

CAROLINA

ISSUE 6, FALL 2022

CROSSTALK

RESEARCH MENTOR SPOTLIGHTS

Featuring Dr. Courtney Monroe, sharing her experiences in research.

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Check out resources from the Office of Undergraduate Research.

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CAROLINA
CROSSTALK

ISSUE 6, FALL 2022

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LOOKING
THROUGH
A NEW
LENS

LETTER
FROM
THE
EDITOR

Do you wear glasses? If you do, then you're familiar with the concept of lenses. Even if you don't wear glasses, you're aware that human eyes, cameras, microscopes, telescopes, and magnifying glasses all use lenses. In all of these contexts, lenses help us visualize objects in different ways, depending on their magnification, reflection, diffraction, or refraction capacities. Optics is all about using lenses to look at the world around us in different, novel ways. When you think outside of the realm of physics, the ability to look at the world through a variety of lenses is a valuable skill. We see life through lenses that are tinted by our individual experiences, realizations, choices, and desires. Though sometimes, we can become too comfortable with seeing life through the lens we're familiar with and this comfort may create incomplete images of life. So, it's important to refocus and widen our vision by constantly adding new lenses to our inventory. Multiple lenses allow us to see the colorful nuances of life rather than being limited by a polarized black-and-white understanding of life. We cannot become habituated to one lens, especially not to the point we become blind to what exists in our periphery. We are not always in control of what our eyes see, but we are in control of how we perceive and interpret what we see. Much like the lenses in physics, the cognitive lenses that we use can reveal, shape, magnify, disregard, correct, or distort our individual perceptions and beliefs. New lenses also enable openmindedness, creative thinking, curious observations, and empathy. Connecting lenses to the act of research, research is fundamentally about challenging our current knowledge and looking at it through different perspectives—different lenses. At almost every step of the research, there is an opportunity to take a step back and ask yourself: how can I look at this differently? We live in a society that aims for rightness and certainty, but research allows us to be open to the possibility that our current knowledge can be incomplete. Research involves actively seeking out 'the unknown' and 'the unlikely.' Pull out your inventory of lenses because, in the new pages, you will learn about climate change, language, mental health, and education through the lens of different research disciplines and researchers. This issue of Carolina CrossTalk presents research as a way to look at the world differently.

Henry
Patel

HENRY PATEL EDITOR-IN-CHIEF

SHEDDING LIGHT ON CLIMATE CHANGE

WRITTEN BY RILEY WATSON
EDITED BY NICOLE HAMNER

FEATURING AIDAN
BILLINGS

MECHANICAL
ENGINEERING, VIOLIN
PERFORMANCE, MAY
2023

Aidan Billings is on the front lines of climate action here at the University of South Carolina (Columbia), studying under one of our top professors, and finding innovative ways to combat the growing problem of carbon dioxide emissions.

Billings, currently a junior studying mechanical engineering and violin performance, began his research journey during his freshman year after one of his professors encouraged them to look for opportunities through the Office of Undergraduate Research. Though the mechanical engineering field is ripe with opportunities, Billings knew exactly what he wanted to do. He had always had a passion for climate action and was eager to help find solutions to our planet's biggest problems. He turned to the Faculty Research Database, which led him to Dr. Kevin Huang.

At the time, Huang was working on a method to extract carbon dioxide from the air. With funds from the Department of Energy and National Science Foundation, Huang, Billings, and their team created a carbon dioxide filter, essentially. Though, this was not your typical sponge. In order to pull CO₂ from the air, a ceramic tube is required. Billings and Professor Huang's team used a specific type of ceramic called GDC, or gadolinia-doped ceria. About 80% of the tube is made up of the GDC material. In order to extract carbon dioxide from the air, the tube needs to be infiltrated at between 300 and 600 degrees Celsius. For those less familiar with the infiltration process, it means the GDC tube is dipped in molten Carbonate salt, which absorbs into the GDC as if the GDC was a sponge. Then, the tube is submerged in liquid carbonate. The tube itself is porous, so when it's submerged, the carbonate is sucked into these pores. After infiltration, the tube is ready to be used as a carbon dioxide filter. At high enough temperatures (~300°C) carbon dioxide can collect one extra oxygen molecule and become carbonate. Then the carbonate can flow through the molten salt to the other side of the filter. When it gets to the other side it loses the extra oxygen and the carbon dioxide is filtered. The extra oxygen is transferred back into the ceramic. While submerged, the carbon dioxide molecules collect one extra oxygen molecule, which turns it into carbonate that leeches back into the surrounding material. The collective carbonate is then able to flow through the tube, where the extra oxygen is transferred back into the ceramic. The GDC ceramic has a special property called oxygen vacancy, meaning that it can conduct oxygen in the way that a wire conducts electricity. The oxygen travels back to the other side of the membrane to help another carbon dioxide molecule travel through the filter.

You might be wondering why this technology isn't being utilized on a mass scale. "These tubes are still too small and not effective enough to be used in the field," Billings said.

But, there is still hope yet! The issue that Billings and his team hope to fix lies in the ceramic itself. These tubes aren't just out on the market already assembled. The ceramic begins as a very fine powder, which is then mixed with a binding agent, pressed into the tube shape, and baked to hardness. Because the powder is so fine, the tube is very fragile. Billings and his



AIDAN WORKING IN THE LAB DURING HIS FIRST SUMMER RESEARCHING IN 2021.



AIDAN EXPLAINING HIS POSTER PRESENTATION TO A FELLOW RESEARCHER AT THE ELECTROCHEMISTRY SOCIETY 242ND ANNUAL CONFERENCE IN FALL 2022.

team’s job is simple: don’t break the tube. Although there is still much work to be done, the team was successful in improving the process. Working off the research done by other scientists in the field and applying their own unique knowledge, the team was able to create the largest of these GDC tubes ever created. Many may scoff at 19 centimeters, but due to the fragility of the materials, a 19-centimeter-long tube is incredibly impressive!

Research is highly collaborative. It takes many different people, across many different locations, so that new breakthroughs can be found. Billings shared that one of the most important discoveries was made before he was even brought onto the team. They found that adding steam to the carbon dioxide allowed it to travel through the tube at much higher speeds. The faster the carbon dioxide flowed, the more carbon dioxide they were able to capture. By the time Billings was finished with this particular project, they had gotten the average amount of carbon capture to 44 percent.

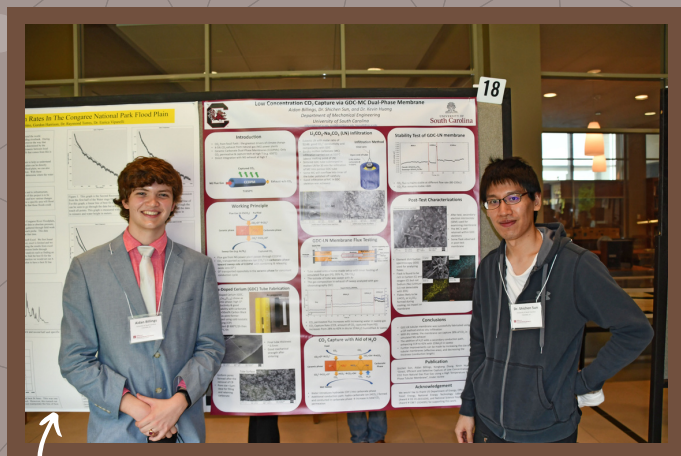
One success wasn’t enough for Aidan Billings, though, and when the opportunity came to work on a new project, he decided to switch his focus to Zinc ion batteries.

You may have heard of lithium ion batteries; you know, the ones that blow up hoverboards? Aside from the aforementioned explosion issues, the rarity of lithium in nature (by 2027, we will not be able to mine enough zinc to create more batteries), and the difficulty of assembling lithium ion batteries make them not the best candidate. Zinc ion batteries work in a similar fashion, but without the problems that come with lithium-based batteries.

As part of a new generation of electronic batteries, zinc ion batteries are less of a hassle. But they’re not perfect—when exposed to anything basic (that is, anything with a PH level close to 7), long strands of zinc form because zinc does not plate evenly. Those long strings of zinc, when they come in contact with the cathode (i.e., the positive side of the battery), cause the battery to die. Sadly, this isn’t the only problem with zinc batteries. Because of the presence of water inside of the electrolytes involved in the chemical process that makes the zinc reactive, as the battery operates, it will begin to form a film over the negative side of the battery, called the anode. With this film, the battery becomes less and less reactive over time.

These problems are why Billings and the team are still in the lab. “Right now, our batteries lose their capacity over just a few days,” he said. “Our project is analyzing how different electrolyte types affect that formation on the surface, as well as those strings called dendrites. Without advancements in energy storage, like batteries, we will never be able to fully rely on Wind or solar power because they are unpredictable. We need to store the energy for when the wind isn’t blowing and the sun isn’t shining.”

All of this research, which Billings began working on last summer, was funded through an army research grant. It was with his professors’ recommendation and support that he was able to obtain these funds. Thanks to those resources, Billings and his team will be able to continue working to solve these and more problems in the future.



AIDAN AND DR. SHICHEN SUN AT MY FIRST RESEARCH POSTER SESSION FOR THE SUMMER RESEARCH SYMPOSIUM FOR THE UNIVERSITY OF SOUTH CAROLINA IN SUMMER 2022.

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We are a student-run research magazine at USC that features the stories of undergraduate researchers in all the diverse disciplines. We aim to communicate student research in an engaging manner to encourage conversation and inspire others to pursue their own research interests.

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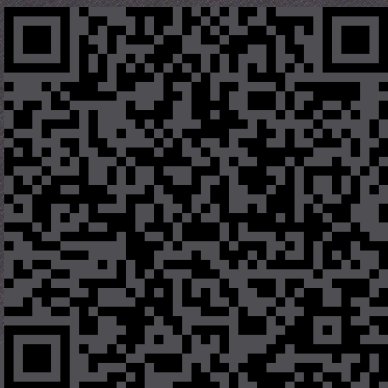
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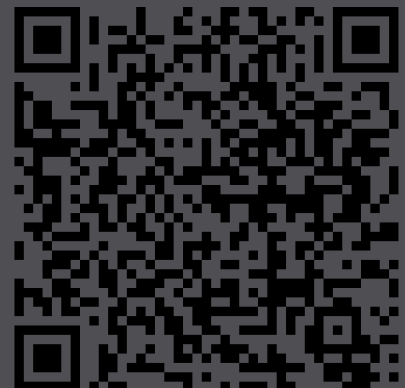
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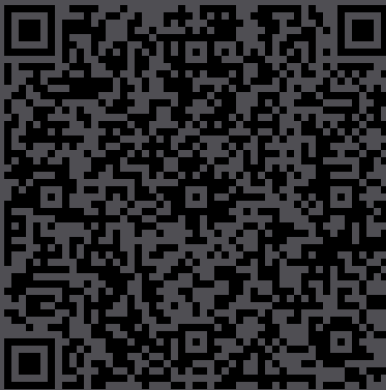


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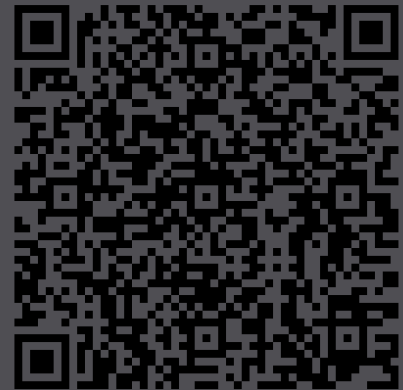
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**WRITING AN ARTICLE WITH CAROLINA CROSSTALK COUNTS AS AN
ALTERNATIVE PRESENTATION!**

BENEFITS OF GLD IN RESEARCH FROM A SECOND-YEAR LAW STUDENT'S PERSPECTIVE

INSIGHTS FROM A RECENT ALUMNA

Whether interning for the U.S. Department of State in Skopje, North Macedonia or researching cases of developing ethnic conflicts and minority language rights with the Language Conflict Project, Jill Boggs has a passion for understanding international relations and making information more accessible to the public.

The **Language Conflict Project** studies developing ethnic conflicts and minority language rights to better understand ethnolinguistic conflicts and ethnic polarization. Jill Boggs joined the project as a sophomore at the University of South Carolina. During her three years with the Language Conflict Project, Boggs researched cases in Tajikistan, Norway, Sri Lanka, Nigeria, and North Macedonia, connecting her studies to her internship with the U.S. Department of State. She used a database to examine historical and current conflicts along ethnic fault lines, and their connection to minority language rights.

Boggs discovered the research opportunity through a newsletter from the USC Honors College. As a political science and history major, linking ethnic conflicts and minority language rights was applicable to her studies. Boggs submitted an application to the faculty mentors **Stanley Dubinsky** and **Michael Gavin**. To prepare, she was assigned a book and literature study to better conceptualize the importance of the project and what attention it required. She continued the project through her senior year, where she felt earning **Graduation with Leadership Distinction** was a natural progression.

WRITTEN BY MADELYN WESTON
EDITED BY SAVANNAH KEATING

FEATURING JILL BOGGS

POLITICAL SCIENCE, ART
HISTORY, AND HISTORY TRIPLE
MAJOR, MAY 2021



JILL VISITING PRIZREN, KOSOVO, IN JUNE 2019 WHILE INTERNING WITH THE DEPARTMENT OF STATE. PRIZREN IS ONE OF THE LARGEST CITIES AND THE HISTORICAL CENTER OF KOSOVO.



JILL WALKING THROUGH DOWNTOWN SKOPJE, THE CAPITAL OF NORTH MACEDONIA, AFTER A FUN DAY AT WORK.

When asked about joining a research project at its beginning, Boggs replied that the general onboarding process was very easy because her faculty mentors communicated their expectations well. Initially, Boggs worked with a partner, but she later gained more liberty and was allowed to select her own cases in her senior year. Since Boggs joined when the project was founded, her first few cases were assigned based on prioritizing which ethnic conflicts her professors needed information about. A majority of their studies were about lesser known conflicts that were not widely publicized, so data presentation was Boggs' main goal. She said, "The beauty of this project was that you're putting all of this information in one space and it's written in ways that were publicly accessible."

For Boggs' first case, she looked at Norway's treatment of their Sami minority concerning language rights and how Norway eventually allowed them to use their language in public spaces after a long period of suppression. Boggs developed a process by doing background research, searching previous publications about specific conflicts, and checking local news sites. She explained that some countries have a government system that limits free press, making research even more difficult. In certain countries, such as Tajikistan, which has a dictatorship, finding any information at all is challenging. She emphasized the importance

of acknowledging that available information may not be perfect, reading objectively, and writing with little bias. Undergraduate research helped Boggs develop a writing process. Boggs' least favorite aspect of presenting research is that it's hard to know where to start writing, especially with complex research. Completing a case study was the most satisfying aspect for her. Having an accountability system with friends who were also on the Language Conflict Project helped Boggs discern which case ideas were promising and how to approach the study.

Interning with the Department of State in North Macedonia in the summer of 2019 supplied a new research connection. Boggs said that program is one of few that would place an undergraduate student in an international setting. She interned in the Regional Security Office in the United States embassy in North Macedonia. This versatile internship included observing the North Atlantic Treaty Organization's activities, administrative work, and outreach projects through the U.S. embassy.

Boggs carried this interest to South Carolina, where she continued her research in a case study with the Language Conflict Project. "I wrote a lot about North Macedonian ethnic conflicts because those were also language based," Boggs explained. "It ended up being more of a choose your own adventure."

Collaborating with her peers while they learned how to study the changes of historical rights provided her with support. Similar to her connections in the Language Conflict Project, Boggs appreciated the peer review of her **Graduation with Leadership Distinction ePortfolio** in UNIV 401, which is a course for seniors where she enhanced her ability to intelligently articulate how her research has provided her with skills and knowledge. Boggs appreciates how completing GLD gave her a cohesive, clear analysis of her undergraduate courses, research, and internship abroad. Her ePortfolio demonstrates her undergraduate research experience and takeaways, which can be shared with possible employers.

Learning about ethnolinguistic conflicts as an undergraduate researcher provided Boggs with a strong historical background and clarity about her academic interests while pursuing a J.D. at Vanderbilt University Law School. She credits most of her success to studying cases with the Language Conflict Project and interning with the Department of State in North Macedonia because it strengthened her applications for graduate schools. This experience heightened her curiosity about international relations, which is a part of her focus in law school. "It

gave me a better understanding of international and legal issues," Boggs said. "That's shown itself in my coursework and my research outside of class."

Although it was difficult to find the information for case studies with the Language Conflict Project, her research on ethnic conflicts in places such as Tajikistan have proven to be important in higher education. Additionally, conflicts in the Balkans and Ukraine are related to ethnicity, so understanding this on an extensive level is useful in international law courses. If it weren't for the Language Conflict Project, Boggs may have focused only on domestic corporate law. Now, she is considering work with the Committee of Foreign Investment in the United States (CFIUS), which entails reviewing the national security impacts of American companies attempting to invest overseas.

Boggs explored opportunities with the Language Conflict Project that led her to her passion in international law, and found friendship in her peer researchers. As a second-year law student, Boggs has shifted from article analysis to writing legal briefs, appreciating the skills that she obtained through support of faculty on the Language Conflict Project and the Graduation with Leadership Distinction program. Her story is one of perseverance, determination, ambition, and community.



A PHOTO FROM A WEEKEND TRIP TO SEE LAKE OHRID, A UNESCO WORLD HERITAGE SITE ON THE BORDER OF NORTH MACEDONIA AND ALBANIA.

CROSSTALK X JOURNAL CLUB COLLAB

REVIEWED BY AUDREY GALIMBA
PRESIDENT OF THE PRE-HEALTH JOURNAL CLUB

AND JADE HANNAN
VICE PRESIDENT OF CURRICULUM OF THE PRE-HEALTH JOURNAL CLUB

EDITED BY HENY PATEL

FEATURING
FATIMA JATOI

PSYCHOLOGY MAJOR,
NEUROSCIENCE AND
COUNSELOR EDUCATION
MINORS, MAY 2023

THE ROLE OF AGE AND EMPATHY LEVELS ON MENTAL HEALTH STIGMA



FATIMA JATOI IS A PSYCHOLOGY MAJOR WITH A DOUBLE MINOR IN NEUROSCIENCE AND COUNSELOR EDUCATION. SHE IS PASSIONATE ABOUT PSYCHOLOGY RESEARCH AND IS EXCITED TO SHARE HER RESULTS FOR HER INDIVIDUAL PROJECT WITH YOU!

ABSTRACT

The stigma surrounding mental illness is a major barrier to mental health care access. This is especially of concern with a currently increasing prevalence of mental health issues among individuals in the United States. This current study investigated how empathy and other factors contribute to the stigmatization of mental illness. Pearson correlation analyses were conducted from the survey data collected from undergraduate students at the University of South Carolina. Results showed that empathy levels had a significant negative correlation with the likelihood to stigmatize mental illness and age had a significant negative relationship with the likelihood to stigmatize mental health. This points to the possibility that mental illness stigma can be decreased with experience and knowledge about mental health.

Keywords: mental health, stigma, empathy, age

INTRODUCTION

Mental health problems are a pressing issue in today's society. According to the National Alliance of Mental Illness, one in five adults suffer from mental illness every year, and suicide is the second leading cause of death in the United States as of 2022. Despite this, there is a substantial stigma in society surrounding mental health and the mental health issues people face. Stigma is defined as "stereotypes or negative views attributed to a person or groups of people when their characteristics or behaviors are viewed as different from or inferior to societal norms" (Ahmedani, 2011). Ahmedani examined the stigma around mental illness in many forms and found that there is a significant stigma around mental illness in western society. Corrigan and Watson found that individuals suffering from mental health issues were perceived as dangerous, incompetent, and weak in character. This stigma contributes to low self-esteem and self-perceptions of weakness and incompetence among individuals with mental health issues (Corrigan and Watson, 2002).

This perception acts as a significant barrier to patients receiving the mental health treatment they need in our society (Corrigan and Watson, 2002). However, this stigma seems to reach other specific populations as well. D'Angelo et al. (2011) found that individuals in the military were less likely to seek out mental health treatment, despite the presence of free mental health services for servicemen. This demonstrates the stigmatized environment around mental health present in the military. It is clear that the fear of social rebuke from peers in a military setting can severely limit willingness to seek help for mental health issues. Ahmedani (2011) found that this stigma also persists among health professionals. This study found that healthcare professionals largely did not differ from the general public when it came to an adverse opinion of individuals with mental illnesses (Ahmedani, 2011). Health professionals' negative attitudes toward mental illnesses may further discourage individuals from seeking the treatment they need, creating a vicious cycle wherein individuals do not seek treatment in fear of discrimination, which leads to a decline in their mental health, and an increase in the need for treatment. With that being said, it is important to uncover the factors that influence the stigma surrounding mental health to understand the means by which the stigma can be resolved (Moradi and Risco, 2006).

Current evidence supports the idea that inducing higher levels of empathy in individuals can help to reduce this stigma. Hecht et al. (2021) examined how empathy and reflectiveness may reduce the stigma surrounding mental illness in the general public. This study specifically examined how the media can reduce the stigma around mental illness by attempting to "elicit empathy and [reflect] thoughts" (Hecht et al., 2021). The results of this study demonstrated that there was a significant positive effect of empathetic feelings and reflective thoughts on positive attitudes toward mental illness which was hypothesized by the researchers. Given that the news and social media can be strong influencers on empathy, the findings of Hecht's study are relevant to our understanding of mental health stigma.

Demographics such as age and gender could also impact attitudes toward mental illness. In a 2020 study, Bradbury studied participants in the 16-18 and 40+ age ranges. The study found that individuals in the 40+ year age group were less likely to stigmatize mental health than those in the 16-18 year age group. This trend could be attributed to increased opportunities in education and association with mental health issues as one ages (Bradbury, 2020). This is corroborated by Griffith et al. (2006), who found that older individuals are most likely to have had more contact with individuals who have mental illnesses, which could be a reason behind the decreased stigma. Additionally, because the older individuals held less judgment, it suggests that attitudes about mental illness are changeable through experience.

Given the impact that age and empathy levels can have on the stigma associated with mental illness and individuals who receive treatment for it, the primary purpose of this research study was to see if there is a correlation between empathy levels, age, and the likelihood to stigmatize mental health and those who receive mental health treatment. It was hypothesized that there would be a negative correlation between empathy levels and the likelihood to stigmatize individuals with mental health issues. Additionally, we hypothesized that there would also be a negative correlation between age and the likelihood to stigmatize mental health.

METHODS

Participants

The participants recruited in this study were undergraduate students at the University of South Carolina. The study had 138 participants (29 males, 109 females). The participants' ages ranged from 18 to 36 years, with a mean of 19.65 years. Participants were recruited by distributing the survey via social media stories as well as messaging services.

Materials, Procedures, and Analyses

A survey was administered using Google Forms, and the link to the survey was distributed via social media platforms including Snapchat, GroupMe, and Instagram. Participants all consented to voluntarily take the survey, and the responses collected were anonymous. Every participant completed all of the questions in the survey, and all responses were included in the analysis.

In the survey, empathy was measured through the General Empathy Scale (Andreychik and Migliaccio, 2015). This questionnaire consisted of 7 statements, which each participant rated on a scale of 0 to 4 on how accurately the statement resonated with them. A second questionnaire, the Mental Health Treatment Stigma scale, measured the stigma towards mental health/people with mental health issues (Castro et al., 2004). This scale consists of 16 statements which each individual rated on a scale of 1 to 4 on how strongly each statement related to them. Additionally, a survey in Google Forms asked about demographics, gender, age, and grade level. The participants' only task was to answer all of the survey questions to the best of their ability. The survey completion time was approximately five minutes. A Pearson correlation was used to test the significance of the results to test the hypothesis if there was a negative relationship between empathy levels and mental health stigma score.

RESULTS

Table 1: Descriptive Statistics: Empathy, Stigma Score, Age

	Mean	Std. Deviation	N
Total Stigma score	32.29	8.101	138
Total Empathy Score	18.43	3.639	138
Age (in years)	19.65	1.966	138

As demonstrated in Table 1, the total stigma score had a mean of 32.29 and a standard deviation of 8.101. A higher stigma score indicates that the individuals were more likely to stigmatize while a lower stigma score means they were less likely to do so. The total empathy score had a mean of 18.43 and a standard deviation of

3.639. A higher empathy score indicates that the individuals had higher levels of empathy while a lower empathy score indicates that they had lower levels of empathy. The maximum total score that participants could have made on the stigma test was 64 while the maximum empathy score they could have made was

Table 2: Inferential Statistics for Pearson Correlation Between Empathy and Stigma Score and Age and Stigma Score

As shown in Table 2, a one-tailed Pearson correlation analysis was conducted on the empathy score ($M=18.43$, $SD=3.639$) and the mental health stigma score ($M=32.29$, $SD=8.101$). Results show that there was a significant negative correlation, $r(136) = -0.166$, $p=0.026$. Additionally, a one-tailed Pearson correlation analysis was conducted on age ($M=19.65$, $SD=1.966$) and the mental health stigma score ($M=32.29$, $SD=8.101$), resulting in a negative significant correlation, $r(136)=-0.218$, $p=0.005$. However, there was no significant correlation between age and empathy scores, $r(136)=0.051$, $p=0.277$.

		Total Stigma score	Total Empathy Score	Age (in years)
Pearson Correlation	Total Stigma score	1.000	-.166	-.218
	Total Empathy Score	-.166	1.000	.051
	Age (in years)	-.218	.051	1.000
Sig. (1-tailed)	Total Stigma score	.	.026	.005
	Total Empathy Score	.026	.	.277
	Age (in years)	.005	.277	.
N	Total Stigma score	138	138	138
	Total Empathy Score	138	138	138
	Age (in years)	138	138	138

DISCUSSION

The primary objective of this study was to highlight the correlation of age and empathy score with mental health stigma in order to find ways to decrease the stigma. Destigmatizing mental health is essential so that individuals who suffer from mental health issues are able to receive the treatment they need without feeling discriminated against. Additionally, destigmatizing mental health helps create a society where individuals can be more open about their mental health instead of suffering in silence. Our findings regarding the negative correlation between stigma and empathy support previous findings by Hecht et al. (2021) that lower empathy levels are associated with an increased likelihood to stigmatize mental health. Hecht et al. (2021) also used Batson's empathy-attitude model which explains that having empathy towards an individual who is a part of a stigmatized group can decrease stigma towards the group as a whole. Applying this model, it can be concluded that inducing empathy towards individuals with mental illness could assist to reduce the overall stigma surrounding mental health. Other studies have also found that mental health care professionals are more likely to be empathetic, and thus have less stigmatizing beliefs towards individuals with mental illness (Gateshill et al., 2018). This helps to support our results because it demonstrates that individuals who have higher levels of empathy toward those with mental illnesses held less stigma.

Our results also support the findings of Bradbury (2020) regarding the negative correlation between age and stigma. As discussed in his research, older individuals most likely have come into contact with more individuals who have mental health issues and thus, are less likely to stigmatize them. In addition to this, Bradbury theorizes that as individuals age, they have encountered more education surrounding mental illness and are thus, less likely to stigmatize mental illness and related topics (Bradbury, 2020). We extend on Bradbury's research by including participants from 18-35 years of age. The current results suggest that the effects of age on mental illness stigma can be detected even within a restricted age range. Moreover, it suggests a possibility that experiences during early adulthood could impact attitudes toward mental health since younger individuals were more likely to stigmatize mental health compared to older individuals. However, this study was limited in its convenience sampling method. Follow-up research should recruit a random sample. In addition, there were only 29 male participants out of 139 total participants, which could have made the sample results less representative of a larger population. There were also only 7 participants who were over the age of 21.

The findings of this study were also interesting because even though there were significant correlations between age and stigma as well as empathy and stigma, there was no correlation found between age and empathy levels. This may suggest that college individuals do not become more empathetic as they age even though the results showed that they were less likely to stigmatize mental health. This raises the question of whether low empathy is an innate characteristic of mental illness stigmatization, or if there are other factors that can efficiently decrease stigma. As mentioned earlier, individuals may be less likely to stigmatize mental health as they age because they possibly gain more experience with individuals with mental health issues. However, this does not necessarily mean that they become more empathetic with these experiences.

Future research still needs to be conducted to further understand the underlying reasons why people have stigmatizing views concerning mental health as well as methods to help break this stigma. Other factors that impact mental illness stigma, such as mental health education, should be examined. A possible approach would be to subject participants to stimuli that evoke feelings of empathy in individuals related to mental illness and study how that affects their likeness to stigmatize mental health. Further insight is needed into why young college students are more likely to stigmatize mental health. Additionally, it would be interesting to examine the relationship between a wider range of ages and the likelihood of stigmatizing mental health to see if the results are consistent with this study. Future research could also be conducted on whether having negative experiences with individuals with mental health increases stigma, even as the individual ages.

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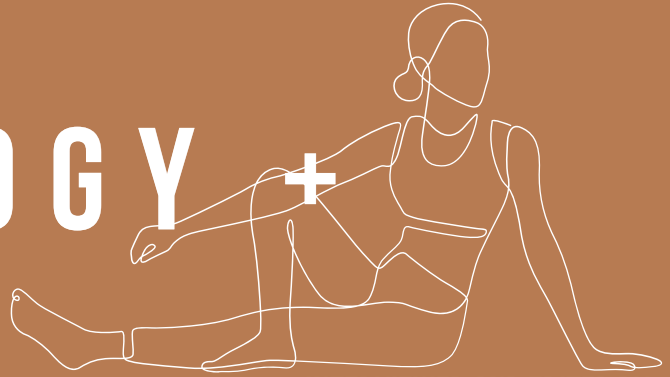
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MENTOR SPOTLIGHT

THE INTEGRATION OF TECHNOLOGY PHYSICAL ACTIVITY PROMOTION THROUGH SOCIAL SUPPORT AND SOCIAL NETWORKS



INTERVIEWED AND EDITED BY
HENY PATEL

FEATURING DR. COURTNEY
MONROE, PH.D., EP-C,

ASSISTANT PROFESSOR,
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***Dr. Courtney Monroe** currently works at the Department of Health Promotion, Education, and Behavior in the Arnold School of Public Health at the University of South Carolina. Her research focuses on utilizing technology to effectively promote physical activity and deliver behavioral weight control methods in adults. Her strategies particularly involve fostering social support and social networks. In 2021, Dr. Monroe received the 2021 Distinguished Undergraduate Research Mentor Award, which celebrates faculty members for the incredible time and energy faculty mentors invest in guiding undergraduate students through their research journey.*

Tell us a little about yourself.

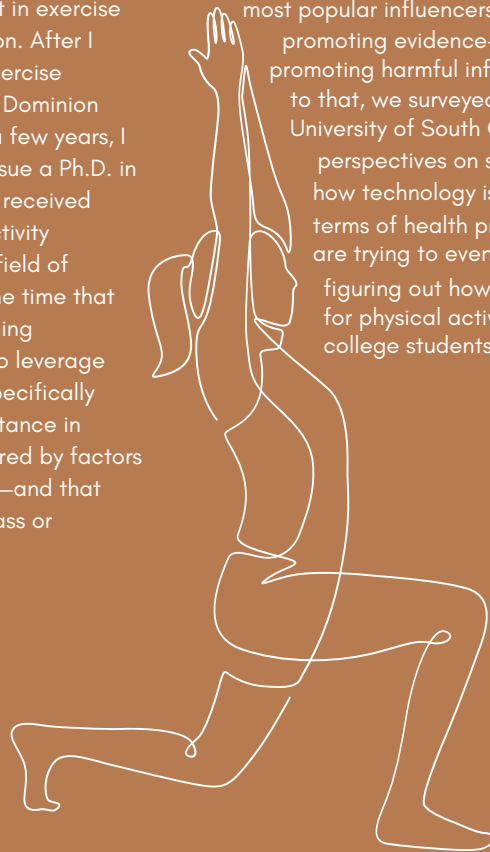
My research mostly focuses on technology-based physical activity promotion (e.g., Knoxville Moves physical activity study). I have also done some research focused on technology-based behavioral weight loss (e.g., NETWORKS weight loss study). I work primarily with adults who are insufficiently physically active, and I try to figure out ways to leverage social support and social networks via technologies to help them become more active. I also conduct research centered on technology, social networks, and physical activity among college students. Additionally, I teach in the Department of Health Promotion, Education, and Behavior (HPEB)—I teach one of the Master of Public Health classes (which focuses on theoretical foundations of health promotion) and a doctoral-level class (which focuses on social, physical, and environmental interventions for health promotion). I have also been involved in service activities with the Society of Behavioral Medicine and the American College of Sports Medicine. Through those professional organizations, I have been able to exchange ideas with colleagues and students.

Explain how you got involved with your research. What is your research journey?

My educational and research interests in physical activity started in my childhood. Growing up, I played a lot of sports and my family was very physically active (we would go for walks and bike rides). I had this inherent interest in physical activity and exercise, especially as I was thinking about my next steps in high school and college. When I was an undergraduate, I started to learn about the obesity epidemic and the physical inactivity epidemic. I subsequently took an interest in exercise science and earned a degree in physical education. After I finished my M.S. in Kinesiology and Recreation (exercise physiology emphasis), I ended up teaching at Old Dominion University in exercise science. After teaching for a few years, I enrolled at the University of Tennessee (UT) to pursue a Ph.D. in Kinesiology and Sport Studies. While I was at UT, I received research training in technology-based physical activity promotion. At the time, there were experts in the field of physical activity promotion, but this was around the time that the Internet and mobile technologies were becoming ubiquitous, and not many individuals had sought to leverage technology for physical activity promotion yet. I specifically became interested in social support and its importance in maintaining physical activity. I am constantly inspired by factors outside of academia that I bring into my research—and that could be exchanging ideas with my students in class or interacting with participants in the studies.

What research projects are you currently working on?

My primary research trajectory now focuses on fully technology-delivered physical activity promotion programs, so I am always testing out strategies that focus on leveraging social support/networks for physical activity promotion. For instance, one of my projects occurred over three years, and I conducted a 3-month-long intervention with a one-year follow-up to see how the participants were doing with respect to their physical activity. The participants enrolled as teams of people who knew each other so that we could leverage those social ties as a potential form of social support. We then randomized the teams to get a traditional technology theory-based physical activity program (Fitbit, personalized step goals, weekly behavior change lessons, and feedback from interventionists) or the same program plus gamification. Gamification is using game principles in non-game contexts (in this case, health promotion). So we were exploring how we could use gamification (i.e., competitions and challenges) to encourage the experimental teams to support each other and coalesce around a similar objective. In regards to another project, we conducted focus groups to get African American and Black adults' perspectives on this type of gamification intervention. Then, we used insights from those focus groups to culturally adapt our intervention to align with their interests and feedback. There is another project I currently work on that applies to college students where we are looking at Instagram fitness influencers. This is a project in which I got awesome student involvement. In simple terms, we are basically analyzing: is the content that the most popular influencers put out good or bad? Are they promoting evidence-based information or are they promoting harmful information? In parallel to that, we surveyed over 700 students at the University of South Carolina to get their perspectives on social media influencers and how technology is integrated into their lives in terms of health promotion. Another project we are trying to eventually get off the ground is figuring out how to leverage virtual reality for physical activity promotion among college students.



What distinguishes your research from other, similar research projects?

When I embarked on this research path (back in 2011), smartwatches had become incredibly popular. There had been researchers that had done things in the research space in smartwatch technology, but I think this field is now more headed toward machine learning and artificial intelligence as interventions for health promotion. To do that effectively, we would want to leverage the full capability of technology. However, that requires a certain level of expertise. So, in my opinion, there is a certain level of merit to human interactions and social interactions as interventions, and how technology can be leveraged to enhance that merit. For example, we know that, in the past, a lot of programs could get a certain level of behavior change but frequently, they are costly, extensive, and not easily scalable. That is where technology comes in. That being said, sometimes the pace of research and technology is tricky because technology usually evolves faster than the pace of research. I believe that technology is never the direct driver of behavior; technology is just the delivery medium for evidence-based or theory-based strategies. Technology is just a tool or platform that can be infused into different strategies.

What experiences have allowed you to expand or share your research project(s) and how?

Conferences are a great way to meet people and exchange ideas. I am also a member of relevant professional organizations that have special interest groups centered on topics related to my research, and those are excellent outlets for collaboration. The collective group of persons in the Arnold School's Technology Center to Promote Health Lifestyles (TechHealth), HPEB Department, and Web Development and Communications Core, as well as relevant opportunities that are offered at USC (e.g., research seminars; HPEB sponsored student engagement activities), all represent factors that have helped facilitate the growth and dissemination of my research.

As a faculty mentor, what is your advice for an undergraduate student looking to get started in research?

Students shouldn't be intimidated by research. It may seem daunting to have to think of novel research ideas. However, once you get momentum in an area that interests you, you will start to realize that there are so many unexplored questions! In fact, I think you will find that most faculty mentors welcome your support and curiosity. Do not hesitate to take the initiative to reach out to faculty if you want to get involved in their research in some fashion. If you don't have a good experience for some reason, don't stop—be persistent. You can always search for another mentor or research opportunities. Also, be open to different areas and ideas even if a topic does not align directly with your current research interests because you can still gain valuable skills and networks out of those experiences. USC is quite supportive when it comes to undergraduate research—

– I am very impressed by the number of avenues available for getting students involved in research, from funding to workshops to Discover USC. USC truly embodies an enriching research environment for all students. The Office of Undergraduate Research is a great place to gather information about research 19 opportunities specific to USC undergraduate students.

What are some qualities you value in an undergraduate

Someone that takes initiative. Someone reliable. Someone curious. Those are my big three!

Tell us about some of your favorite moments in research.

Recently, I worked with my first Magellan Scholar (Reid Davis), and she was an undergraduate at USC (now she is doing a doctoral program at Michigan State University). It was such a rewarding experience and easily one of my favorite moments in research because it was the first time where I got to formally work with a student on a grant application and proposal and mentor them on those processes. The research project centered around Instagram influencers and how they impact fitness and physical activity. It was a true mentor-mentee relationship. Through the research study, I enjoyed the fact that Reid was also helping me learn about techniques for capturing social media data. Additional favorite moments come from the interactions I have had with the participants of my research studies. Working with the community is incredibly rewarding because I get to interact with, learn from, and support diverse groups of people. They all have different reasons and motivations for joining the studies, and it is fun and rewarding to observe each person's health evolution throughout the research process. I also think their feedback is so valuable because it improves our research and the potential impact we can have within the community going forward. I have always worked with the local community, and now I am working with individuals across the entire Southeast region and beyond because my studies are often fully technology-delivered. It is an exciting time to be working in the digital health promotion space.

THE RELATIONSHIP BETWEEN EXTRAVERSION AND PREFERENCE OF INSTRUCTION

ABSTRACT

This study investigated the correlation between the level of extraversion and preference for in-person or online educational instruction. Education is continuously evolving, so it is vital to research how the modality of education affects students. A t-test was conducted to determine whether or not college students prefer in-person or online instruction. A Pearson correlation was conducted using the Big Five personality trait extraversion and the individual's preference of instruction scores. Results show that the level of extraversion and preference of academic instruction was positively correlated. Another Pearson correlation suggests a significant negative relationship between age and in-person instruction and a significant positive relationship between age and online instruction. The individual's level of extraversion functioned as a significant predictor of preference of instruction modality. This data suggests that, when presented with the choice of in-person or online instruction preference, students' level of extraversion is a predictor of their instruction choice in higher education.

Keywords: extraversion, in-person instruction, online instruction, age

FEATURING
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INTRODUCTION

The development of modern technology and recent global events have transformed traditional higher education into a more innovative space. Online college classes are offered at a rate that far surpasses the growth of overall higher education classes in previous years (Harrington & Loffredo, 2010). In modern education, it is vital to assess students' differences and the effect their experience has on their future. Altering the traditional learning environment by offering many modalities of instruction allows for different outcomes in learned skills, the future workplace, and overall mental health. The definition of extraversion is "a personality trait or style characterized by a preference for or orientation to engaging socially with others" (Merriam-Webster, 2022). Students are likely to prefer a type of learning environment that allows them to feel comfortable and excel in their studies. Preference may be affected by individual differences such as personality traits. To further research the effects of different learning modalities, this study explored the correlation between instructional method preference and extraversion. This research used college students from the University of South Carolina and questioned the correlation between the preference for in-person or online instruction and levels of extraversion. A participant's level of extraversion was determined by their responses to questions measured by the Likert scale. One might assume that higher levels of extraversion are linked to a preference for in-person instruction; while many pieces of evidence support this idea, there are mixed results. This present study attempts to add to the current body of research and better understand the relationship between extraversion and instruction preference.

Education affects many different areas of an individual's life; interaction in class can develop soft skills like collaboration, teamwork, and communication. Completing an online course may advance an individual's technological and organizational planning skills. In-person and online classes require students to dedicate time; however, individuals may learn a certain skill better depending on the modality. Current evidence has indicated a correlation between extraversion and the preference for in-person instruction. There are many ways to consume knowledge, and a student's personality traits may affect how they learn.

When the modality of education was restricted to online learning due to the COVID-19 pandemic, there was an array of negative effects, including worsened learning outcomes. The following articles show the importance of having a variety of instruction modalities because people learn differently. Zhonggen Yu researches many variables, specifically how personality affected education outcomes during COVID-19 (Yu, 2021). Yu's study supported that the level of extraversion is negatively correlated with online learning outcomes (Yu, 202, pg. 05). During the pandemic, students continued their education virtually, which was shown to negatively affect the learning of extroverts. Higher education transitioned from restrictive online instruction to more varied modalities of instruction such as hybrid learning. This research aids the current study in further understanding the effects of the pandemic on educational outcomes and how an individual's personality correlates with a preference for instruction. The example of COVID-19 has demonstrated that a restrictive modality of learning can have many negative effects. It is vital to acknowledge students' differences and how different modalities such as online, in-person, or blended learning may affect students.

The current study aims to understand further the correlation between university students' level of extraversion and their preference for in-person or online instruction. It is hypothesized to observe a positive correlation between the preference of instruction and the level of extraversion. Furthermore, if the level of extraversion measured by the five-point Likert scale were associated with the preference of instruction, then the scores would have a linear correlation. Technology will continue to expand and affect education; therefore, it is important to understand the correlation between individual differences and the inclination of instructional modalities students may have.

METHODS

Participants

Thirty-seven participants from the University of South Carolina completed a Google Form survey; all participants were registered undergraduate students. Subjects were recruited using digital platforms (GroupMe group and text messaging). The respondents included 30 females, 5 males, and 2 non-binary individuals for a total of 37 participants. The ages ranged from 18 to 28, with a mean of 20 years of age. There were 3 freshmen, 16 sophomores, 14 juniors, and 4 seniors.

METHODS

Materials and Procedures

To test the hypothesis, a survey about the preference for in-person or online instruction and the correlation between the level of extraversion was created.

Developing the content of the survey was assisted by a Big Five Questionnaire created by Michael Minkov (2019). The test by Minkov contained an extraversion section of the Big Five personality measure. The current study's survey contained sixteen questions with half of the questions on the preference for in-person or online instruction; the other half of the questions asked about the level of extraversion. To measure questions about pertaining to extraversion from the Big Five Questionnaire and preference of learning modality, the survey utilized a five-point scale. The Likert scale asked how much the participant agreed with the statement (1 = Disagree strongly to 5 = Agree strongly).

RESULTS

The current study hypothesized there would be a positive correlation between the preference of instruction and level of extraversion as defined by the Big Five Personality test. The three analyses conducted to test this hypothesis were a t-test and two-tailed Pearson's correlations. The t-test measured if the sample preferred online or in-person instruction. The Pearson correlation evaluated the linear relationship between the preference of in-person instruction and the individual's level of extraversion. Another Pearson correlation measured the relationship between age and preference of instruction.

First, a t-test was conducted to determine whether or not students prefer in-person instruction ($M = 3.851$, $SD = 1.113$) or online instruction ($M = 2.628$, $SD = 1.035$). Results suggested that there is a preference for in-person instruction independently from the variable of extraversion, $t(36) = 3.696$, $p < 0.001$.

Secondly, a Pearson correlation was conducted to determine whether or not students who scored higher on extraversion ($M = 1.760$, $SD = 7.751$) would have a positive linear relationship with an in-person preference of instruction ($M = 3.851$, $SD = 1.113$). Results suggest that there was a significant positive relationship, $r(35) = 0.415$, $p = 0.011$, two-tailed. The scatterplot of the data shows a positive linear relationship between the in-person preference for instruction and the level of extraversion (**Figure 1**). The Pearson correlation determined there was a significant relationship between the preference of instruction modality and age ($M = 20.16$, $SD = 1.724$). Results suggest that there was also a significant negative correlation between in-person instruction and age, $r(35) = -0.378$, $p = 0.021$. There was a significant positive relationship between online instruction ($M = 2.628$, $SD = 1.035$) and age, $r(35) = 0.362$, $p = 0.028$.

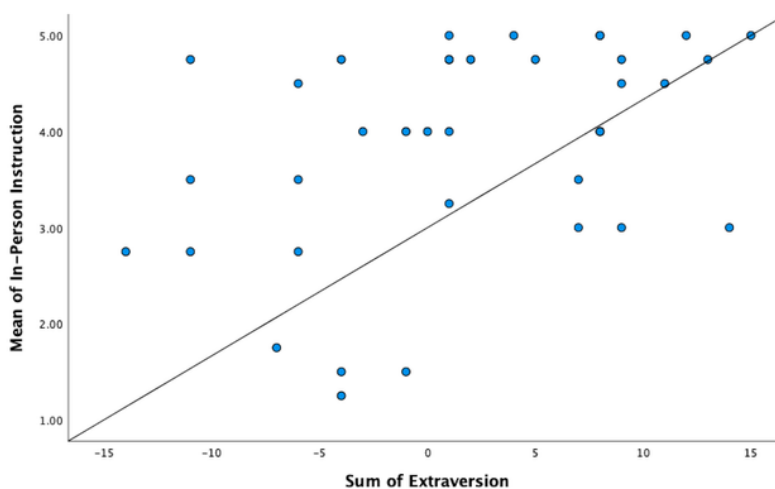


Figure 1. Scatterplot comparing sum of preference of instruction and level of extraversion.

DISCUSSION

This study researched the relationship between the level of extraversion and preference of instruction with the option of an in-person or online modality. The purpose of this study was to further investigate how the increased use of technology in higher education correlates with the personality trait of extraversion. Results indicated there was a positive correlation; the individual's level of extraversion operated as a predictor for preference of instructional modality. Participants that reported a higher level of extraversion were significantly more likely to prefer in-person instruction, while participants lower on extraversion were more likely to report a preference of online instruction. These results, subsequently, support the hypothesis that there would be a positive correlation between the preference of instruction and level of extraversion.

Harrington and Loffredo found that personality type plays a statistically significant role in the preference of instruction which strengthens the current research. However, they also found that over one third of their participants preferred the opposite learning modality with respect to their personality type which may be due to individual preference (Harrington & Loffredo, 2010). The current study's t-test supports Harrington & Loffredo's findings that overall, participants preferred in-person instruction. Harrington and Loffredo found that personality plays a significant role in instruction preference but also addressed individuals' differences which parallels the outcomes of this study's research. These previous results show that extraverts tend to prefer in-person instruction and that their academic performance declined because they did not have a choice and had to continue online. This research aligns with the current study in demonstrating how personality type and preference of instruction affects an individual's academic performance.

There are many possible influencers in the positive relationship between extraversion and instruction preference. In subsequent studies, researchers addressed another instructional modality: blended learning, a mixture of online and in-person instruction. In their meta-analysis, Means et al. found that online and face-to-face instruction are equally effective, but blended learning is the most effective for students' success (Means et al., 2013). Keshavarz & Hulus (2019) researched students' personalities and learning styles regarding the use of blended learning. Their results found that "...extraverts and intuitive learners preferred blended learning over traditional methods" (Keshavarz & Hulus, 2019, pg. 85). These two studies show the alternative option of blended learning, which can be used to understand other outcomes when researching other effective modalities of education. The current study's Pearson correlation also determined another variable that may affect the correlation: age. There was a significant negative correlation between in-person instruction and age, and a significant positive correlation between online instruction and age. These results suggest that younger individuals preferred the in-person modality while older individuals preferred the online modality. Age may affect an individual's level of responsibilities such as jobs, internships, or family, which could be reasons that they prefer online instruction. The study's age group ranged from 18 to 28, but this may indicate certain educational preferences may be affected by age.

The current study demonstrated a positive correlation between the level of extraversion and preference for instruction. Possible limitations in the study leave room for further research. Two demographic limitations were 81% of the participants being female and, besides one outlier, the primary age group being 18 to 22. This data was collected using a self-report, which may lead to some unreliable numbers because their answers are subjective. Gathering information from individuals close to the participant, such as significant others or family members, may improve results. The study utilized convenient and voluntary sampling, which reduced reliability due to the increased possibility of biased results. Convenient and voluntary sampling may affect the results because the demographic of participants is narrow. Another possible way to improve results is a larger and randomly selected sample population. In future research, evaluating the option of blended learning as well as online and in-person instruction may also provide statistically significant results. Blended learning is important because it is a more probable scenario within higher education than fully online or in-person. To continue to improve this research, a longitudinal study from the beginning of instruction to the end of the individual's education while measuring personality type and preference of instruction may lead to more explicit results. This study also does not research extraversion's counterpart introversion, which would add more dimensions and understanding when studying this topic. Another future direction could be whether preference for instruction is correlated with performance in course and the learning outcomes.

DISCUSSION

The use of technology in education continues to increase, which allows for new and innovative solutions that have been seen through the recent event of a pandemic. Students at all levels of education had to adapt to an online modality of instruction; afterwards, many institutions continued to maintain an increased level of online learning. The results of this study demonstrate that it is important to consider students' personality traits and preference of instruction because it affects their experience in higher education. It is critical to continue this research because if technology continues its currently exponential growth in education, it will be vital to address students' individual differences and how their learning is affected by technology. Education is a pivotal experience for the development of self and mind; therefore, acknowledging the importance of students' preferences so they can succeed, grow, and continue to better the next generation's education.

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