in the study.

C. Methods:

- Participants will be asked to come with their phone and then their phone will be taken away at some point during the study. By the end participants will have their phone back.
- This will be happening either in science research class or after school. Students can come during their free periods or lunch as well.
- Participants will take a survey before where they reveal their attitude on the topic, how many hours they use their smartphone, how they think it affects their life, etc... (survey attached)

D. Risk Assessment:

- This study can possibly show that smartphones cause distraction and a relationship between smartphone use and ability to concentrate.

E. Protection of Privacy:

- When I see the scores they will all be anonymous so there will be no invasion of privacy.
- I will assign each participant a number so I do not use their names.
- The data will be stored on Excel spreadsheets instead of Google sheets so the information will not be on the Internet.

F. Informed Consent Policy:

- I will explain my study to the participants as well as give them an information sheet that includes the purpose of the study.
- As the study is voluntary, participants have the ability to stop at any moment.