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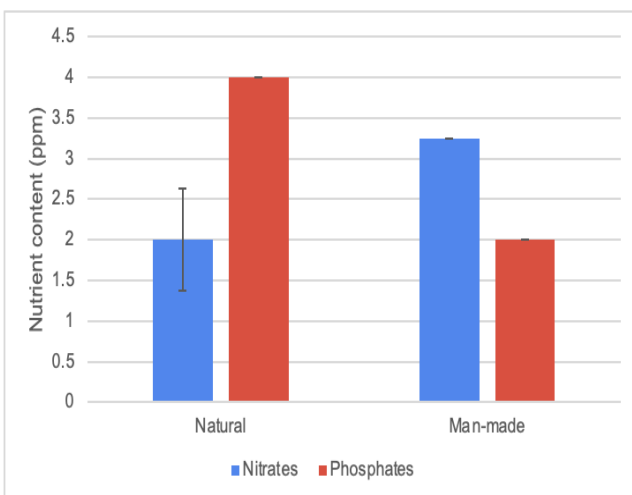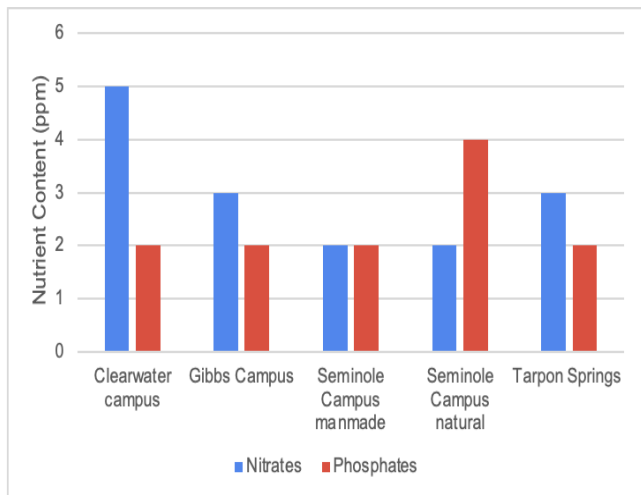
St. Petersburg College First Generation Students

2021 Student Research Projects

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SPC St. Petersburg College

About the Undergraduate Research Experience Report

In 2018 St. Petersburg College (SPC) developed and implemented a model to provide interested STEM students with paid Undergraduate Research Experiences (UREs) facilitated by faculty in their field of interest. The URE implementation was made possible by The Tampa Bay Bridge to the Baccalaureate (TB-B2B) Program, which was grant funded by the National Science Foundation (NSF) as part of the Louis Stokes Alliance for Minority Participation (LSAMP).

Over the ensuing years, student and faculty interest in UREs has continued to increase. In 2021 building on this success, SPC initiated a collegewide expansion and began offering paid UREs to first generation students, in both STEM and non-STEM fields.

Students' final reports for each URE completed by first generation students during 2021 are contained within this document.

<u>Background</u>

Prior to the start of each semester in 2021, first generation students were informed that 8-week research opportunities within their undergraduate major were available during the following semester, and included a paid stipend of $250. Interested students were provided the name of a professor in their field, and were directed to schedule a meeting with the professor to discuss their research interests. Once a student agrees to start a project, the professor updates the URE Commitment and Agreement form with the project details and the form is signed by both. A sample form is provided in Appendix A.

Eleven SPC first generation students participated in 8-week UREs within their field of interest during 2021. Students received their stipend after all research project requirements were met at the conclusion of the eight weeks, including the completion of a final report. UREs included research projects in five categories, Psychology, Ecology, Microbiology, Environmental Science, and Health Science.

Upon completing a URE, students are surveyed to measure their perspective about the impact the UREs had on them, and assist the college to continuously improve. The survey was adapted from the Community College Undergraduate Research Initiative (CCURI), and the Undergraduate Research Student Self-Assessment (URSSA) from the University of Colorado, and with their permission, we removed a few questions that were not applicable to our URE model.

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Undergraduate Research Experiences (UREs)

Listed below are the names of eleven first generation students who completed UREs with guidance from St. Petersburg College professors in five disciplines, and submitted their final reports contained within this document.

Ecology UREs conducted with Professor Erin Goergen, PhD

- Talya Redinger   *Population Analysis of Fiddler Crabs at the SPC STEM Center*
- Alexander Teleszky   *The ability of plants to act as a natural air filter to remove VOCs*
- Olivia Rehberger   *Water quality in natural and man-made ponds on SPC Campuses*

Ecology Restoration URE conducted with Professor Erica Moulton, MS

- Amber Maskell   *Tampa Bay Estuary Program (TBEP) Marketing Campaign*

Health Science URE conducted with Professor Will Baldwin, MPH

- Ashley Noyes   *The Effect of Exercise on Quality of Life for Dementia Patients*

Microbiology UREs conducted with Professor Shannon Ulrich, PhD

- Angelica Delillo   *Characteristics of Bacteria and Fungi*
- Regan Barnes   *Effectiveness of contact lenses solutions*

Psychology UREs conducted with Professor Sharon Olsen, MA

- Amanda Broadwater   *Empathy, Alter-Centrism, and Psychology*
- Destini Bethune   *College Connectedness Factors During a National Pandemic*

Psychology UREs conducted with Professor Kimberly Molinaro, M.Ed

- Madison Gauley   *Age and Content of Earliest Childhood Memory*
- Dakota Lawson   *Parenting by Lying: Mitigating Factors and Consequences*

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Undergraduate Research Experiences (UREs) Survey Results Highlights

The URE survey was administered to eleven students who completed UREs in 2021, and eight responded resulting in a 73% response rate. Below are several survey results highlights.

I. GAINS IN THINKING AND WORKING LIKE A SCIENTIST: APPLICATION OF KNOWLEDGE TO RESEARCH WORK:
How much did you GAIN as a result of your URE: 88% of respondents reported 'Great Gain' or Moderate Gain'
Percent of respondents who reported 'Great Gain'
- Formulating a research question that could be answered with data: 100%
- Understanding the relevance of research to my coursework: 75%
- Figuring out the next step in a research project: 63%
- Understanding the theory and concepts guiding my research project: 63%

II. PERSONAL GAINS RELATED TO URE: 100% reported 'Great Gain' or Moderate Gain'
Percent of respondents who reported 'Great Gain'
- Ability to work independently: 88%
- Comfort in discussing scientific concepts with others: 63%
- Confidence in my ability to do well in future science courses: 63%
- Comfort in working collaboratively with others: 63%

III. GAINS IN SKILLS: How much did you GAIN as a result of your URE:
Percent of respondents who reported 'Great Gain' or Moderate Gain'
- Writing scientific reports or papers: 100%
- Conducting database or internet searches: 100%
- Managing my time: 100%
- Conducting observations in the lab or field: 100%
Percent of respondents who 'Strongly Agree' or 'Agree' with the following statements:
- Doing research confirmed my interest in my field of study: 100%
- My research experience has prepared me for a job: 100%
- My URE has prepared me to transfer from a 2-year to a 4-year institution: 88%

IV. Compared to your intentions BEFORE doing research, HOW LIKELY ARE YOU NOW to:
Percent of respondents who are now 'Extremely More Likely' or 'Somewhat More Likely' to:
- Complete your Bachelor's degree in science, mathematics, or engineering? 88%
- Enroll in a Master's program in science, mathematics, or engineering? 75%
- Work in a science lab? 63%

Student Comments
"…helpful in learning how to analyze data, interpret results and conduct field studies…useful in the scientific field."
"…research experience further… my plans to continue in the science field with engineering and marine biology."
"… solidified my decision further in studying optometry!"
"…confirmed that I want a career involving microbiology research and microscopy. I genuinely had fun…"
"…allowed me to see which aspects of psychology I want to focus on. I might go on to get my MA degree."
"…a better understanding as to what biologist and conservation scientist do and how things are assessed."
"…confirmed for me that I want to go past by BA degree and get at least my MA degree so I can become a counselor."

Source: This survey was adapted from the Community College Undergraduate Research Initiative (CCURI), and the Undergraduate Research Student Self-Assessment (URSSA) from the University of Colorado.

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Ecology
Research Projects

St. Petersburg College Student Research Final Report

Name: Talya Redinger   **Professor:** Erin Goergen, PhD

Date: 06/18/2021

Population Analysis of Fiddler Crabs at the SPC STEM Center

Outline of Responsibilities

- Attending a weekly research meeting and/or participating in ecological monitoring at the Bay Pines STEM Center
- Performing primary literature research on methods of population analysis and role of fiddler crabs in shoreline ecosystems
- Conducting field surveys of population size
- Meeting with Dr. Goergen either online or in person on a weekly basis for status updates and determination of the following week's goals
- Completing compiled report of the research/activities done each week (e.g., results observed, assumptions, and/or conclusions, learning achieved)

Purpose of Project

Population analysis of fiddler crabs at the SPC STEM Center

Fiddler crabs (*Uca* spp.) play a crucial role in the health of estuarine ecosystems around the world. Known as ecosystem engineers (Smith et al., 2009), construction of their burrows aids in nutrient cycling as burrows aerate, translocate sediments, increases sediment drainage (Penha-Lopes et al.2009) and alters the physical, chemical and biological state of soft sediments in these coastal marshes(Smith et al., 2009). Functionally detritivores, fiddlers feed on decomposing organic matter and consume algae, bacteria and nematode*s* found in the sediments (Fiddler Crabs of Northern Gulf Coast, n.d.). Fiddlers are also considered an indicator species as it is sensitive to pollutants, suggesting the presence of toxins, metals, and pesticides in the environment by changes in their behavior, population density and internal biomarkers (Giblock n.d.).

Due to the role of these species in intertidal and estuarine systems, it is important to monitor populations, especially in locations experiencing modifications. Existing habitat fragmentation and upcoming restoration to a more natural, living shoreline makes the SPC STEM Center a unique location to determine pre and post seawall removal effects on resident fiddler crabs. The aim of this part of our study is to determine the status of the fiddler crab (*Uca pugilator*) population at the STEM Center.

Weekly Reports and Data

- Week 1 (April 14th) Met with Dr. Goergen to talk about potential projects and narrowed it down to looking at fiddler crab populations out at the SPC STEM Center.

- Week 2 (April 23rd) Meeting with Dr. Goergen at the STEM Center to discuss the project being conducted and to conduct preliminary transects in the salt flats. Researched basic biology of the fiddler crab species as well as how and when to observe their activity. Entered data into the spreadsheets.

- Figure 1. and 2: Site 1 (boardwalk) and site 2 transect collection.

- 3Week 3 (April 28th) Meeting with Dr. Goergen at the STEM Center to carry out quadrat sampling to assess burrow density. Also, researched information about sampling procedures and behavior / life cycle of fiddler crabs. Entered data into the spreadsheets.

Figure 3. and 4.: Site 3 of fiddler population study project. Quadrat sampling in site 2.

- Week 4 (May 5th) Meeting with Dr. Goergen to talk about the data collected thus far and plans for additional factors to measure at the next field sampling.
- Week 5 (May 11th) Second quadrat sampling date. Entered data into the spreadsheets.

- Week 6 (May 16th) Put out cameras to try and catch activity of fiddler crabs and met with Dr. Goergen to talk about data analysis using excel. Began writing up methods. Soil sample analysis conducted.
- Week 7 (May 24th) Continued examining the existing data and writing up the report. Conducted additional literature reviews on the role of fiddler crabs in estuary and intertidal ecosystems.
- Week 8 (June 6th) Continued working on the research report and conducting a literature review on the effects of seawalls on fiddler crabs and estuary ecosystems in general. Met with Dr. Goergen to discuss paper layout for discussion.
- Week 9 (June 11th) Final editing and construction of the report on the research.

Research Findings

Fiddler crab population density study at SPC STEM Center's Living Shoreline Project
By Talya Redinger & Dr. Erin Goergen

Introduction

Fiddler crabs (*Uca* spp.) play a crucial role in the health of estuarine ecosystems around the world. Known as ecosystem engineers (Smith et al., 2009)**,** *these Uca* species are recognized by the square shape of their body and the presence of a large claw seen in males that resembles a fiddle (Fiddler Crabs of Northern Gulf Coast, n.d**.).** Construction of their burrows aids in nutrient cycling, as the excavating aerates, translocates sediments, increases sediment drainage (Penha-Lopes et al**.**2009) and alters the physical, chemical, and biological state of soft sediments in these coastal marshes by mitigating the resources available to marsh flora (Smith et al., 2009). Functionally detritivores, fiddlers feed on decomposing organic matter and consume algae, bacteria and nematode*s* found in the sediments (Fiddler Crabs of Northern Gulf Coast, n.d.). While all crabs have gills, fiddlers breathe oxygen and prefer to be on land as adult fiddlers do not swim well (Fiddler Crabs of Northern Gulf Coast, n.d.). Fiddler crabs are also considered an indicator species as they are sensitive to pollutants, suggesting the presence of toxins, metals, and pesticides in the environment by changes in their behavior, population density and internal biomarkers (Giblock n.d.) for estuarine and salt flat ecosystems.

Estuarine ecosystems can offer numerous ecosystem services provided that they are healthy and functioning including coastal protection, flood and storm protection, purification and flow regulation, air quality improvements, maintenance of fisheries, seafood harvest, habitat and refuge, carbon and nitrogen sequestering and cultural activities (Duarte et al., 2021). Despite these benefits, many estuarine ecosystems adjacent to developed areas are reinforced by structures such as seawalls, jetties, etc. to prevent erosion and wave damage to existing structures. Current research on shoreline reinforcement indicates that hardened structures, like a seawall, can have negative effects on biodiversity, water quality, ecology, and ecosystem services (Prosser et al., 2017). At our study site, these negative effects may be compounded because of the proximity to a highly urban setting, a potential for nutrient pollution, fossil fuel combustion emissions, and roadway runoff, resulting in harmful algae blooms, growth in aquatic plants, including phytoplankton and nuisance algae (Prosser et al., 2017). Bozek & Burdick (2005) discuss how seawalls act as a low permeability layer at the upland marsh boundary, reducing the groundwater flow to the marsh surface, thereby increasing salinity, and impacting plant distribution and growth limitations. Armoring of the seawall can also reduce the accumulation of wrack

and organic debris, both of which fiddlers use for foraging and are essential to sediment depositional processes (Prosser et al., 2017).

Due to the role of fiddler crabs in these crucial intertidal and estuarine ecosystems, it is important to monitor populations, especially in locations experiencing modifications. Although numerous studies have investigated population dynamics and colonization of invertebrate populations after seawall installation (Dugan et al., 2008), little data exists about the effect of seawall removal on existing populations. Existing habitat fragmentation and upcoming restoration to a more natural, living shoreline makes the SPC STEM Center a unique location to determine pre and post seawall removal effects on resident fiddler crabs. Fiddler crab presence at the SPC STEM center is seen throughout the lagoon's interior higher intertidal zones. The aim of this part of our study is to determine the current status of the fiddler crab (*Uca pugilator*) population at the STEM Center.

Materials and Methods

Study Site

This study was conducted at the St. Petersburg College STEM center in the intertidal regions adjacent to the Intercoastal waterway of Pinellas County, FL (27°48'41"N, 82°47'11"W).This 55 acre property of salt flat and submerged land is located adjacent to Boca Ciega Bay in St. Petersburg, FL. Currently used as a learning center and laboratory for environmental science and biology students at the college, the property is undergoing a restoration to a natural shoreline, by removing the bulkheads along the 5 acres of interior lagoon. Daily tidal influx, floods into the salt marsh above the bulkheads, causing fiddlers to retreat to the burrows until the next diurnal low tide. Three sampling locations were identified in the salt flat/mangrove environments adjacent to a seawall on hurricane hole lagoon (figure 1). Although a public area, the sites do not historically have a lot of foot traffic.

Site 1 was located southeast of the STEM Center towards hurricane hole (lagoon) along an old dock trail. Due to existing conditions of a trail, the site was laid out as a rectangle ~4m x 33m (132m^2 total area) with packed soil in the center and vegetation along the edges. Site 2 was south of site 1 with

a total area measurement of 187.5m^2. This area is directly adjacent to the seawall and floods daily with rising tide causing tidal impediment to turn substrate to muck when inundated. This site was characterized by more estuarine vegetation including mangrove species. Site 3, the largest area (~1500m^2), was located south of site 2 and also adjacent to the seawall and had similar substrate and vegetation conditions as site 2.

Figure 1. St. Petersburg College STEM Center's Living Shoreline Project aerial site identification.

Soil Sampling

To determine if sites differed in soil composition, two soil samples were taken per site to characterize soil texture differences via the settling method. At each site, two samples were taken to a depth of 10cm and homogenized (n=2 per site, 6 samples total). Approximately 500ml of soil was placed in a 1000ml graduated cylinder with 200ml water and mixed. The soil was allowed to settle by particle size over 48 hr. to determine percentage sand, silt, and clay.

Population Sampling

To estimate population size of fiddler crabs at the SPC STEM Center, we performed both transect and quadrat sampling to assess burrow abundance and density. Due to differences in size and shape of the sampling sites, a different number of transects /quadrats was used among sites, but all sites had equivalent amounts of area sampled.

On April 23 one 33m transect line was established on the boardwalk path (site 1) with the number of burrows within 2m on either side of the transect tape being recorded every meter along the transect. At site 2, three 10m transect lines were established ~2.5m apart. The number of burrows was counted within 2m on either side of the transect tape every 1m, starting at the seawall side. Due to time constraints and the large size of site three, transects were not conducted there.

In addition to transect sampling, we conducted quadrat sampling to assess density of burrows and to also characterize the average size of burrows. The first sampling was conducted on April 28 and occurred at high tide while the second sampling occurred on May 11 and was at low tide. During high tide, sites 2 and 3 were mostly submerged. At each sampling, 0.25 x 0.25m quadrats were randomly located within each site and the percent cover of vegetation was recorded, along with the number of and diameter of each burrow present. A total of 10 quadrats were sampled in sites 1 and 2 and 20 in site 3. The different number of quadrats was due to differences in area of the different sampling locations. Additionally, one quadrat from each location was excavated to look for fiddler crabs within burrows. This involved excavating an area of 0.0625 m^2 to a depth of 6cm. Any crabs that were found were sexed and carapace size was measured. After identification and measurement, the specimens were released in a nearby location so as to not return to the excavation site while dig was still in process.

Results & Discussion

Results indicate that all three sites had similar coverage of vegetation (28-31%), although the dominant species present varied among sites. Saltwort (*Batis maritima)* and black mangroves (*Avicennia germinans)* were present in varying amounts at all sites surveyed. Saltwort was the dominant flora of site 1 and 2 while black mangrove was proportionally dominant in site 3 (figure 2). Glasswort (*Salicornia ambigua*) was only seen in site 1, while Saltgrass (*Distichlis spicata)* was seen at site 2 and 3.
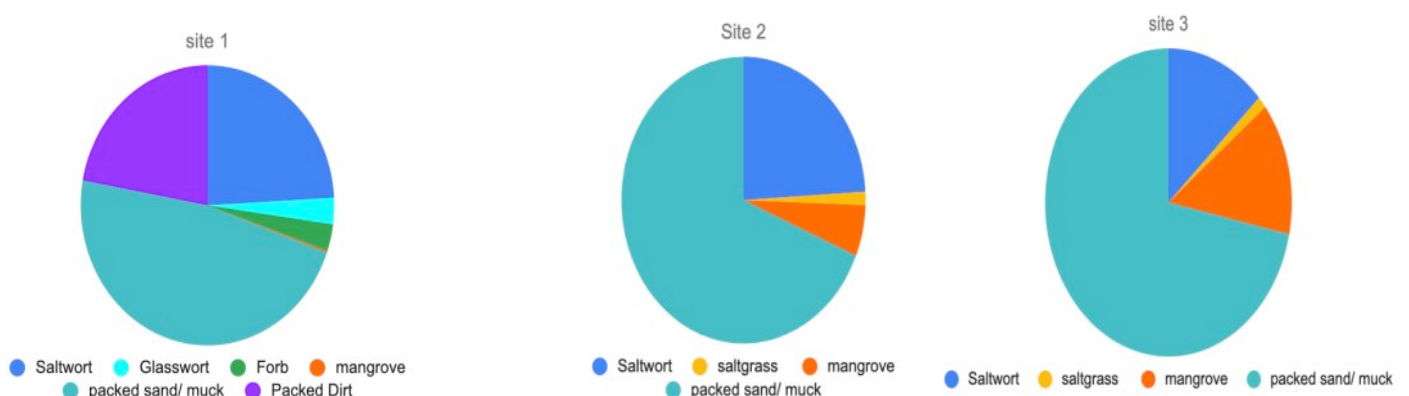

Figure 2Average cover of different vegetation and substrate types for each sampling location

Visual identification of substrate was classified as either packed sand, packed dirt, or muck (inundated with tidal waters, whether receding or incoming). Our surveys revealed that substrate was primarily muck in April and packed sand in May, primarily due to differences in tide at time of survey. Based on the soil texture analysis, site 1's substrate was identified as clay loam (38% sand, 24% silt and 38% clay including 4% of suspended organic litter in the water of the graduated cylinder). Site 2 was loam (45% sand, 33% silt and 22% clay) and site 3 a sandy clay loam (47% sand, 25% silt and 28% clay). Each site displayed a layer of sand /crushed shell, silt, and clay. In all sites, the sand /crushed shell was found in higher percentages than any of the other substrates identified. Different species of *Uca* specialize for certain particle sizes, which may affect their distribution (Crane 1975); *U. pugilator* tends to preferentially burrow in sandy soils (Aspey 1978).

Transect data revealed no correlation between the distance from sea wall and number of burrows. For every meter that was surveyed the range of burrows would vary from 0-15 in site 1 and 0-11 in site 2. This result contrasts with other studies that have found an increase in burrow density as distance from water (Mouton and Felder 1996, Reinsel and Rittschof 1995). Ecological studies suggest that *U. pugilator* tends to create burrows in the somewhat drier soils above the tidal line and forage into the more saturated low tidal areas (Reinsel and Rittschof 1995). It is possible that the lack of pattern in burrow density at our site is because the distances were not great enough to have observable tidal effects. However, more likely, the presence of the seawall reduced tidal influence in the sampling locations. It is possible that restoration of a more natural shoreline would resume a stronger effect of tidal influx on burrow behavior.
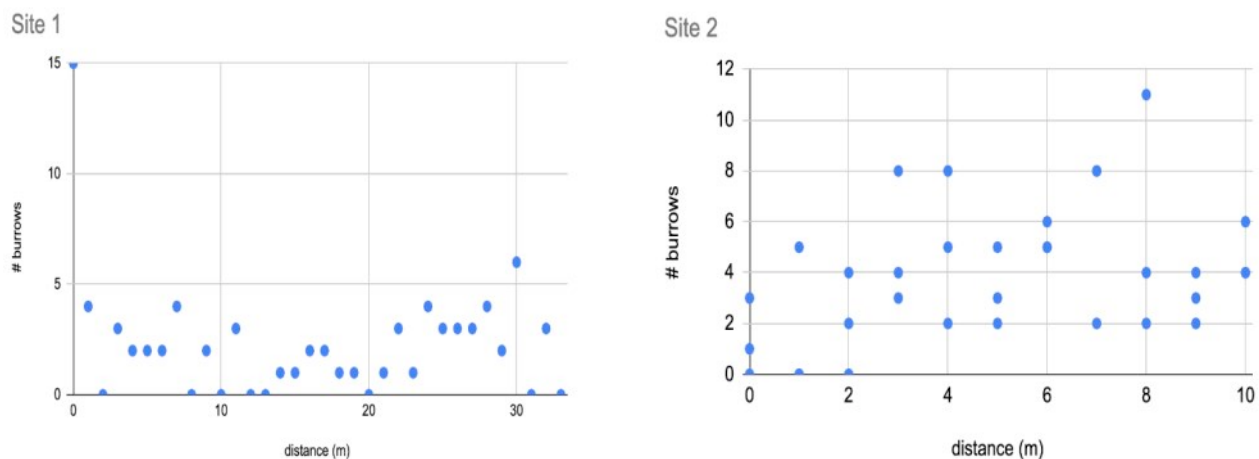

Figure 3Correlation between distance along transect 0m = closest to seawall) and number of burrows.

Burrow density was highest in site 3, with a density of 44.4 burrows m^{-2}. This was nearly double the density observed at site 1 (19.2 m^{-2}) and 1.3 times greater than site 2 (34.4m^{-2}). The higher burrow density seen in site 3 could be in part due to the presence of black mangroves and daily influx of tidal water. Chen et al. (2019) suggests that the tidal cycle is responsible for the input and output of organic matter on which fiddler crabs rely, and it is essential for larval release and settlement of juveniles as well. In our study, both sites 2 and 3 had a much greater tidal influence than did site 1 based on both the amount of visible soil saturation and substrate cover.

For many *Uca* spp., burrow density tends to increase with increasing vegetation (Mouton and Felder 1996), and we saw a weak similar pattern (figure 4). Fiddlers found in high densities are in areas of primary productivity, and the cover of vegetation becomes a refuge against predation (Carlson et al., 2013). Although our sites did not differ in the average amount of vegetative cover, they did differ in the type of vegetation present. For example, the taller vegetation found in site 2 and 3 also creates a canopy

over the substrate, reducing substrate temperatures. Fiddler crabs are exothermic, meaning outside sources regulate their body temperatures. A higher density of burrows in site 3 could also be attributed to the presence of clay in the substrate. Clay has the capacity to hold moisture longer than just sandy substrate and clay is composed of organic and /or mineral materials (Chen et al., 2019).
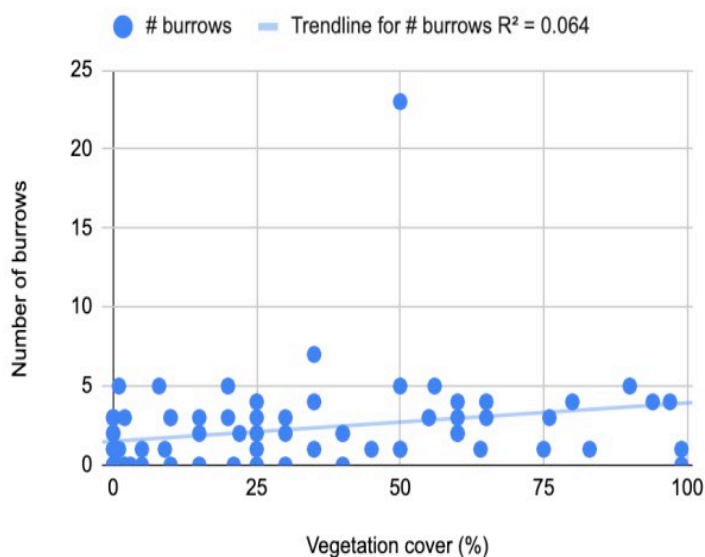

Figure 4 Correlation between number of burrows and total vegetation cover per quadrat.

Could the influence of diurnal tides and higher vegetation used for transport of organic material, protection, foraging, and temperature regulation be the correlation as to why site 3 has shown a higher density in the fiddler crab population? The fact that site 2 was more similar to site 3 in terms of burrow density, vegetation composition, substrate composition, and tidal influence suggests that these environmental factors play a role. Despite differences among sampling locations, the range of burrow densities we found are similar to other studies investigating burrow density in *Uca* species

from other locations. For example, in a survey of various *Uca* species, Montague (1980) found densities ranging from 21 to 152 burrows m^{-2}. Other studies have also found that burrow densities vary with time for *U. pugilator*, with highest densities (47m^{-2}) from January to April (Mouton and Felder 1996). Using burrow densities as a proxy for population size is a quick, non-destructive method and is therefore a frequent measure; however, it does tend to overestimate population sizes by roughly 20% (Macia et al 2001). There are numerous reasons for this such as burrows being abandoned or burrows having multiple openings to escape predators (Marcia et al 2001). To account for a 20% error in visual identification those numbers for site 1 change to 15.36 m^{-2}, site 2, 27.52m^{-2} and site 3, 35.52m^{-2}. These numbers fall within the range of other similar studies (Aspey 1975, Montague 1980, Mouton and Felder 1996) and suggest the population of *Uca pugilator* at the STEM Center is within the lower average density range. This may be due to the use of the armored shoreline (seawall) and the restriction of organic material flow in and out of the salt marsh. Another factor that may have contributed to our lower count of densities in our population could be attributed to mating individuals, as the early summer months are when fiddlers breed and begin plugging their burrows for several weeks while the females incubate their eggs (Mouton and Felder 1996).

When examining only plots where burrows were found, it was observed that average burrow width ranged from 1.4-1.8cm, with site 2 having the largest average burrow diameter, although differences were small. The proximity of site 2 as compared to site 1 and 3 may also have contributed to the larger burrow widths. Site 1 is identified as more impacted by anthropocentric activities thus it is less likely to recruit fiddlers (Carlson et al., 2013). Site 1's average diameter of burrows measured at 1.6cm. Site 3 had larger open areas of bare substrate providing less refuge to fiddlers against predation (Carlson et al., 2013) and a layer of salt crust above the substrate. Site 3's average diameter of burrows was measured at 1.4cm. Further, studies indicate that burrow size positively correlates to the age/size of crabs using the burrow (Colby and Fonseca 1984). As most crabs are territorial, as they get larger (and hence larger diameter burrows), it would be expected that there is lower burrow density (Connell

1963). When comparing the correlation, we observed this negative relationship between burrow density and burrow size per sampling quadrat (figure 5).
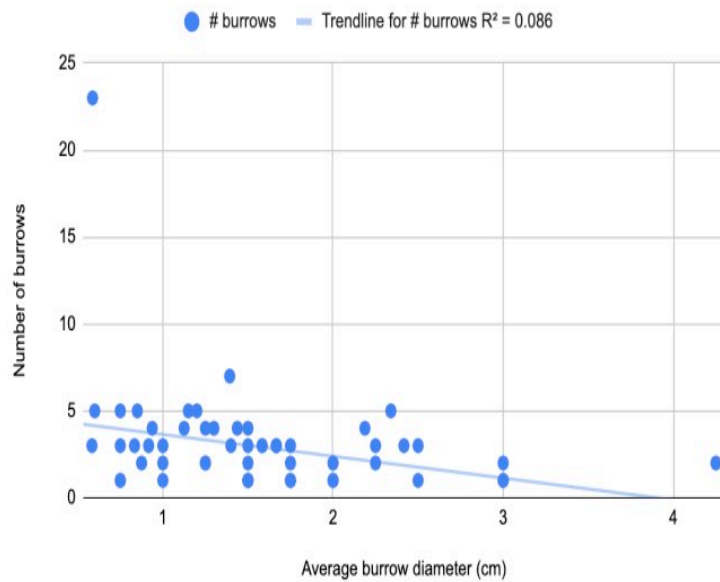

Figure 5. Correlation between burrow number and burrow diameter per sampling quadrat.

In an attempt to identify species and verify population density within select quadrats, we excavated a total of 6 plots. Fiddler crabs were only observed at site 2, during a low diurnal tide with proximity to the seawall of within ~2m. During the April sampling, the excavated quadrat had 2 burrows and a total of 2 crabs were found. Both crabs were juvenile and had a carapace width of 1 cm; one was male, and one was female. During the May sampling, five burrows were counted before excavation and a total of eight live fiddlers were captured and measured. All were identified as juveniles with carapace width ranging from 0.5 to 1.2cm. Males were distinguished by the presence of an enlarged cheliped. Seven males were recorded and one only one female was detected during the dig. This finding shows some correlation with research conducted by Carlson et al., (2013) where juveniles are commonly found in muddy habitats of higher salinity. Additionally, the observed sex bias towards males observed in our study is consistent with other demographic studies of fiddler crab species (Johnson 2003).

Conclusions

Overall, this study indicates the population of fiddler crabs at the STEM Center falls within density ranges observed in other Southeastern US populations (Aspey 1978,Mouton and Felder 1996). However, although numerous burrows were observed, there were limited sightings of the actual fiddler crabs creating the burrows. This could be due to foraging in a location away from burrows, abandoned burrows, incubating females, predation and multiple burrow entrances (Reinsel and Rittschof 1995, Macia et al 2001). Additional studies to characterize the correlation between burrows and actual crab presence are needed, but this study provides a nice baseline to determine potential effects of seawall removal on fiddler crab populations at the STEM Center. Future studies to verify population size could include mark and recapture studies or use of pitfall traps.

As restoration of the mangrove/estuary shoreline progresses, additional studies will be conducted to determine population impacts. Possible factors to be assed in regard to fiddler recruitment and habitat preference at the STEM Center include vegetation, substrate, and tidal changes after seawall removal, identification and/or modification of predators and other macroinvertebrates competitors of *Uca pugilator*. Based on the results from this study, and other similar studies, we would expect the *Uca pugilator* population at the STEM Center to ultimately see an increase in recruitment after completion of the living shoreline. It is possible that the population may see a temporary decrease or migration due to the disturbance associated with seawall extraction, but populations are expected to rebound and integrate into a wider range of nearshore refuge. This prediction is based on a similar restoration project in Puget Sound's where shoreline armoring was removed and biotic and abiotic conditions were left to

naturally self-repair, resulting in positive recovery by macroinvertebrates (Lee et al, 2018). Although some biotic recoveries may not reach their full potential until 3 to 5 years after restoration (Lee et al., 2018), it is our hope that restoration of this estuarine ecosystem will continue to create opportunities for increases in population density for *Uca pugilator* and increased biodiversity of estuary-dependent species.

References

Aspey, W. P. (1978). Fiddler crab behavioral ecology: burrow density in *Uca pugnax* (Smith) and *Uca pugilato*r (Bosc)(Decapoda Brachyura). *Crustaceana*, 235-244.

Bozek, C. M., & Burdick, D. M. (2005). Impacts of Seawalls on Saltmarsh Plant Communities in the Great Bay Estuary, New Hampshire USA. *Wetlands Ecology and Management*, *13*(5), 553–568. https://doi.org/10.1007/s11273-004-5543-z

Carlson, M. D., Regassa, L. B., & George, S. B. (2013). Density, Shell Use and Species Composition of Juvenile Fiddler Crabs (*Uca* spp.) at Low and High Anthropogenic Impact Salt Marsh Sites. *Estuaries and Coasts*, *37*(3), 602–609. https://doi.org/10.1007/s12237-013-9700-6

Crane, J. (1975). Fiddler crabs of the world: Ocypodidae: genus *Uca* (Vol. 1276). Princeton University Press.

Chen, T.-Y., Hwang, G.-W., Mayfield, A. B., Chen, C.-P., & Lin, H.-J. (2019). The development of habitat suitability models for fiddler crabs residing in subtropical tidal flats. *Ocean & Coastal Management*, *182*, 104931. https://doi.org/10.1016/j.ocecoaman.2019.104931

Colby, D. R. & Fonseca M.S. (1984). Population dynamics, spatial dispersion, and somatic growth of the sand fiddler crab *Uca pugilator*. *Marine Ecology-Progress Series*, *16*, 269-279.

Connell, J. H. (1963). Territorial behavior and dispersion in some marine invertebrates. *Researches on Population Ecology*, *5*(2), 87-101.

Duarte, B., Carreiras, J., & Caçador, I. (2021). Climate Change Impacts on Salt Marsh Blue Carbon, Nitrogen and Phosphorous Stocks and Ecosystem Services. *Applied Sciences*, *11*(4), 1969. https://doi.org/10.3390/app11041969

Dugan, J. E., Hubbard, D. M., Rodil, I. F., Revell, D. L., & Schroeter, S. (2008). Ecological effects of coastal armoring on sandy beaches. *Marine Ecology*, *29*(s1), 160–170. https://doi.org/10.1111/j.1439-0485.2008.00231.x

Fiddler Crabs Of the Northern Gulf Coast. Fiddler Crabs of the Northern Gulf Coast, Richard Heard, Gulf Coast Research Laboratory. (n.d.). https://gcrl.usm.edu/public/gulf.creatures/fiddler.crabs/fiddler.crabs.php.

Giblock, S. (n.d.). (rep.). Fiddler crabs *(Uca pugilator)* as bioindicators of environmental health in coastal estuarine communities of Beaufort, South Carolina (pp. 5–7).

Johnson, P. (2003). Biased sex ratios in fiddler crabs (Brachyura, Ocypodidae): a review and evaluation of the influence of sampling method, size class, and sex-specific mortality. *Crustaceana*, *76*(5), 559-580.

Lee, T. S., Toft, J. D., Cordell, J. R., Dethier, M. N., Adams, J. W., & Kelly, R. P. (2018). Quantifying the effectiveness of shoreline armoring removal on coastal biota of Puget Sound. *PeerJ*, *6*. https://doi.org/10.7717/peerj.4275

Montague, C. L., & CL, M. (1980). A natural history of temperate western Atlantic fiddler crab (Genus *Uca*) with reference to their impact on the salt marsh.

Mouton, E. C., & Felder, D. L. (1996). Burrow distributions and population estimates for the fiddler crabs *Uca spinicarpa* and *Uca longisignalis* in a Gulf of Mexico salt marsh. *Estuaries*, *19*(1), 51-61.

Penha-Lopes, Gil, et al. (2009). Are Fiddler Crabs Potentially Useful Ecosystem Engineers in Mangrove Wastewater Wetlands? *Marine Pollution Bulletin*,58(11), 1694–1703., doi:10.1016/j.marpolbul.2009.06.015.

Prosser, D. J., Jordan, T. E., Nagel, J. L., Seitz, R. D., Weller, D. E., & Whigham, D. F.   (2017). Impacts of Coastal Land Use and Shoreline Armoring on Estuarine Ecosystems: an Introduction to a Special Issue. *Estuaries and Coasts*, *41*(S1), 2–18. https://doi.org/10.1007/s12237-017-0331-1

Reinsel, K. A., & Rittschof, D. (1995). Environmental regulation of foraging in the sand fiddler crab Uca pugilator (Bosc 1802). *Journal of Experimental Marine Biology and Ecology*, *187*(2), 269-287.

Smith, N. F., Wilcox, C., & Lessmann, J. M. (2009). Fiddler crab burrowing affects growth and production of the white mangrove (*Laguncularia racemosa*) in a restored Florida coastal marsh. *Marine Biology*, *156*(11), 2255–2266. https://doi.org/10.1007/s00227-009-1253-7

Techniques and Procedures Utilized

Literature research skills:

- Reading and summarizing scientific studies.
- Finding and recreating established sampling protocols so that baseline data can be collected to determine how changes in the seawall/estuary environment impacts fiddler crab populations.

Field sampling techniques learned:

- Quadrat sampling to determine density and abundance of fiddler crab burrows as well as cover of different plant and substrate types.
- Transect sampling to determine relationship between burrow abundance and distance from shoreline.
- Soil sampling to determine soil texture type
- Fiddler crab collection, measuring (carapace size) and gender identification
- Monitoring of organisms with field cameras

Data analysis techniques learned:

- Collection of data in a notebook and cataloging it in an online database.
- Interpreting the data by creating graphs to show the different patterns and trends.
- Writing up the major results of the study.

St. Petersburg College Student Research Final Report

Name: Alexander Teleszky

Professor: Erin Goergen, PhD

Date: 1/14/2022

The ability of plants to act as a natural air filter to remove VOCs

Outline of Responsibilities

- Attending a weekly research meeting and/or participating in ecological monitoring at the different SPC campuses.
- Performing primary literature research on the role of various plants in air purification ability.
- Learning to use/program the databots for environmental sampling.
- Meeting with Dr. Goergen either online or in person on a weekly basis for status updates and determination of the following week's goals
- Completing compiled report of the research/activities done each week (e.g. results observed, assumptions, and/or conclusions, learning achieved)

Purpose of Project

Environmental air pollution has long been recognized as a factor affecting human health (Lave and Seskin 1970). However, air quality indoors can also influence human health, especially in developed countries where individuals spend nearly 90% of their time indoors (Sarigiannis et al. 2011). It has been proposed that plants have the ability to act as environmental filters to reduce the effects of indoor pollutants. Along with scrubbing CO_2 from the air, plants have the potential to remove other pollutants such as volatile organic carbon (VOCs; Yang et al. 2009, Cruz et al. 2014, Deng and Deng 2018, but see Cummings and Waring 2020) that can be emitted in large quantities from synthetic materials commonly found in homes.

 The goal of my experiment was to determine if common house plants were able to effectively remove pollutants and if VOC removal differed among plants. To examine this question, we used controlled environmental chambers (2 L) exposed to 20 mL vinegar (VOC to be removed). A positive control of a known scrubbing chemical (baking soda) was used as a comparison to determine if common houseplants (pothos and spider plant) were more, less, or equally as effective in removing VOCs. It was hypothesized that household plants would be more effective than baking soda at removing VOCs from the environmental chamber. Further it was predicted

that the spider plant would be able to remove the most from its environment due to its greater leaf surface area and more extensive root system.

Weekly Reports and Data

- **Week 1 (October 27):** I met with Dr. Goergen to discuss project possibilities.

- **Week 2 (November 3rd):** After discussing possibilities we narrowed it down to measuring VOCs with the help of databot. During this time, I reviewed literature and programs for the databot while researching types of household plants to be used for testing.

https://nymag.com/strategist/2019/12/jade-pothos-cyber-monday-sale-the-sill.html

https://www.fellys.com/plant/hanging-basket-spider-plant/prod6500314

Figure 1. Pothos (*Epipremnum aureum,* left) and spider plant (Chlorophytum comosum ,right) were the experimental subjects.

- **Week 3 (November 10th):** I was given my own databot for the project and selected which houseplants would be used for the experiment. Pothos and Spider plants had worked out to be the best option due to their availability and growth rate (Figure 1). Dr. Goergen and I then came up with a system that would work best for testing, finding that 2 Liter experimental chambers would be a perfect closed system. After we figured out how to work the databot physically, we identified some test runs and went over how to separate the data.

- **Week 4 (November 17th):** After connecting the databot, we came up with a process to test our question. Before trials were begun, I had to figure out how long to leave the vinegar in the closed system before getting to the right levels and determine the duration of the databot's battery and how often it required a charge. After a bit of trial and error,

the biggest issue during the trial process was not having enough containers. This affected my ability to be able to efficiently measure for pollutant concentration ppb (parts per billion) buildup and meant I would have to clean the containers/flasks for leftover residue that would skew data. This increased the trial run time and wasted materials. Once most of the issues were dealt with, I began running control tests for the databot's ability to measure VOCs in vinegar as well as measuring the power of 10mL baking soda as a control scrubber.

Figure 2. Supplies used for the experimental trials.

- **Week 5 (November 24th)**:
  This week, I started recording data for initial and final VOCs using one from each variable to understand how to get better data. I initially started recording measurements when the VOC level was between 15,000 and 10,000 ppb. Noticing the difficulty of retaining those levels, I reduced starting concentrations to 7,000-9,000 ppb before opening the container and replacing the vinegar with an air scrubber and letting it run for ten minutes (Figure 2). After the initial trials were conducted, the following protocol was created.

  For this experiment, three treatments were used: (1) a negative control of vinegar alone, (2) a positive control of vinegar and baking soda, and (3) an experimental treatment of vinegar and a plant (either pothos or spider plant). For the negative control, I placed 20 ml of vinegar in the experimental chamber and sealed it. I waited until the VOC concentration reached 7000-9000 ppb and then quickly removed the vinegar and recapped the chamber. The levels of VOC were recorded at the start of the trial and again after 10 minutes. The negative control was meant to measure the natural breakdown/decrease of VOC in the absence of any scrubbers. For the positive control, the procedure started the same as the negative control, however, after the vinegar was removed, a beaker with 10 ml of baking soda was placed in the chamber before once

again sealing it. As with the negative control, VOC concentration was recorded at the start and after 10 minutes. Finally, for the experimental treatment, instead of placing baking soda in the environmental chamber, either a pothos or spider plant was placed in the chamber. VOC concentrations were recorded at the start and again after 10 minutes. Once data was recorded, the percent removal of VOCs was recorded by subtracting the final concentration from the initial concentration and then dividing by the initial concentration.

Figure 3. Experimental trial with pothos. Inside the chamber is the plant and the databot to record VOC concentrations.

- **Week 6 (December 1)**: At the start of this week, I started recording sets of data for each of the variables. Five runs for each treatment were completed to get an average of VOCs removed from vinegar alone, and vinegar replaced with baking soda as a positive control. I found that there is no real change in VOC concentrations when there is not a scrubber cleaning the system. For our positive control, baking soda was able to remove 3,851 ppb on average, or roughly 52%.

- **Week 7 (December 8th)**: During this week, I started measuring the abilities of spider and pothos plants to remove pollutants from the air (Figure 3). Using five plants from each species in order to account for variability, I let the vinegar sit in a closed system until it reached about 8,000ppb before removing the vinegar and replacing it with one plant and seeing how much it removed in ten minutes. On average, spider plants filtered out 4,616 ppb (53%) while pothos plants were able to filter out 4,301ppb (48%).

- **Week 8 (December 15th, plus some time in January)**: During this time I compiled data, completed writing my final report, and figured out the next step in researching the ability of plants to help the environment.

Research Findings

The results of this experiment indicate that plants are able to remove VOCs from the air relative to the negative control (Figure 4). However, contrary to our expectations, the plants did not perform exceedingly better than the positive control of baking soda. While both plants were effectively able to remove VOCs from the container almost as well as baking soda, the spider plant ultimately performed better than pothos. This could be due to its morphology and size as the test subjects had greater leaf surface area and a more extensive root system compared to pothos test subjects. It could also be a factor of the type of VOC used. In a similar study, Gong et al. (2019) found that pothos had higher removal of the VOC benzene over a 24hr. trial period. The results of the experiment for plants being able to scrub out VOCs was confirmed, and removal rates were similar or higher than shown in other studies (Gong et al. 2019).

Confirming the ability of small houseplants to remove VOCs allows us to study them further and in larger scale environments to understand how well they can improve human habitats and quality of life through air filtering and psychological improvements (Deng and Deng 2018). Overall, our data stayed consistent with other studies on air quality and plants' ability to improve them.
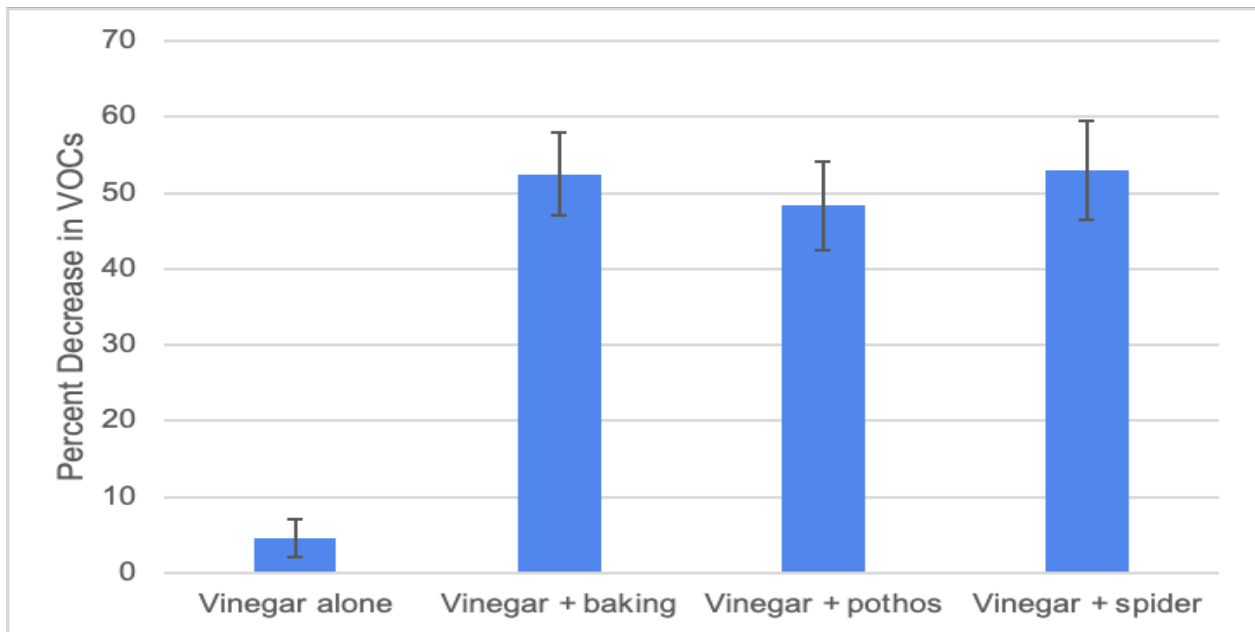

Figure 4. Percent of VOCs removed from the environmental chamber over 10 minutes when no 'filter' was present (negative control), or when one of 3 'filters' was present: baking soda (positive control), pothos or spider plant (experimental treatments).

Future studies on the ability of plants to be effective air filters could examine if maternal effects can improve scrubbing abilities in offspring from exposed plants. In a sense, if the scrubbing power of a certain chemical can be 'taught' and passed onto future plant clones, it could slowly improve how well it can filter with each new generation. It is also important to determine any impacts on plant health by those that are able to filter VOCs. One potential issue with exposing plants is them losing some plasticity and color in the leaves. Is this permanent or after a few cycles of uncontaminated growth will they be able to fully recover? The ultimate goal would be to determine future applications of plant filtering and if it could be used to help ecosystems fighting climate change and natural disasters by scrubbing out harmful pollutants that affect the planet.

Literature Cited

Cruz, M. D., Müller, R., Svensmark, B., Pedersen, J. S., & Christensen, J. H. (2014). Assessment of volatile organic compound removal by indoor plants—a novel experimental setup. *Environmental Science and Pollution Research*, *21*(13), 7838-7846.

Cummings, B. E., & Waring, M. S. (2020). Potted plants do not improve indoor air quality: a review and analysis of reported VOC removal efficiencies. *Journal of exposure science & environmental epidemiology*, *30*(2), 253-261.

Deng, L., & Deng, Q. (2018). The basic roles of indoor plants in human health and comfort. *Environmental Science and Pollution Research*, *25*(36), 36087-36101.

Gong, Y., Zhou, T., Wang, P., Lin, Y., Zheng, R., Zhao, Y., & Xu, B. (2019). Fundamentals of ornamental plants in removing benzene in indoor air. *Atmosphere*, *10*(4), 221.

Lave, L. B., & Seskin, E. P. (1970). Air pollution and human health: the quantitative effect, with an estimate of the dollar benefit of pollution abatement, is considered. *Science*, *169*(3947), 723-733.

Sarigiannis, D. A., Karakitsios, S. P., Gotti, A., Liakos, I. L., & Katsoyiannis, A. (2011). Exposure to major volatile organic compounds and carbonyls in European indoor environments and associated health risk. Environment International, 37, 743–765.

Yang, D. S., Pennisi, S. V., Son, K. C., & Kays, S. J. (2009). Screening indoor plants for volatile organic pollutant removal efficiency. HortScience, 44(5), 1377-1381.

Techniques and Procedures Utilized

Literature research skills:

- Reading and summarizing scientific studies.

- Using background reading to formulate hypotheses to be examined.

Experimental sampling techniques learned:

- I gained experience on how to set up a replicated experiment with a positive and negative control using environmental chambers.
- I learned how to use the databots to record various abiotic data, focusing specifically on levels of VOCs

Data analysis techniques learned:

- Collection of data in a notebook and cataloging it in an online database.
- Interpreting the data by creating graphs to show the different patterns and trends.
- Writing up the major results of the study and comparing it to existing literature.

St. Petersburg College Student Research Final Report

Name: Olivia Rehberger   **Professor:** Erin Goergen, PhD

Date: 11/5/2021

Comparison of water quality in natural and man-made ponds on SPC Campus locations

Outline of Responsibilities

- · Attending a weekly research meeting and/or participating in ecological monitoring at the different SPC campuses.
- · Performing primary literature research on methods of water quality sampling in natural and artificial lakes and ponds.
- · Meeting with Dr. Goergen either online or in person on a weekly basis for status updates and determination of the following week's goals.
- · Completing a compiled report of the research/activities done each week (e.g., results observed, assumptions, and/or conclusions, learning achieved).

Purpose of Project

Water quality in lakes and ponds is extremely important to monitor for both humans and wildlife, and as such, the EPA sets stringent standards for drinking water. The Safe Drinking Water Act (SDWA) gives individual states the opportunity to set and enforce their own drinking water standards if the standards are at a minimum as stringent as EPA's national standards. They regulate over 90 contaminants commonly found in drinking water (Drinking 2021). In addition to naturally formed lakes and ponds, man-made retention ponds can also be an important water source for wildlife. For retention pond water quality, the EPA assists communities in developing integrated stormwater management systems which includes maintenance of existing wet ponds, exploration of opportunities, and implementation of micro-treatment practices and design principles (Stormwater 2021), but quality of the water is not as strictly regulated due to their role of overflow and flood prevention.

Retention ponds utilize a permanent pool of water as the primary mechanism to treat stormwater. The pool allows settling of sediments and removal of soluble pollutants. Ponds have a moderate to high capacity for removing most urban pollutants, depending on how large the volume is in relation to the runoff from the surrounding watershed (Weld 1997). Humans aren't drinking the water from these man-made ponds, but this is where many other organisms live and hydrate. The ecological services that these bodies of water provide include habitat for

species, increased water and air quality, flood prevention, water conservation, and aesthetic appeal (Moore et al. 2012, Retention 2015).

Urban ponds, both natural and man-made, are particularly important because they serve as a refuge in highly developed environments (Hassal 2014) and studies suggest that they can support very diverse invertebrate communities (Le Viol et al. 2009). Although urban freshwater ecosystems often support large amounts of biodiversity, they frequently are disproportionately impacted by development, runoff, pollution, and invasive species (Dudgeon et al. 2006). How is the quality of water affecting the creatures that use these ponds?

To address this question, I compared data from five ponds on 4 of the St. Petersburg College campuses, 4 retention ponds and one natural pond. I hypothesized that the bodies of water with the largest surface area will have higher water quality, regardless of whether they are natural or man-made. Further, I predicted that the natural pond would have better quality than retention ponds due to their utility. Retention ponds are used to catch runoff water. As it rains, the water that doesn't permeate into the ground drains into these basins. This often contains runoff that comes from roadways or other concrete surfaces. Higher levels of nitrates and chemicals such as pesticides are expected to be present. Natural ponds have developed over time rather than being constructed like retention ponds, and therefore usually contain more vegetation that acts as natural filtration. Additionally, I observed the wildlife roaming around these areas as an indicator of ecosystem health.

Weekly Reports and Data

- **Week 1 (August 31st):** I met with Dr. Goergen to discuss project possibilities. We decided on monitoring the water quality of surface water on each SPC campus. Dr. G sent me examples of final reports to view.

- **Week 2 (September 7th):** Meeting with Dr. Goergen to make a schedule for monitoring. I was provided with background information on the methodology of water sampling. We collected the materials needed to do sampling. We also ordered a pesticide test kit for each location. During this week I also created hypotheses after doing research and discussing what would be expected.

- **Week 3 (September 14th):** First week of sampling. I sketched a map for each sampling location. Dr. Goergen and I collected samples at the southwest side of the Clearwater campus retention pond at 2:44pm. We tested the water for temperature, turbidity, dissolved oxygen (DO), pH, nitrates, phosphates, coliform bacteria and biological oxygen demand (BOD). The weather conditions were mostly sunny, partly cloudy at a temperature of 31°C. We noticed there were many dragonflies in the area.

Table 1. Results of water quality sampling at the Clearwater Campus retention pond.

Turbidity (JTU)	DO ppm	DO (% saturation)	BOD (ppm)	Coliform (P/A)	P (ppm)	N (ppm)	Atrazine (P/A)	Simazine (P/A)
30	2	26.5	1	P	2	5	A	A

Figure 1. Sampling at the Clearwater Campus retention pond (left) and dragonflies observed (right).

- **Week 4 (September 21st):** Second week of sampling. This week's sampling was done at SPC Gibbs campus. I collected from the south side of the retention pond. I found the water to be 2 degrees cooler than water at Clearwater campus at 32°C. The weather conditions were mostly sunny and 31°C. The pond acted as a great environment for tiny fish, ducks, seagulls, and white ibis.

Table 2. Results of water quality sampling at the St. Petersburg Gibbs Campus retention pond.

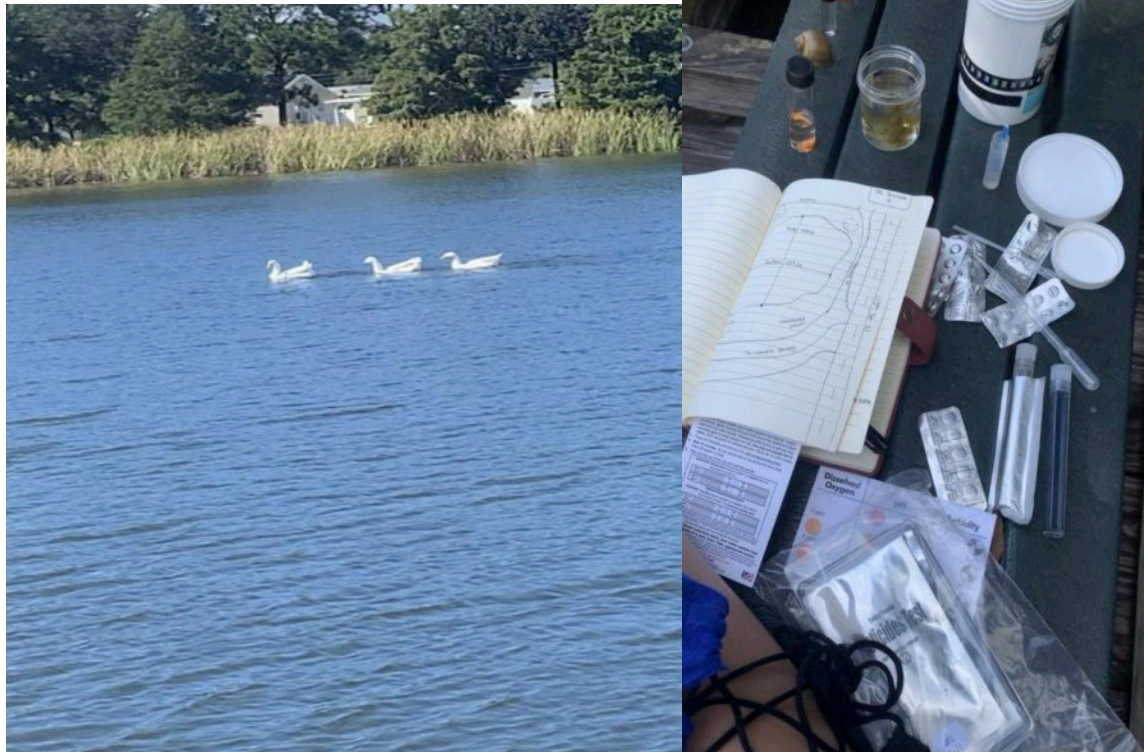| Turbidity (JTU)	DO ppm	DO (% saturation)	BOD (ppm)	Coliform (P/A)	P (ppm)	N (ppm)	Atrazine (P/A)	Simazine (P/A)
60	1.5	17.6	1.5	P	2	3	A	A

Figure 2. Ducks observed while sampling St. Petersburg Gibbs retention pond(left). Example of the testing procedure(right).

- **Week 5 (September 28th)**: Third week of sampling. This week's sampling was taken at the Seminole campus. The first location was the retention pond. I sampled the west side of the body of water. I noticed a lot of wildlife here. Some examples include blue and white herons, parakeets, common moorhens, even a yellow-bellied freshwater turtle. Testing time was 3:38pm. The air temp was 28.9°C while water temp was 32°C.

Table 3. Results of water quality sampling at the Clearwater Campus retention pond.

Turbidity (JTU)	DO ppm	DO (% saturation)	BOD (ppm)	Coliform (P/A)	P (ppm)	N (ppm)	Atrazine (P/A)	Simazine (P/A)
80	3	39.7	2	P	2	2	A	A

Figure 3. Part of the retention pond at Seminole Campus (left). You can see a small creature that was captured in the water sample at this sight (right).

- The second location I tested at Seminole campus was a natural pond located in their nature preserve. I took the sample from a southeast location. I saw more wildlife in this area like a brown bunny, little blue herons, and the sound of bullfrogs. It was 4:30 pm. The air temperature was slightly warmer at 30°C which was the same as the water temperature.

Table 4. Results of water quality sampling at the Clearwater Campus retention pond.

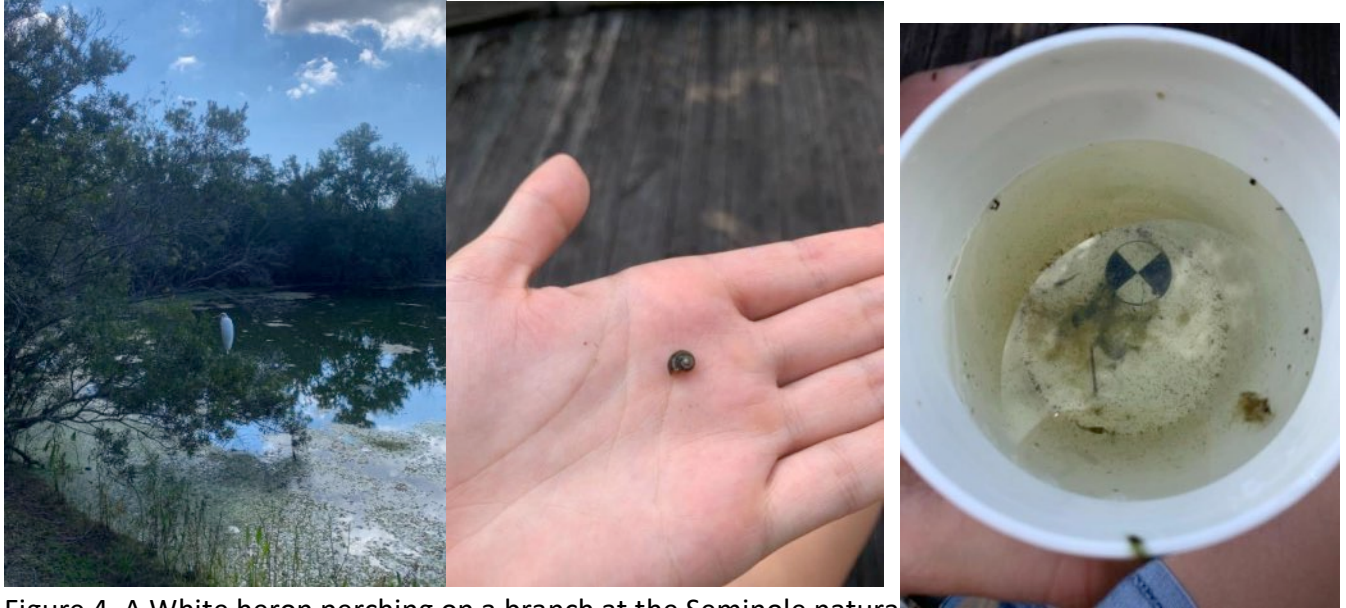| Turbidity (JTU)	DO ppm	DO (% saturation)	BOD (ppm)	Coliform (P/A)	P (ppm)	N (ppm)	Atrazine (P/A)	Simazine (P/A)
20	3	39.7	2	P	4	2	A	A

Figure 4. A White heron perching on a branch at the Seminole natural pond sampling site (left). A small freshwater snail collected in sample (middle). If you look closely, you can see a tadpole that was also collected in the sample (right).

- **Week 6 (October 5th)**: Fourth week of sampling. Tarpon Springs was the final place to sample. I took the sample at 3:19 from the southwest side of the retention pond. The air temperature was 31°C and the water temperature was 32°C. Some wildlife I saw here included dragonflies, small blue heron, a white heron, and small fish. There was a lot more visible trash here than any other location.

Table 5. Results of water quality sampling at the Clearwater Campus retention pond.

Turbidity (JTU)	DO ppm	DO (% saturation)	BOD (ppm)	Coliform (P/A)	P (ppm)	N (ppm)	Atrazine (P/A)	Simazine (P/A)
20	1.5	17.6	2	P	1.5	3	A	A

Figure 5. Sampling for dissolved oxygen at Tarpon Springs Campus retention pond.

- **Week 7 (October 12)**: I worked with Dr. G to interpret the data collected. We created graphs to find trends and patterns. I also started drafting my final report. The size of the different ponds was estimated by using google maps and measuring the length and width of the ponds.

- **Week 8 (October 19)**: During this week I continued working on my final report.

Research Findings

Results of this experiment indicate that, for the ponds sampled, size did not directly correlate with water quality, contrary to my prediction. Further, results suggest that that man-made retention ponds and natural bodies of water act in similar ways and have similar quality. Although we only had one natural pond to examine as a comparison, we did observe some interesting patterns.

Pond size

The ponds varied in size with the smallest being the retention pond on the Clearwater campus and the largest the man-made retention ponds on Tarpon Springs campus and Gibbs campus (Table 6). There were no observed correlations between pond size and the variables measured, indicating that for this study, larger ponds did not differ in quality from smaller ponds.

Table 6. Estimated size of the different surveyed ponds on each campus.

Location	Lake condition	Size
Clearwater campus	Man-made	221.6 x136ft
Gibbs Campus	Man-made	633.7x451ft
Seminole Campus 1	Man-made	283x248ft
Seminole Campus 2	Natural	464x336ft
Tarpon Springs	Man-made	1082x283ft

Chemical attributes

The level of nitrates was within the range of tolerance as designated by the EPA (below 10ppm for N, WQSR 2018), but amounts of P were higher than what would be expected for Florida waters (0.001ppm P, WQSR 2018). Further, we observed some differences both among sites and between man-made and natural ponds. In general, man-made ponds had more N and less P than the natural pond (Figure 6). The high amounts of N were driven mainly by the Clearwater sampling site, which had nearly double that of any other site. These higher levels could be caused by runoff of fertilizers or pesticides used to maintain the surrounding lawn or runoff from the nearby roadway (Old Coachman Road and Drew Street). High amounts of nitrogen can contribute to the excess growth of aquatic plants and algae further depleting the dissolved oxygen levels (Nitrogen).
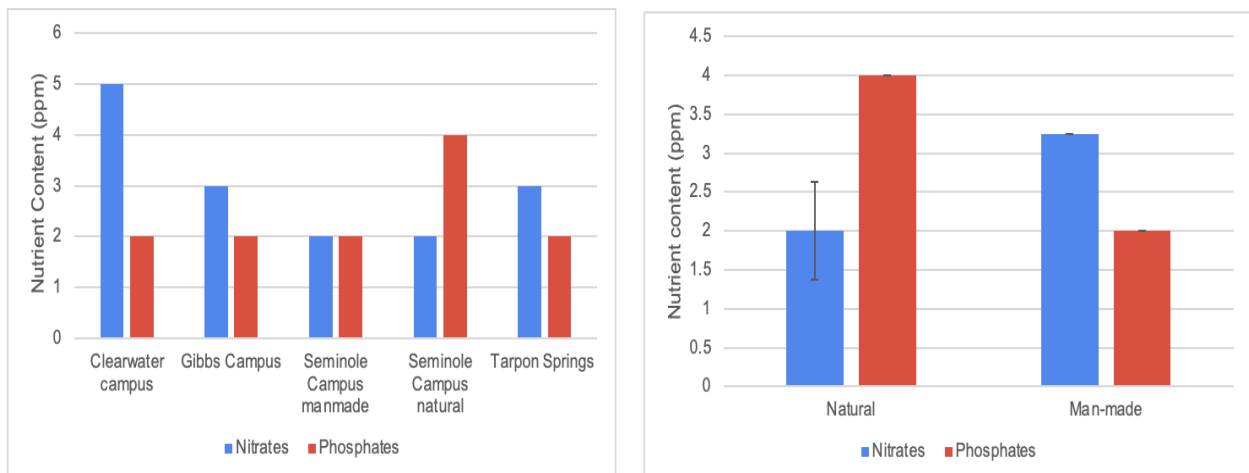

Figure 6. Nitrate and phosphorus content (ppm) in all sites individually (left) and averaged in man-made and natural sites (right).

All the ponds had a pH that ranged between 6.5 and 8, with the natural pond having the lowest pH of all the sites sampled (Figure 7). These levels also fall within the expected ranges for Florida waters, which generally have a pH between 6 and 8.5 (WQSR 2018). These findings are also consistent with a study by Perron and Pick (2020) that found more acidic conditions in natural vs stormwater retention ponds. Turbidity of pond water varied from 20 to 80 JTU, with the natural pond, along with the man-made pond on Tarpon Campus having the lowest levels of turbidity. Moderate levels of turbidity suggest the ponds are mesotrophic, supporting moderate zoo and phytoplankton. We would expect high quality bodies of water to have less than 30 JTU (WQSR 2018), indicating that the retention pond on Gibbs campus and the man-made pond at Seminole campus have more turbid water than ideal. The higher amounts of turbidity suggest that either the ponds are more eutrophic, with high levels of plankton, or greater disturbance of the water, resulting in sediments in the water column. This high turbidity can prevent light from reaching the phytoplankton in the ponds and reduce photosynthetic activity (Teng et al 2007).
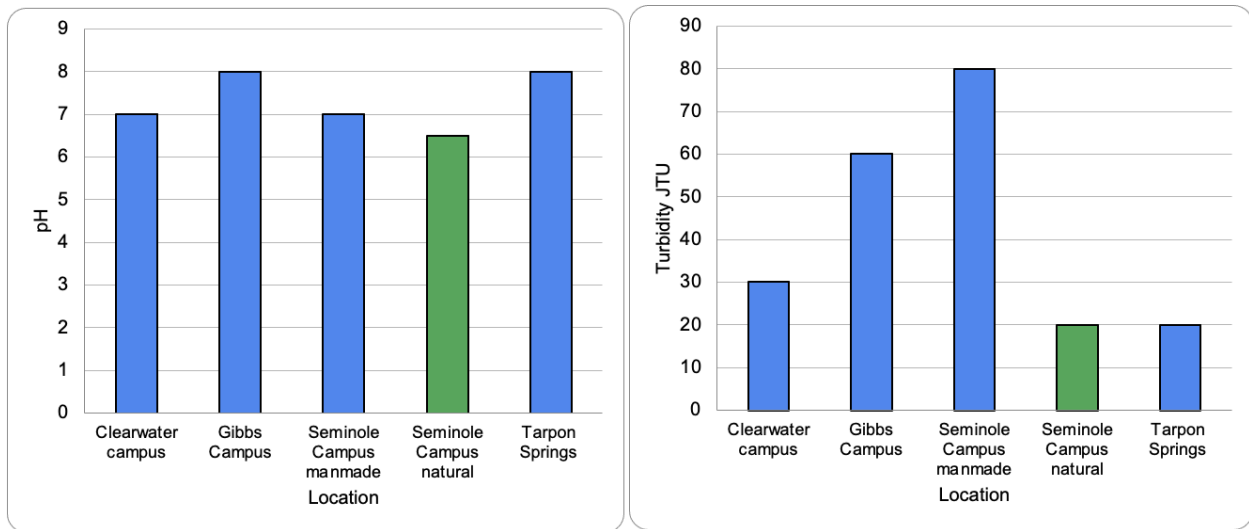

Figure 7. pH (left) and turbidity (right) values of the different ponds sampled. Green bar indicates natural pond vs blue, man-made ponds.

Lastly, each location tested negative for pesticide levels exceeding the EPA regulated amount. The pesticides we tested for were atrazine and simazine. I was surprised by the results of this due to retention ponds collecting pollution and runoff from grass or roadways. This is contrary to my predictions and suggests that it is not something that would have negative effects on wildlife using the pond.

Biological Attributes

I found that the natural pond had higher average levels of dissolved oxygen than the man-made ponds (Figure 7). This is likely due to more vegetation living in the water and lower temperature of water due to greater tree cover surrounding the natural pond. Both pond types sampled had

lower than 50% dissolved oxygen; however, the biological oxygen demand was less than the amount of dissolved oxygen available suggesting the ponds can support aerobic organisms.

I observed the greatest diversity and abundance of wildlife at the two Seminole locations. I saw many species of birds such as herons, parakeets, and moorhens. I also noticed turtles, bunnies, small fish, and tadpoles in the water unlike the other locations. This is likely due to the greater amount of natural vegetation around the campus that provides additional habitat. In contrast, the other campuses had lower diversity of organisms observed. For example, the retention pond on Clearwater campus only had insects like dragonflies. Similarly, the Gibbs campus supported only birds such as seagulls and ducks.
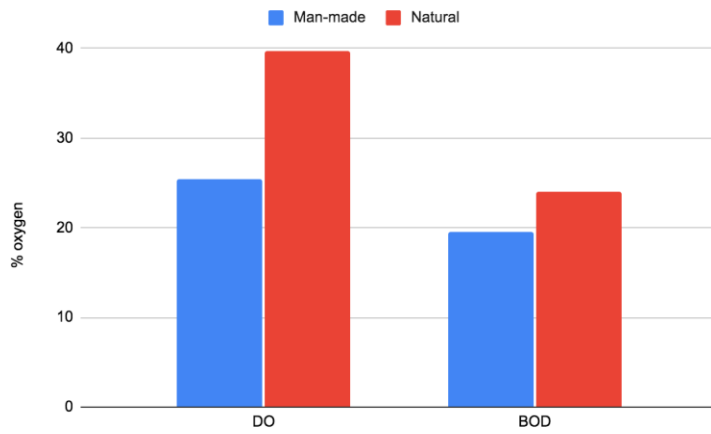

Figure 7. Oxygen vs. Manmade and Natural ponds

Overall, this data suggests that both the natural and man-made ponds on the SPC campuses have relatively good water quality that would enable them to act as an effective habitat. The fact that these ponds are in fairly good condition suggests that they have the potential to provide a much-needed resource in these urban areas.

Literature Cited

Drinking Water Regulations. EPA. 2021 Oct 4 [accessed 2021 Oct 26]. https://www.epa.gov/dwreginfo/drinking-water-regulations

Dudgeon, D., Arthington, A.H., Gessner, M.O., Kawabata, Z.I., Knowler, D.J., Lévêque, C., Naiman, R.J., Prieur-Richard, A.H., Soto, D., Stiassny, M.L. and Sullivan, C.A., (2006). Freshwater biodiversity: importance, threats, status and conservation challenges. *Biological reviews*, *81*(2), pp.163-182.

Hassall, C (2014). The ecology and biodiversity of urban ponds. Wiley Interdisciplinary Reviews: Water, 1 (2). pp. 187-206.

Le Viol, I., Mocq, J., Julliard, R. and Kerbiriou, C., (2009). The contribution of motorway stormwater retention ponds to the biodiversity of aquatic macroinvertebrates. *Biological Conservation*, *142*(12), pp.3163-3171.

Moore, T. L. C. and Hunt, W. F. (2012). Ecosystem service provision by stormwater wetlands and ponds – a means for evaluation?, Water research, 46(20), pp. 6811–23

"Nitrogen and Water." *USGS.* [accessed 2 Nov. 2021] usgs.gov/special-topic/water-science-school/science/nitrogen-and-water?qt-science_center_objects=0#qt-science_center_objects.

Perron, M. A. C., & Pick, F. R. (2020). Water quality effects on dragonfly and damselfly nymph communities: A comparison of urban and natural ponds. *Environmental Pollution*, *263*, 114472.

"Retention Ponds." *Natural Water Retention Measures.* [accessed 9 Jun. 2015.]

"Stormwater Maintenance." National Pollutant DIscharge Elimination System. *U.S EPA.* 23 Sept. 2021.

Teng, W., Guoxiang, W., & Qiang, L. (2007). Effects of water turbidity on the photosynthetic characteristics of Myriophyllum spicatum L. *Asian Journal of Plant Sciences*, *6*(5), 773-780.

Weld, Coxe, Struhs, and O'Donnell. (1997) "Stormwater Management: Stormwater Technical Handbook" Vol. 2. *U.S EPA*. p. 3B-1

Water Quality Standard Regulations: Florida (WQSR) 2018. https://www.epa.gov/wqs-tech/water-quality-standards-regulations-florida

Techniques and Procedures Utilized

Literature research skills:

- Reading and summarizing scientific studies.
- Using background reading to formulate hypotheses to be examined.

Field sampling techniques learned:

- I collected water samples with a plankton tow.
- I tested for various parameters using colorimetric analysis.
- To test for turbidity, I collected the water sample and compared the secchi disk sticker at the bottom of the jar to the color comparison chart.
- To test for dissolved oxygen, I filled a small test vial with water. I dropped two dissolved oxygen test tabs into the vial. Then mix until tabs dissolved and wait 5 minutes for color to develop. Compare vial to color comparison chart.
- For BOD I filled a small glass vial with water and placed it in a dark place for 5 days. Then took it out, added two dissolved oxygen tabs, mixed and waited 5 minutes before comparing.

- I calculated % saturation by using a chart and knowing the dissolved oxygen and water temperature.
- To find pH I filled a plastic test tube to 10mL. I dropped a pH tab into the tube, mixed until dissolved, then compared the tube to a color comparison sheet.
- In order to calculate phosphates, I filled a plastic test tube to 5mL. I added a phosphate tab and shook until dissolved. Then waited 5 minutes to compare the color comparison sheet.
- Identifying nitrates is a similar process except you add a second nitrate tab then place the test tube in foil for 5 minutes before comparing color shades.
- For coliform bacteria I filled a glass vial to 10mL with a tab already in it. I stored it in a dark place for 2 days before comparing the color.
- Testing for pesticides was a little different. I filled a small test tube to the fill line then placed a strip in it for 10 minutes. The strip had one line for negative and two lines for positive.

Data analysis techniques learned:

- Collection of data in a notebook and cataloging it in an online database.
- Interpreting the data by creating graphs to show the different patterns and trends.
- Writing up the major results of the study and comparing it to existing literature.

St. Petersburg College Student Research Final Report

Name: Amber Maskell   **Professor:** Erica Moulton, MS

Date: 5/14/2021

Tampa Bay Estuary Program (TBEP) Marketing Campaign

Outline of Responsibilities

Working with the TBEP grant recipients to understand common denominators in the successfully funded Tarpon Tag projects

Developing and Writing the "if you Buy a Tarpon Tag" campaign for public distribution

Working with the TBEP staff to select program participants that represent the public message.

Completing a compiled report of the research activities completed each week.

Purpose of Project

The specific project is to produce an awareness/social media campaign surrounding the Florida license plate known as the "Tarpon Tag". The funds collected from the tag and the tag renewal are given to the Tampa Bay Estuary Program (TBEP) and then TBEP distributes the funds to grant applicants, such as SPC, to do a variety of things - from restoration to research.

The TBEP sees their audience for this digital content as falling into 2 categories. A) current plate holders who will renew their tag and those who do not know why they should buy a specialty license plate and B) current plate holders who have the tag as part of a lifestyle brand. For group B they are going to work with G. Steve Jordan to create a digital content campaign and for group A, they are working with us at SPC.

The original concept for the work is based on the "If you give a mouse a cookie" children's book. So really - what happens when you buy a tarpon tag? Who benefits and how the funds are used in the community?

The additional goal of the partnership with TBEP and this project is to advertise the Tarpon Tag license plate to show consumers how their purchase of the Tag helps fund environmental projects in the Tampa Bay community. To show a variety of projects that have been funded by the program, the TBEP has focused on a set of projects they have funded from the last 5 years.

Our overall goal is to help the TBEP increases the number of purchases and renewals of the Tarpon Tag so they can fund more environmental causes and to increase the understanding of where these funds go to work in our community.

Weekly Reports and Data

- Week 1 (dates) Meeting with Erica Moulton to discuss the project being conducted and to find out best ways to approach the research. Reading about the TBEP and its grant program to provide a better understanding of the need to share their message.

- Week 2 (dates) - Contacted researchers at TBEP through zoom to talk what the TBEP is and how they use fund to help support non-profits. We also talked about previous projects and ideas going forward.

- Week 3 (dates) - Did additional solo research on TBEP. Learned where and how to apply for a tarpon license plate, learned about what projects are going on in our area, and had to familiarize myself with how the funding flow works. We had zoom call with Erica to talk about template ideas.

Week 4 (dates)Contacted Shelia for a list of all funded nonprofits. Met via zoom with Erica on how to choose the nonprofits that would work best to market.

Week 5 (dates) Once we got the list, we had a zoom call with Erica to look through it together and to choose which nonprofits we wanted to contact. We also created a pinpoint map to make sure we were choosing nonprofits that surrounded the Tampa Bay area.

Week 6 (dates) I created an email to send out to our recipients. I sent it to Erica for approval. Once I got her approval, the email was sent. In the meantime, I familiarized myself with Canva.

Week 7 (dates) Once I got a couple of responses, additional emails were sent to the recipients, and I was able to collect data from them to create the campaign.

Week 8 (dates) Results Created two templates to market via Canva. One for the Living Shoreline Project and the Tampa Bay Monarch Project.

Conclusions

Amber Maskell has completed the requirements for her stipend as it relates to the project with the Tampa Bay Estuary Program (TBEP) and the SPC STEM Center's work to help create a marketing profile for the TBEP grants program.

Ms. Maskell met all the deadlines requested to create a mockup of the planned marketing material. Ms. Maskell made use of a variety of online and social platforms as well as community outreach to determine which of the TBEP activities should be highlighted as a part of the marketing campaign. She then worked the TBEP team to contact the community groups that TBEP approved. Ms. Maskell then used Canva to create the digital media for the public outreach campaign.

Ms. Maskell's work resulted in the selection of 5 TBEP partners that will be featured in the campaign and Amber also completed one profile, example story board that will now be used as the framework for the remaining material.

Techniques and Procedures Utilized

Literature research skills:

- Reading and summarizing scientific or community-based projects and studies.
- Determining which examples related to public understanding of marketing goal.
- Determining copyright, style and font permitted so that campaign evokes message target of cause/effect like If You Give a Mouse a Cookie

Online and Data base sampling techniques learned:

- Research methods for procurement of permission to use media images and data for public consumption
- Identification of best practices for successful social marketing of science

Data analysis techniques learned:

- Interpreting the key components of a project that would be relatable to a non-science audience.
- Review of up to 100 projects over a multiyear funding format that target a wide variety of TBEP's goals so that the campaign is appealing to all audiences.
- Writing up repeatable/form letters and emails that explain the project goals and purpose.

Health Science Research Project

St. Petersburg College Student Research Final Report

The Effect of Exercise on Quality of Life for Dementia Patients

Ashley Noyes

St. Petersburg College

Undergraduate Research Experience

Prof. Will Baldwin, MPH, CPH

Health Services Administration Bachelor of Applied Science

December 10, 2021

Background on Dementia

In the United States, nearly 6.2 million people have dementia (Centers for Disease Control and Prevention [CDC], 2021). Alzheimer's is the most common type of dementia (Department of Elder Affairs, 2021; CDC, 2021). It accounts for 60 to 80 percent of all dementia patients, and it is not a normal part of aging (CDC, 2021). Alzheimer's and dementia are a progressive disease, starting with mild memory loss, to the inability to hold a conversation (CDC, 2021). Symptoms of dementia include memory loss, wandering, confusion, repeating of questions, and hallucinations (CDC, 2020). Symptoms are also characterized by neurological, neuropsychiatric, and other health concerns (Gale, 2020). Most symptoms of dementia begin around the age of 60 (CDC, 2020). Diagnosis of this disease can start from early onset to the severe fatal stages of Alzheimer's (Gustafson, 2020). Dementia brings increased cognitive decline over time (Gustafson, 2020). As of today, there is not a cure (Gustafson, 2020). While our older adults are living longer, this disease is having a dramatic effect on their quality of life as they age. Exercise can be an effective remedy to counteract the progression of dementia and to improve patients' quality of life.

Physical Benefits of Exercise

It is estimated that 40 percent of dementia can be prevented or delayed (CDC, 2020). Adequate exercise treatment can be an alternative to pharmaceutical management (Sampaio et al, 2021; Carvalho et al, 2021). When exercise treatment is added to daily life it can prevent falls (Bajwa, 2019). It can also help with memory care due to the process of learning procedures in fall prevention (Bajwa, 2019). Adding exercise treatment for dementia patients helps with

balance and strength (Di Lorito et al, 2019; Bajwa et al, 2019; Ptomey et at, 2019; Carvalho et al, 2021).

Cognitive Benefits of Exercise

Exercise prevents cognitive decline. With adequate forms of exercise, the quality of life of someone dealing with dementia can be improved (Sampaio et al, 2021). Exercise helps those with dementia who deal with anxiety (Mackintosh et al, 2019). Fear of falling was decreased significantly in dementia patients who exercise (Goldberg et al, 2019). Behavior also changes in dementia patients who exercise (Di Lorito et al, 2019). When exercise is added to someone dealing with dementia on a day-to-day basis, social involvement is increased (Di Lorito et al, 2019). Overall, these benefits of increased confidence, lower anxiety, positive behavior change, and improved social engagement show how exercise can improve the mental aspect of quality of life among dementia patients (Di Lorito et al, 2019).

Decrease in Caregiver Burden

Exercise helps with gait speed, mood, and confidence which can decrease caregiver and family burden since it helps patients become more self-sufficient (Di Lorito et al, 2019; Bajwa et al, 2019; Ptomey et al, 2019). Having a sufficient exercise regimen with someone dealing with dementia helps with activities of daily living (Goldberg et al, 2019; Di Lorito et al, 2019; Bajwa et al, 2019; Ptomey et al, 2019). When someone has an increase in activities of daily living, this can lessen the burden on caregivers and loved ones (Ptomey et al, 2019). The dependency on a caregiver is also decreased with exercise due to the confidence that comes with increased stability and decreased fear of falling (Goldberg et al, 2019; Di Lorito et al, 2019; Bajwa et al, 2019; Ptomey et at, 2019; Carvalho et al, 2021).

Discussion

As the population of those 60 years and older increases in the United States, professionals in aging and elder care need more strategies to counteract and prevent the quality of life issues that comes from different forms of dementia. Studies have clearly shown that exercise is an effective treatment to improve quality of life among dementia patients. This seems like promising information since the practicality and financial cost of implementing exercise programs can be easier to manage than some other types of treatment. It is highly recommended that caregivers, assisted living facilities, and skilled nursing facilities begin exploring the use of exercise as a way to improve dementia patients' quality of life.

References

Bajwa. R., Goldberg. S. E., Van der Ward. V., Burgon. C., Di Lorito. C., Godfrey. M., Dunlop.
M., Logan. P., Masud. T., Gladman. J., Smith. H., Hood-Moore. V., Booth. V., Das Nair.
R., Pollock. K., Vedhara. K., Edward. R. T., Jones. C., Hoare. Z., Hoare. Z., Brand. A.,
Hardwood. R. H., (2019). A randomised controlled trial of an exercise intervention
promoting activity, independence and stability in older adults with mild cognitive
impairment and early dementia (PrAISED) - A Protocol. *Trials. 20(1)*.
https://doi.org/10.1186/s13063-019-3871-9.

Carvalho. J., Borges-Machado. F., Barros. D., Sampaio. A., Marques-Aleixo. I., Bohn. L.,
Pizzarro. A., Teixeira. L., Magalhaes. J., Ribeiro. O., (2021). Body & Brain: effects of a
multicomponent exercise intervention on physical and cognitive function of adults with
dementia - study protocol for a quasi-experimental controlled trial. *BM Geriatrics.* 21(1).
https://doi.org/10.1186/s12877-021-02104-1.

Center for Disease Control and Prevention. (2019). *Caregiving for a person with Alzheimer's
Disease of related dementia.* https://www.cdc.gov/aging/caregiving/alzheimer.htm

Center for Disease Control and Prevention. (2020). *The truth about aging and dementia*.
https://www.cdc.gov/aging/publications/features/dementia-not-normal-aging.html

Center for Disease Control and Prevention. (2021a). *Alzheimer's Disease*.
https://www.cdc.gov/dotw/alzheimers/

Center for Disease Control and Prevention. (2021b). *The truth about aging and dementia*.
https://www.cdc.gov/aging/publications/features/dementia-not-normal-aging.html

Department of Elder Affairs. (2021). *Dementia care & cure initiatives.*

> https://elderaffairs.org/programs-services/bureau-of-elder-rights/dementia-care-cure-
> initiative/

Di Lorito. C., Pollock. K., Hardwood. R., Das Nair. R., Logan. P., Goldberg. S., Booth. V.,

> Vedhara. K., Van der Wardt. V., (2019). *A scoping review of behavior change theories in*
> *adults without dementia to adapt and develop the "phyt in dementia", a model promoting*
> *physical activity in people with dementia.*
> file:///C:/Users/naeke/Zotero/storage/HX96GFKQ/source%201%20for%20research%20p
> roject.pdf

Gale. S., (2018). *Dementia*. https://doi.org/0.1016/j.amjmed.2018.01.022

Goldberg. S. E., van der Wardt. V., Brand. A., Burgon. C., Bajwa. R., Hoare. Z., Logan P. L.,

> Hardwood. R. H., (2019). Promoting activity, Independence and stability in early
> dementia (PrAISED): a, multisite, randomised controlled, feasibility trial. *BMC*
> *Geriatrics. 19(1).* https://doi.org/10.1186/s12877-019-1379-5

Gustafson. L. (2021). *What is dementia.* ps://doi.org/10.1111/j.1600-0404.1996.tb00367.x

Macintosh. E., Kelly. L., Smith. S. O., (2019). Care about Physical Activity (CAPA)

> improvement programme –improving older people's quality of life through engagement
> in movement meaningful to them. *International Journal of Integrated Care. 19(4).*
> https://doi.org/10.5334/ijic.s3155

National Institute of Aging. (2021). *What is dementia? symptoms, types, and diagnosis. national*

> *institute of aging.* https://www.nia.nih.gov/health/what-dementia-symptoms-types-and-
> diagnosis

Ptomey. L. T., Szabo-Reed. A. N., Vidoni. E. D., Washburn. R. A., Gorczyca. A. M., Little. T.
D., Lee. J., Helsel. B. C., Williams. K. N., Donnelley. J. E., (2020). *A dyadic approach
for a remote physical activity intervention in adults with alzheimer's disease and their
caregivers: rationale and design for an 18-month randomized trial.*
file:///C:/Users/naeke/Zotero/storage/KJ4L2GGE/source%205%20research%20project.pd
f

Sampaio. A., Marques-Aleixo. I., Seabra. A., Mota. J., Carvalho. J., (2021). Physical exercise for
individuals with dementia: potential benefits perceived by formal caregivers. *BMC
Geriatrics. 21(1).* https://doi.org/10.1186/s12877-020-01938-5

Santen. J. V., Droes. R. M., Bosmans. J. E., Blanson. O. A., Henkemans. B., van Bommel. S.,
Hakvoort. E., Valk. R., Scholten. C., Wiersinga. J., van Straten. A., Meiland. F., (2019).
The (cost-) effectiveness of exergaming in people living with dementia and their informal
caregivers: protocol for a randomized controlled trial. *BMC Geriatrics. 19(1).*
https://doi.org/10.1186/s12877-019-1062-x

Appendix A

Journal Entries

     Week 1. To initiate the process of compiling research sources I was able to communicate via zoom with my professor to thoroughly acquire understanding on how to brainstorm a specified topic to study. Professor Baldwin was able to help me sort through ideas that relate to the topic of dementia in a skilled nursing facility. In conclusion I was able to find a very effective and interesting topic relating to how physical activity increases quality of life in one who has a diagnosis of Dementia. On zoom Professor Baldwin helped me find a specific database, Academic Search Complete, and how to narrow down the sources to as little as possible.

     When I went to Academic Search Complete, I used keywords Dementia and Physical Activity and quality of life. I narrowed down the search to dates from 2019 to 2021. I also narrowed down my search to full text, quality peer reviewed articles. The end results were 41 academic journals. Throughout week 1 I will sort through the abstracts to determine what are the best sources.

     Week 2. The goal for this week is to obtain 10 journal articles including title and DOI number. Professor Baldwin and I had a short zoom call where we discussed the importance of having a minimum of 30 scholarly journal resources for the research project. I found numerous sources that contain everything from quasi experiments, literature reviews, and case studies. I have also narrowed down my search engine to 80 sources on academic resources. Professor Baldwin and I had a meeting scheduled to further discuss the project. Unfortunately, the meeting was postponed.

Week 3. This week professor Baldwin and I discussed the synthesis matrix on a zoom call. This week I will be reading through all my sources and finding similar claims throughout each research article. The goal is to find identical claims throughout each scholarly journal research project. I also downloaded Zotero for future use. I will be using excel to keep track of all my claims including the authors of each claim. If I find that I did not find enough sources, I will continue my search to find more sources with the intent to find more claims.

Today I attempted to download every source I chose and found a slight dilemma. Many of the sources I chose had no option to down pdf or open the entire research article. I will be discussing this dilemma with Professor Baldwin.

Week 4. This week I focused my time on reading the sources through and finding claims while adding them to my synthesis matrix. I found mutual claims amongst the different articles. I found this week to be challenging with the numerous articles because some of the articles were not thorough in a description of a claim. Professor Baldwin and I have not had a zoom this week so I look forward to getting his feedback on the synthesis matrix thus far.

Week 5. This week I focused on the synthesis matrix and looking for reliable scholarly articles to add to the matrix. I focused on exercise and quality of life in dementia patients. This was a challenging week looking for all the right sources. I approximately looked up 50 articles and found 5 that were sufficient. Professor Baldwin has helped me brainstorm ideas on sources as well.

Week 6. This week professor Baldwin and I met on zoom to further discuss my synthesis matrix. The upcoming sources will need to be typed up APA. I will put sources in this documentation. I am almost done with synthesis matrix. Professor Baldwin also gave me some reliable sources to use.

Week 7. After a quick zoom with Professor Baldwin he showed me how to put references into Zotero. My job this week is to put references into Zotero manually.

Week 8. This week professor Baldwin reviewed my paper and showed me some areas of improvement. I have made note of those area and will work on the paper this week to broaden the areas he has suggested

Week 9. This week I will review the paper and tweek the areas that need to be tweaked. I have requested a zoom with Professor Baldwin to help broaden the paper. We are in crunch time to finish the paper before the end of the semester.

Week 10. Professor Baldwin and I had our final zoom where he taught me how to add an in-text citation to the research paper. This week I will be finalizing the details of my research project. I will be adding sources to the reference page along with in text citations. I will also be adding an appendix with all the journal entries.

Appendix B

Synthesis Matrix

Claim	Rupinder	Macintosh	Nadia	Goldberg	Di Lorito	Bajwa	Ptomey	Santen	Sampaio	Carvalho	Alsubaie	Huntley C	Departme	NIH	CDC	CDC	CDC	CDC	Gustafson	Gale
exercise treatment helped prevent falls in those dealing with dementia	x					x														
exercise not only helped with fall prevention but helped with memory care and quality of life due to the procedures in fall preventions	x					x														
exercise over a 12 month period of time helped out with day to day activities	x																			
balance and strength were improved helping with activities of daily living	x			x	x	x	x			x										
mood, confidence, and gait speed were improved	x				x	x														
decrease in anxiety and increase in mobility with added exercise	x	x																		
exercise prevents cognitive decline	x		x																	
fear of falling in dementia patients decrease signifcantly with added exercise				x																
independence was increase with exercise improving quality of life				x	x		x													
behavior changed amongst those with exercise					x															
social involvement increased with exercise in dementia patients					x															
functional ability increased over time						x			x	x										
increase in independce						x														
people with MCI and mild dementia retain functional ability						x														
exercise, strength, and balance increased mood, depression, and gait speed						x														
decrease in anxiety and increase in mobility with added exercise						x														
decrease in apathy and mood function with increase in exercise						x														
reduction in dependecy						x														
decrease in caregiver burden							x													
decrease in family burdens							x													
Increase in socialization with increase in exercise								x												
increase in general mood happened with exercise								x												
exercise treatment is an alternative to pharmaceutical management									x	x										
quality of life was increased over time									x											
cognitive function increased over time									x	x	x									
improved sleep											x									
slows down mental decline											x									
%40 of dementia can be prevented of delayed												x								

Microbiology Research Projects
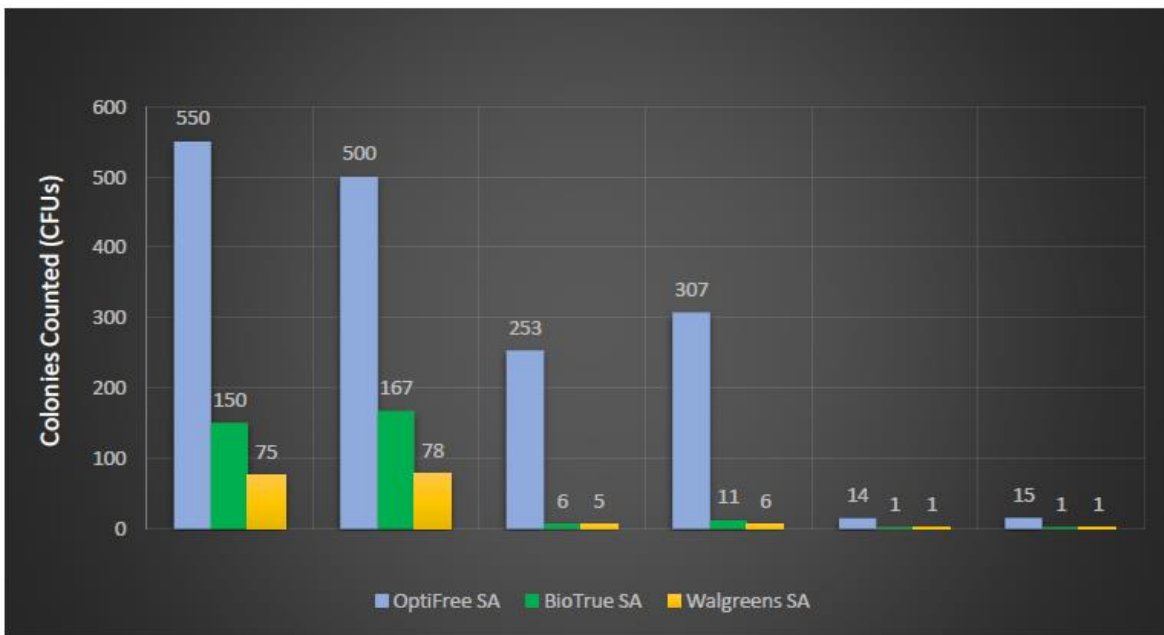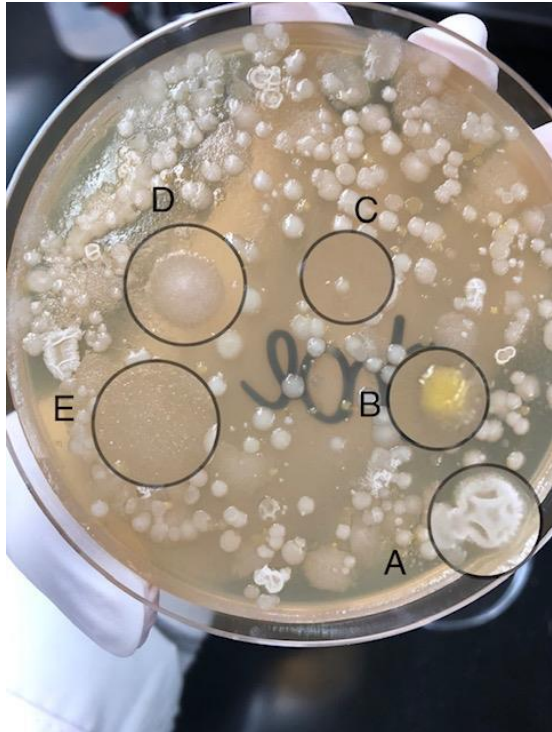
St. Petersburg College Student Research Final Report

Name: Angelica Delillo   **Professor:** Shannon Ulrich, PhD
Date: 10/20/2021

Outline of Responsibilities

- Attending a weekly microbiology research meeting Wednesdays 10-11AM
- Performing primary literature research and/or laboratory experiments
- Meeting with Professor Ulrich on a weekly basis for status updates and determination of the following week's goals
- Complete compiled report of the research/activities done each week (e.g. results observed, assumptions, and/or conclusions, learning achieved)

Weekly Reports & Data

Week 1: 9/1/2021
Met with Dr. Ulrich to discuss possible research topics. Discussed interests and future plans. Decided to research and perform microbiological staining procedures on samples.

Week 2: 9/8/2021
Met with Dr. Ulrich via Zoom to discuss differences between bacteria and fungi. Investigated resources and wrote a synopsis on bacteria and fungi descriptions.

Week 3: 9/15/2021
Met with Dr. Ulrich via Zoom to discuss the Gram stain procedure. Researched the details of Gram staining and prepared a summary of Gram staining and a procedure for Gram staining.

Week 4: 9/22/2021
Met with Dr. Ulrich via Zoom to discuss the Endospore stain procedure. Researched the details of Endospore staining and prepared a summary of Endospore staining and a procedure for Endospore staining.

Week 5: 9/29/2021
Met with Dr. Ulrich in the laboratory. Toured the lab. Practiced the Gram staining procedure on bacteria directly swabbed from phone and a culture of *Pseudomonas aeruginosa* and *Staphylococcus aureus*. Originally we planned to Gram stain samples directly swabbed from objects however the bacterial loads were relatively low and hard to find on the microscope slide. Therefore, moving forward we decided to concentrate the bacterial samples by culturing samples on tryptic soy agar (TSA). Five samples were swabbed including belly button, phone, wallet, watch, and shoe bottom. Samples were incubated at 37ºC for 24 hours.

Week 6: 10/6/2021

TSA plates were observed (Figure 1). Gram stain procedure was performed on 5 distinct colonies from the shoe bottom TSA plate (Figure 2). The distinct colonies were subcultured onto TSA plates and incubated at 37ºC for 24 hours.
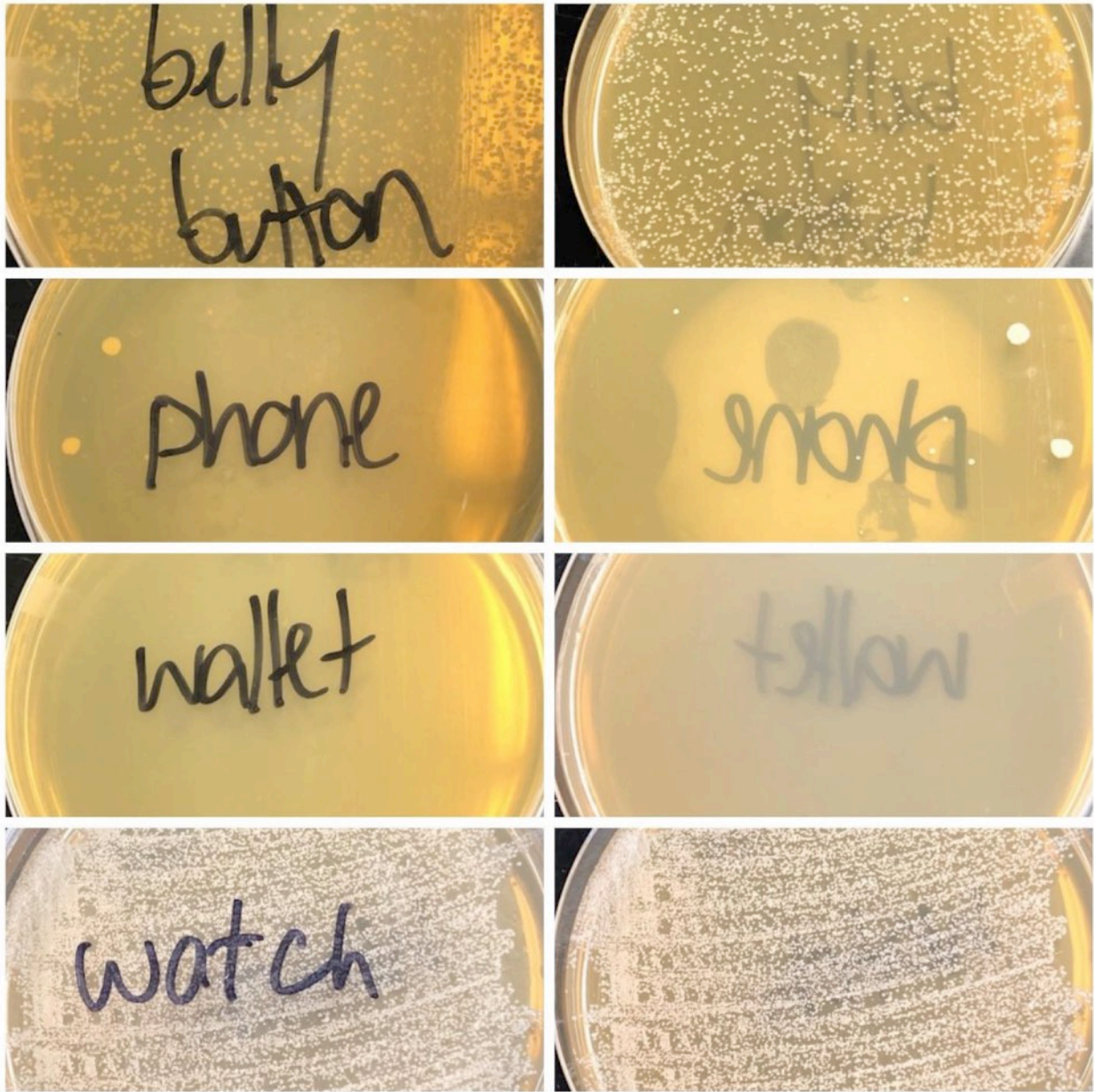

Figure 1. TSA plates from the belly button, phone, wallet, and watch samples.

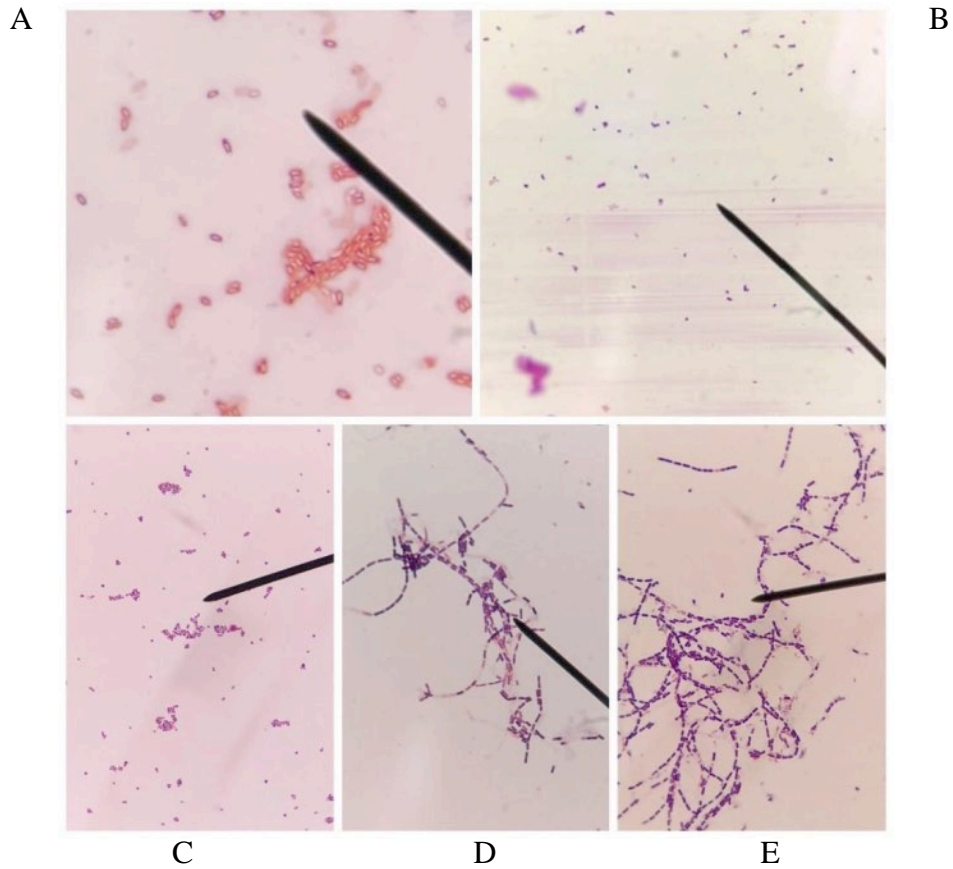Figure 2. Five distinct colonies were selected for Gram staining.

Figure 3. Results of Gram staining for colonies A-E.

Week 7: 10/13/2021

Isolated A-E colonies were observed on the TSA plates (Figure 4). Endospore stain procedure (Figure 5) was performed on the colony A sample as it exhibited possible endospores in the Gram staining procedure (Figure 3A). Results of Endospore procedure are pictured below (Figure 6).
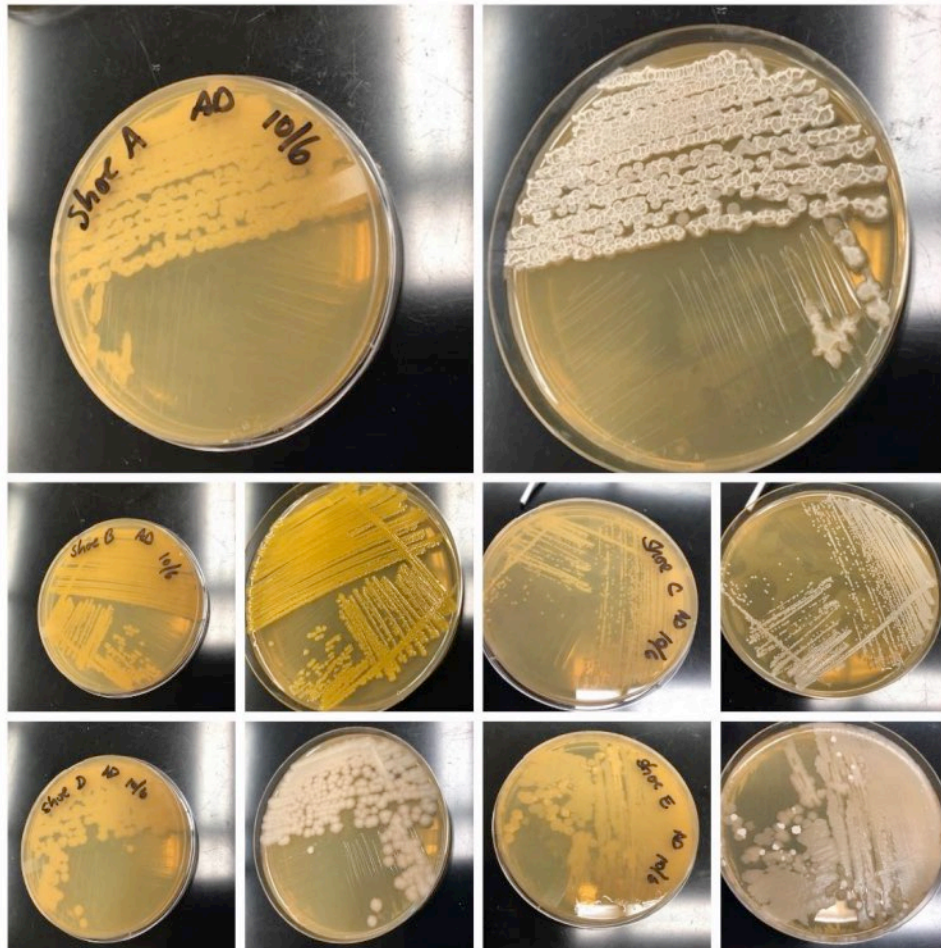

Figure 4. TSA plates of isolated colonies A-E

Figure 5. Process of Endospore Stain (bacterial smear, steaming slide in malachite green, observing the stained endospores and vegetative cells.)
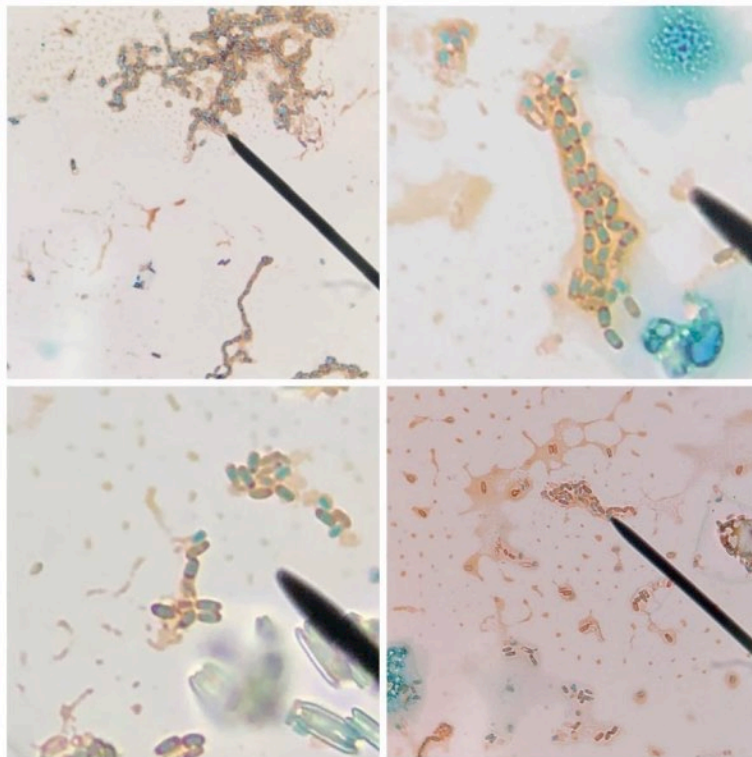

Figure 6. Results of Endospore stain for colony A.

Week 8: 10/20/2021
Compiled data and prepared lab report.

Conclusions

Characteristics of Bacteria and Fungi
There are two categories of bacteria that can be found with a Gram stain: Gram-positive and Gram-negative bacteria. Each type will react differently to the Gram stain due to varying thickness of peptidoglycan in the cell membrane. Gram-positive bacteria have a thicker peptidoglycan layer, which allows them to retain the violet dye used in a Gram stain. Due to this, Gram-positive bacteria appear purple after a Gram stain. Gram-negative bacteria, on the other hand, have a thinner layer of peptidoglycan. This causes the outer membrane to degrade once the decolorizer is added during a Gram stain, which prevents the bacteria from retaining the violet dye. The Gram-negative bacteria are usually stained red or pink after the violet dye has been washed out.

Further testing will need to be done to determine exactly which type of bacteria is present, but the Gram stain helps narrow it down. The shape of bacteria (usually cocci or bacilli), as well as the groupings of the bacteria, can also provide more information about which type of bacteria it may be. When examining the bacteria during the Gram test, checking whether the bacteria is intracellular or extracellular can also give insight into the infection.

Fungi may also be present during the Gram stain test. Fungi are eukaryotes, so they are more complex and typically larger than bacteria. The two fungal infections that may be present are yeast and mold. Yeast appears as single cells and may have buds present. Molds are composed of hyphae and may resemble branches.

Details of Gram Staining
Gram staining is a test that is used to check for bacteria, usually in certain body fluids, or in wounds. This test will determine which category of bacteria is present: Gram-positive or Gram-negative. Gram-positive bacteria will appear purple, while Gram-negative bacteria will be pink or red. Along with the size and groupings of bacteria, and whether fungi is present, this test helps narrow down the possible infection.

A sample is first taken, typically from a wound, urine, blood, throat culture, or sputum culture. The sample is then heat-fixed to the slide, by carefully passing the slide through a Bunsen burner three times. Next, the sample is stained with a water-soluble dye called crystal violet and incubated for one minute. The slide is briefly (not more than five seconds) rinsed with a gentle stream of water, and the unbound dye is removed. A solution of iodine and potassium iodine is left on the slide for one minute, which then forms a complex with the crystal violet. This complex has a larger molecule size than the original stain and is not water soluble.

After one minute, the slide is rinsed with a decolorizer like ethyl alcohol for three seconds, and again rinsed with a gentle stream of water. The decolorizer dehydrates the peptidoglycan layer and shrinks it. In Gram-negative bacteria, this degrades the outer membrane, and the crystal

violet cannot be retained. In Gram-positive bacteria, the crystal violet complex cannot penetrate the tightened peptidoglycan layer, so the color is not lost, as it is in the Gram-negative bacteria.

Now the decolorized Gram-negative bacteria must be stained. A counterstain, such as safranin, is added to the slide, and incubated for one minute. Once again, the slide is rinsed with a stream of water for about five seconds. Finally, the color of the bacteria can be checked to see if they are Gram-positive or Gram-negative. The Gram-negative cells will have been stained red or pink, but the Gram-negative cells will not be disrupted by the lighter dye and will remain purple.

Details of Endospore Staining
Bacterial spores are formed as a defense against poor growing conditions and allow certain bacteria to survive for long periods of time. Endospores are metabolically inactive, dehydrated structures with a thick keratin layer. Bacteria that produce endospores enter a vegetative state, and can form spores in the center, end, or between the middle and end of the cell. Once the spores are exposed to more favorable conditions, they can germinate into a vegetative cell. Endospores can be larger or smaller in diameter than the vegetative cell. The presence, size and shape of the spores can help identify bacteria. The endospore staining procedure is used to stain the resistance structure of the endospore.

The first step in an endospore stain is to perform a bacterial smear on a clean slide. The organism is then heat fixed to the slide, and covered with a piece of blotting paper, which can be cut to fit the slide. The blotting paper is saturated with malachite green and steamed over a burner or a container of boiling water for 7-10 minutes. More malachite green can be added as necessary, to ensure that the blotting paper remains saturated. Once this process is complete, the paper is removed, and the slide is rinsed gently with water. This will wash the water-soluble malachite green out of the vegetative cells, since they do not have the thick protein layer like the spores. Next, a counterstain of safranin is added for one minute, which will color the vegetative cells red or pink. Finally, the slide is rinsed with a gentle stream of water and is ready to examine.

The endospores will be viewed as bright green, while the vegetative cells will have a red or pink color. This staining process allows us to differentiate between endospores and their vegetative bacterial cells. It also shows the difference between spore-forming bacteria, and bacteria that do not form spores.

Results of this Analysis

 Colony A was an endospore forming Gram positive bacillus. Colony B and C were Gram positive cocci. Colony D was Gram positive streptobacilli. Colony E was a mixture of bacteria exhibiting both Gram positive bacillus morphology and Gram negative rods. The distribution of gram types and morphologies and summarized in Figure 7.
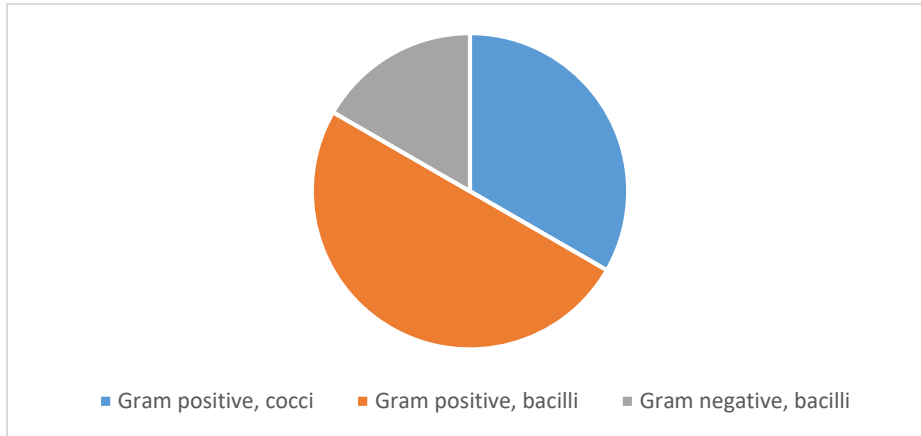

Figure 7. Distribution of gram types and morphologies for the bacterial samples stained.

Techniques Utilized

Microbiological techniques learned:
- Microscopy
- Gram stain procedure
- Endospore stain procedure

St. Petersburg College Student Research Final Report

Name: Regan Barnes **Professor:** Shannon Ulrich, PhD

Date: 11/04/2021

Responsibilities

- Attend weekly meetings from 10:30 am – 11:30 am on Wednesdays for 8 consecutive weeks.
- Execute a serial dilution experiment to gather data on which contact lens solutions are most effective against *Pseudomonas aeruginosa* and *Staphylococcus aureus*.
- Complete report of the experiment.

Weekly Schedule & Data Reports

Week 1: 09/08/2021 – Zoom
- Met with Dr. Ulrich via Zoom to discuss possible research topics, planned schedule and completed necessary paperwork.

Week 2: 09/15/2021 – Zoom
- Met with Dr. Ulrich via Zoom to discuss the design of the experiment. Specifically, discussed the most common bacteria associated with wearing contact lenses, the most common contact lens solutions used, and at what dilutions to test the bacteria against the chosen solution.

Week 3: 09/22/2021 – Lab
- Met with Dr. Ulrich in the laboratory to prepare the media by pouring plates and then culturing the bacteria: *Pseudomonas aeruginosa* and *Staphylococcus aureus*. The contact lens solutions tested were OptiFree (A), BioTru (B), and Walgreen's brand (C). The buffer control used was 1x PBS. Each bacterium was diluted to 10^2, 10^3, 10^4. Creating a total of 6 plates per solution, 18 plates per bacteria type, and 36 plates total.

Week 4: 09/29/2021 – Lab

- Met with Dr. Ulrich in the laboratory to test *Pseudomonas aeruginos,* the gram-negative bacteria. The bacteria samples at dilutions of 10^2, 10^3, and 10^4 were added to each mixture of contact lens solution and seesawed 3 times. Then were plated using the spread technique. The samples were plated twice with each different contact lens solution and then incubated to see which solution is the most effective at eliminating the bacteria.

Week 5: 10.06.2021 – Lab
- Met with Dr. Ulrich in the laboratory to records the results of the *Pseudomonas aeruginosa* portion of the experiment. Also, to test *Staphylococcus aureus,* the gram-positive bacteria. The bacteria samples at dilutions of 10^2, 10^3, and 10^4 were added to each mixture of contact lens solution and seesawed 3 times. Then were plated using the spread technique. The samples were plated twice with each different contact lens solution and then incubated to see which solution is the most effective at eliminating the bacteria.

Week 6: 10.13.2021 – Lab
- Met with Dr. Ulrich in the laboratory to records the results of the *Staphylococcus aureus* portion of the experiment.
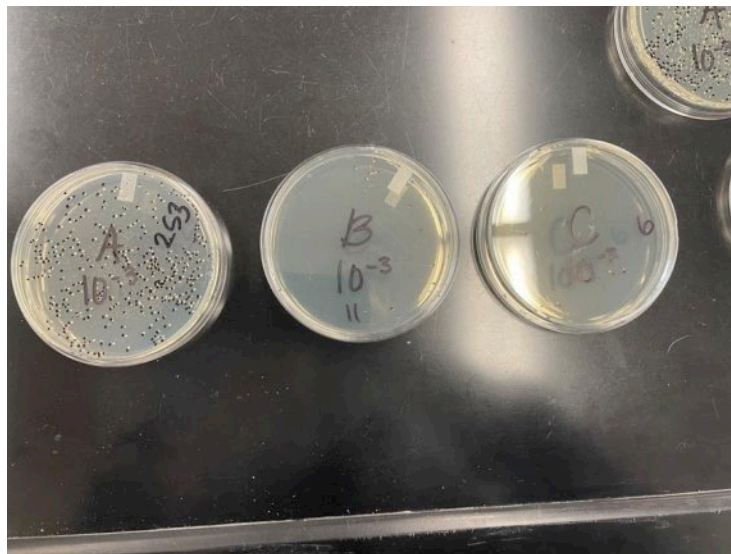
Week 7: 10.20.2021 – Lab
- Met with Dr. Ulrich in the laboratory to analyze results and discuss laboratory report.

Table 1: Colonies counted for *Pseudomonas aeruginosa* (gram-negative bacteria) growth after exposure to contact lens solutions.

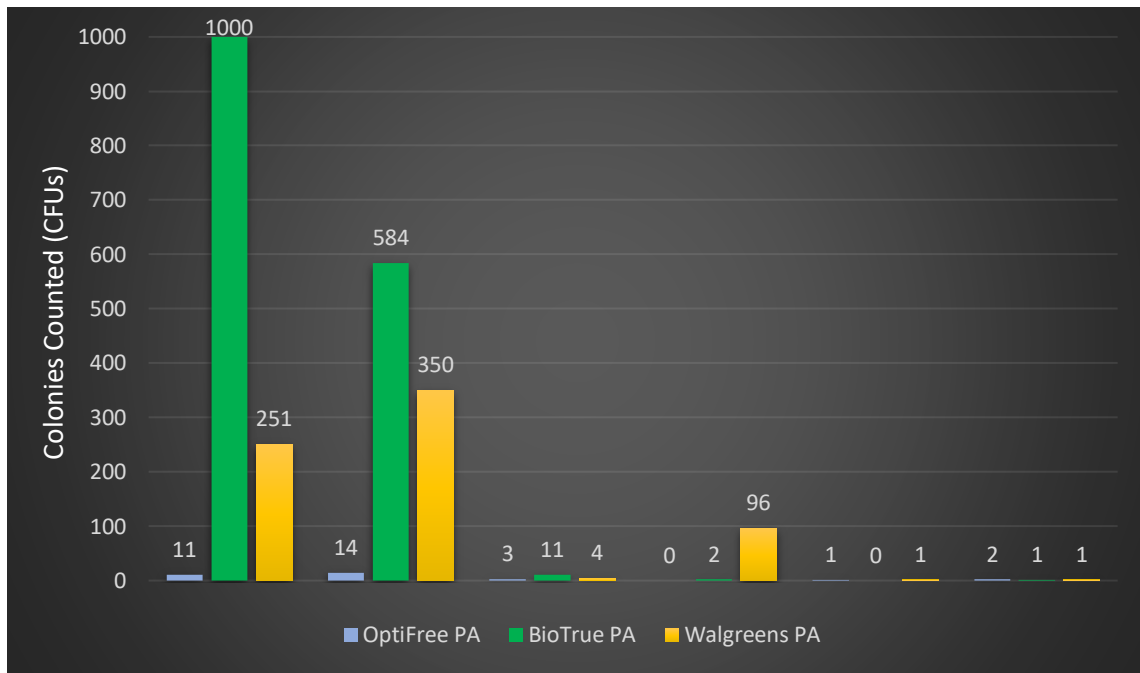| Dilution	OptiFree	BioTrue	Walgreens
10^(-2)	11	TNTC	251
	14	TNTC	350
10^(-3)	3	11	4
	0	2	96
10^(-4)	1	0	1
	2	1	1

Figure 1: Results of *Pseudomonas aeruginosa* growth in various contact lens solutions.

Table 2: Colonies counted for *Staphylococcus aureus* (gram-positive bacteria) growth after exposure to various contact lens solutions.

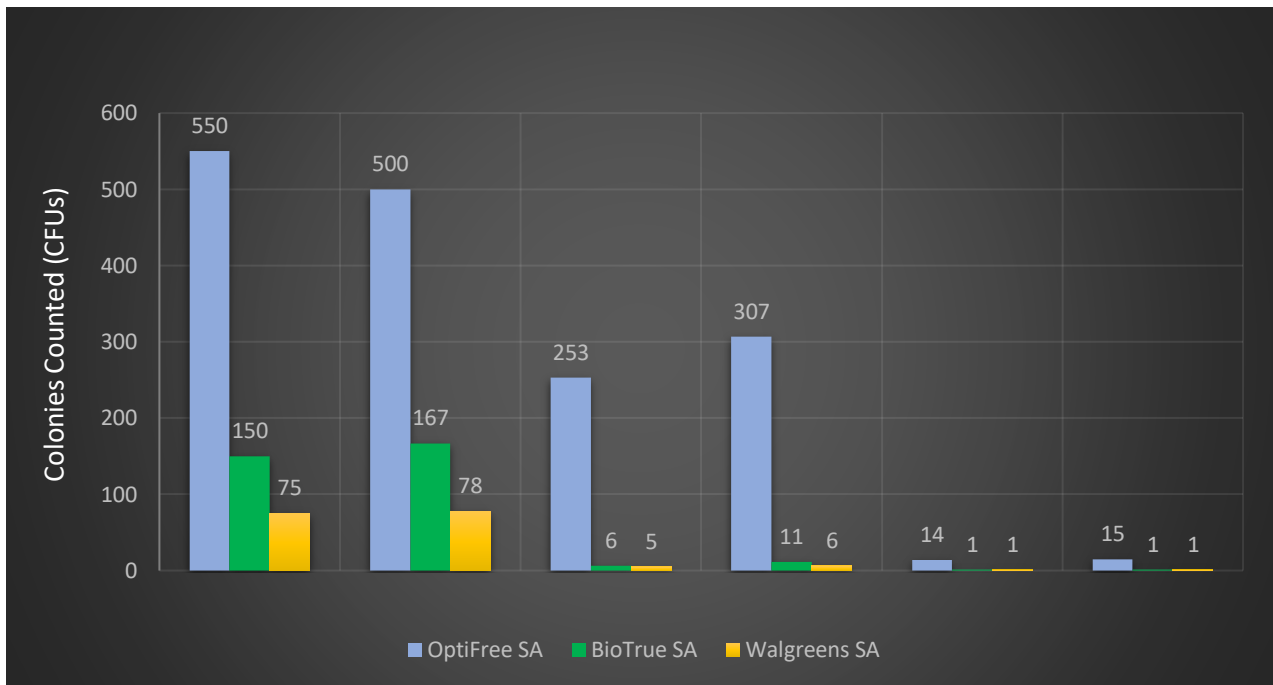| Dilution	OptiFree	BioTrue	Walgreens
10^(-2)	TNTC	150	75
	TNTC	167	78
10^(-3)	253	6	5
	307	11	6
10^(-4)	14	TFTC	TFTC
	15	TFTC	TFTC

Figure 2: Results of *Staphylococcus aureus* growth in various contact lens solutions.
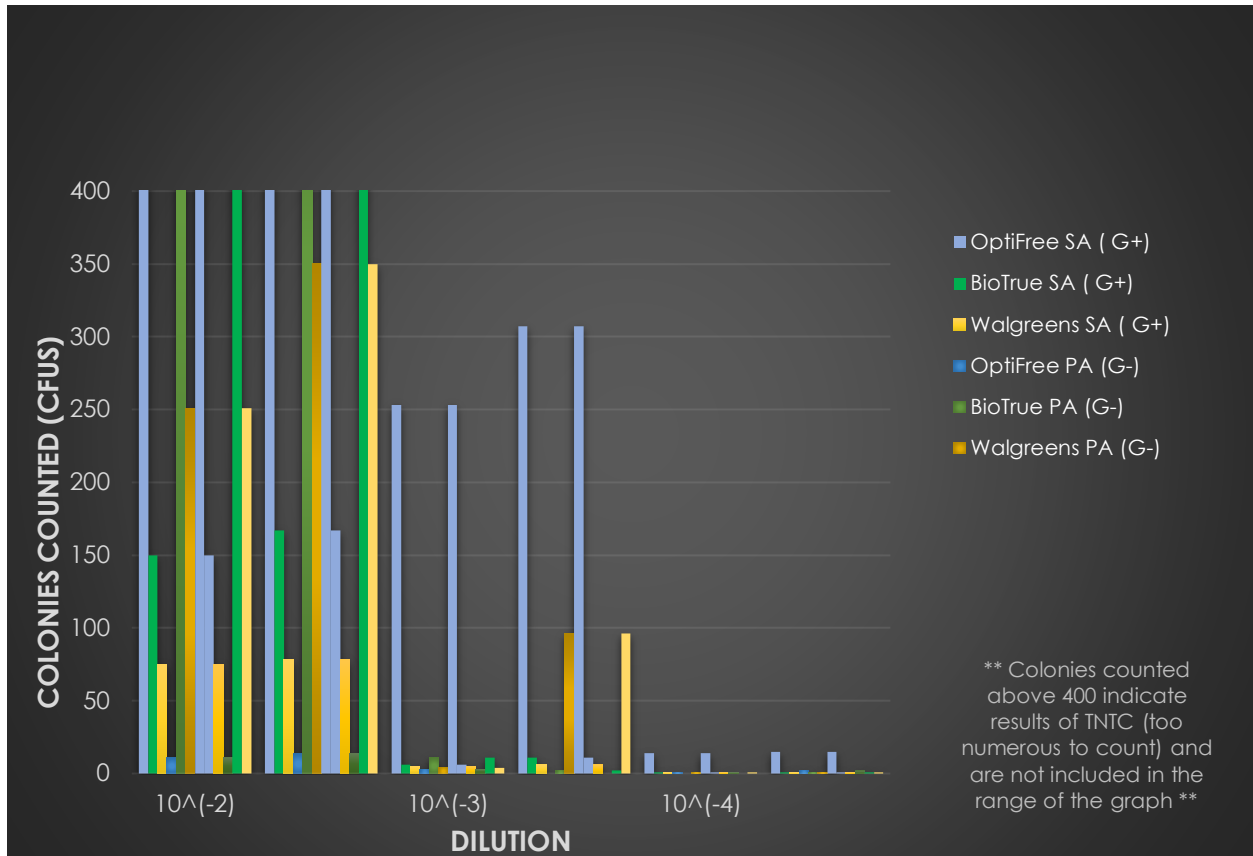
Figure 3: Combination of data from *Staphylococcus aureus* and *Pseudomonas aeruginosa* growth in various contact lens solutions.

Week 8: 10.27.2021 – Zoom
- Prepared laboratory report.

Discussion/ Conclusion

Contact Lenses

Millions of Americans wake up every day and put in soft contact lenses to correct their visual acuity. There are numerous manufactures that each produce multiple brands of soft contact lenses. Each contact lens has a different design engineered to correct acuity and some even have different modalities. For example, Bausch + Lomb is responsible for manufacturing Biotrue ONEday which is a daily disposable lens that comes in a design to corrects spherical powers, toric cylinders, and even multifocal prescriptions. They also manufacture a lens called Ultra, that corrects for toric-multifocal prescriptions. Another

manufacturer that is popular is Alcon. Alcon is manufactures daily, monthly, and even 2-week lenses known as Air Optix. Additional manufactures include but are not limited to CooperVision and Johnson & Johnson.

Bacterial Conjunctivitis

Wearing contacts creates a significant increase of handling something that goes onto the eyes. Due to this, the chances of getting bacterial conjunctivitis, more commonly known as pink eye, increases significantly. Bacterial conjunctivitis is caused by several bacteria. The most common include *Staphylococcus aureus, Haemophilus influenzae, Streptococcus pneumonia and Pseudomonas aeruginosa.*

Gram-Negative and Gram-Positive Bacteria

Gram-negative bacteria are characterized by the thin peptidoglycan cell wall, along with the outer membrane containing lipopolysaccharide. Gram-positive bacteria have no outer membrane, but the cell wall is a thick layer of peptidoglycan. The outer layer of gram-negative bacteria is difficult to penetrate, providing additional protection and making this type of bacteria harder to eliminate. Though, both gram types need to be approached with a different treatment, they both can cause an array of problems.

Pseudomonas aeruginosa is gram-negative bacterium belonging to the *Pseudomonadaceae* family. This type of bacteria can cause not only conjunctivitis, but also infections within the skin, soft tissues, bones, joint and even the respiratory system. It is an aerobic, rod-shaped, and can even grow in distilled water. *Staphylococcus aureus* is a gram-positive bacterium that is known to cause wide variety of diseases. The bacteria normally reside on the skin, but if it gets into the bloodstream or internal tissues it was cause a serious infection. So, knowing how to properly protect our bodies from those potential infection is crucial, especially for people who are at higher risk due to wearing contacts.

Contact Lens Solutions

Not only do manufactures make contact lenses, they also manufacture the solution for the contact lens maintenance. The Alcon brand is labeled Opti-Free and for Bausch + Lomb it is BioTrue. In addition to that, there are solutions such as RevitaLens manufactured by Johnson & Johnson, equate made by

Walmart and Walgreens brand. All the brands contain an extremely similar number of preservatives but each of them has different wetting agents.

Conclusion

The experiment concluded with the Opti-free being the most effective against gram-negative bacteria, with minimal growth at each dilution as seen in Table 1 and Figure 1. The least effective solution against *Pseudomonas aeruginosa* overall was BioTrue. More growth was found at dilutions of 10^{-2} and 10^{-3}; at 10^{-4} there were few growths among all solutions. The gram-positive bacteria, *Staphylococcus aureus*, had more growth in OptiFree and the least growth within Biotrue. Overall the Walgreens brand was more consistent in reducing both gram positive and gram negative bacterial growth.
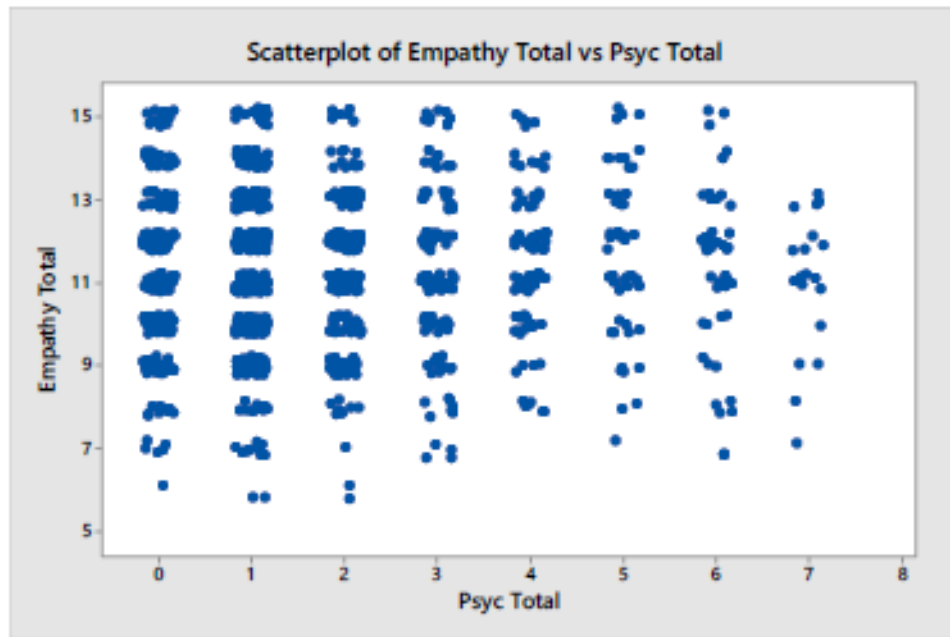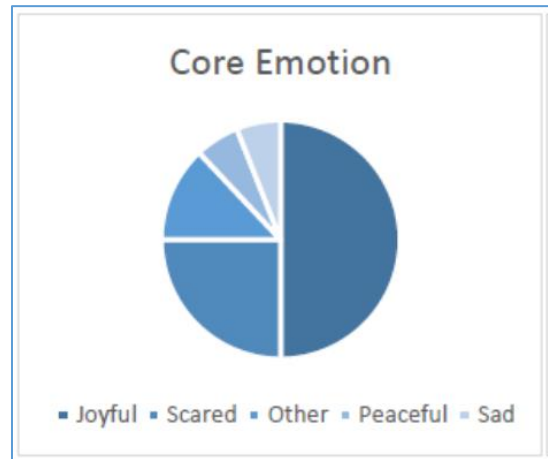
Techniques Used
- Plate pouring
- Serial dilutions
- Spread plate technique

Psychology Research Projects
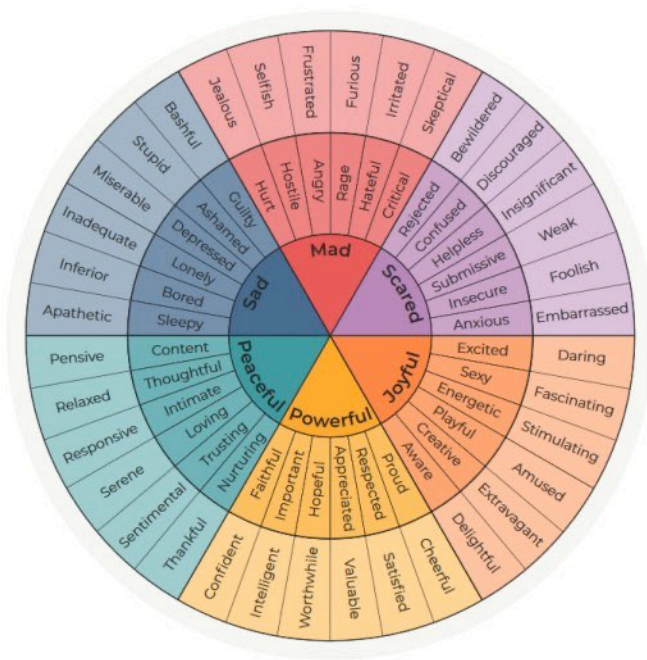
Core Emotion

- Joyful
- Scared
- Other
- Peaceful
- Sad

Scatterplot of Empathy Total vs Psyc Total

Empathy, Alter-Centrism, and the Study of Psychology in Community College Students

Amanda Broadwater

Supervised by Sharon Olsen, M.A.

St. Petersburg College

Abstract

The purpose of this study was to investigate the relationship between taking Psychology courses and measures of empathy and alter-centrism. We hypothesized that there would be a positive correlation between completion of more psychology courses and measures of empathy and alter-centrism as measured by an online questionnaire. Participants (n=1,248) completed an online questionnaire that was provided by the Psi Beta National Honor Society for Psychology Students' 2019-20 National Research Project. Contrary to our hypotheses, the results of the present study did not find a strong relationship between the number of Psychology courses taken and measures of empathy and alter-centrism.

Empathy, Alter-Centrism, and the Study of Psychology in Community College Students

Are men and women that different empathetically or do each of them have different ways of expressing empathy to others? Do the number of psychology classes one takes affect this score too? We have always heard that women are more empathetic than men are and that they tend to express empathy better than men. Will this still be found to be accurate, and will the number of psychology classes taken will affect a person's empathy score?

Empathy is the ability to understand and share the internal feelings of others (Christov-Moore et. Al 2014). This definition tends to be why people think that women are more empathetic than men are because they are seen as the more nurturing type and men are more seen as the protectors of the family. The study that provided this definition speculates whether empathy is just developed or whether or not the brain and the behavior of a person have an effect on one's empathy score. There are so many different things that impact empathy and help it develop no matter what age or gender a person is. According to one study, women tend to be more empathetic when someone is crying versus men who may not have as much of an empathetic response to when someone is crying or not (Han, Fan, Mao 2008). This study further suggests that in fact women tend to have higher empathy scores than men do along with having a more empathetic response to things that are going on around them (Han, Fan, Mao 2008). Interestingly, women tend to have a more psychological response of empathy to someone whereas men tend to have a more physiological response of empathy towards someone who went through something difficult (Han, Fan, Mao 2008). At first, this study seemed to be inconclusive on which gender was more empathetic, but the more information gathered the more that it proved

that women are still more empathetic than men are whether someone is in psychological or physical pain.

Another variable of interest is whether taking psychology courses affects someone's levels of empathy. First, let us go over the consequences of a lack of empathy. Individuals that typically lack empathy towards people or events display a lot of antisocial behavior and tend to be more aggressive when it comes to dealing with things that happen to them (Jolliffe & Farrington 2006). According to Joliffe & Farrington (2006), a person's age impacts their empathy score. Their research states the fact that younger generations now have a higher empathy score than older generations. An additional question of interest is whether choosing a psychology degree affects a person's empathy score. The psychology field is generally a female-dominant career field. Harton-Lyons (2003) asked both male and female participants why they chose to study psychology. While males tended to choose psychology due to the fact that they got higher grades in these types of classes, females reported that they chose psychology because they just wanted to be able to help people through their struggles (Harton-Lyons, 2003). This helps prove that women are more empathetic just based on the responses of why they chose a psychology degree. This also helps explain that empathy is a multidimensional study based on the factors of someone's emotions, needs, and things that happen in their everyday lives (Harton-Lyons,2003). This study also illustrated that women have a higher empathetic response than men do and that the number of psychology classes that they take affects the empathy score somewhat. The purpose of this study was to investigate the relationship between taking Psychology courses and measures of empathy and alter-centrism. We hypothesized that there would be a positive correlation between completion of more psychology courses and measures of empathy and alter-centrism as measured by an online questionnaire. Participants (n=1,248) completed an online

questionnaire that was provided by the Psi Beta National Honor Society for Psychology Students' 2019-20 National Research Project. Contrary to our hypotheses, the results of the present study did not find a strong relationship between the number of Psychology courses taken and measures of empathy and alter-centrism.

Method

This study aims to add to the current understanding of the relationship between taking Psychology courses and measures of empathy and alter-centrism in students enrolled in a community college. It was hypothesized that compared to males, females will have a higher mean score on communication scales designed to measure empathy and alter-centrism as measured by an online questionnaire provided by the Psi Beta National Honor Society for Psychology Students' National Research Project. It is further hypothesized that there will be a positive correlation between completion of more psychology courses and measures of empathy and alter-centrism.

Participants

This study reviewed a data file from the 2019-20 Psi Beta National Research Project. In this study, participants (n=1,248) were students enrolled in community college in Psychology courses at St. Petersburg College (SPC) and other community colleges around the United States. Participants were recruited through the 2019-20 Psi Beta National Research Project and were limited to those 18 years or older. This study was approved by the SPC Research Review Board and the Psi Beta National Office, as well as the Irvine Valley College Research Review Board. Participants were asked to complete an online survey anonymously and voluntarily as part of research. Students who agreed to participate were given a link to participate in the study. Once a student clicked on the link, they were prompted to review the purpose of the study and

electronically sign an informed consent and confirm that they are over the age of 18. The

informed consent form is stored electronically by the Psi Beta National Office. Once participants

consented to participate in the study, they were directed to a self-report questionnaire that they

anonymously completed and submitted electronically using an electronic device. The data

collection took approximately 30 minutes to complete.

Measures

Below is a list of measures were combined into a four-section online questionnaire for use in

this study. (For our study, we specifically looked at the scales measuring empathy and alter-

centrism.)

- Subscales drawn from the Interpersonal Competence Questionnaire (ICQ) (Buhrmester,
  Furman, Wittenberg, & Reis, 1988) include Initiation (8 items), Disclosure (8 items).

- Subscales are drawn from the Interpersonal Communication Competence Scale (ICCS)
  (Rubin & Martin, 1991): Self-disclosure (3 items), Empathy (3 items), Social
  Relaxation (3 items), Alter-centrism (3 items), and Interaction Management (3 items).

- Subscales are drawn from the Interpersonal Communication Skills Instrument
  (unpublished, Irvine Valley College Psychology Department, 2018): Efficacy for
  Initiating Conversations (9 items), and Efficacy for Facilitating Balanced Two-way
  Conversations (6 items).

- The entire Employable Skills Self-Efficacy Survey (Ciarocco & Strohmetz, 2018) which
  include these scales: Communication, Analytical Inquiry, Collaboration, and Professional
  Development.

- Demographics: sex, ethnicity, year in college, first-generation college student status, college units earned, number and type of psychology courses completed, co-curricular involvement

All data collected was stored anonymously and securely on password protected computers and secure servers. The stored data does not include information that could identify any individual. Participation was completely voluntary. Students were informed that they had the right to refuse participation and/or withdraw from participation without penalty at any time. Participants who chose to participate entered the questionnaire and chose to accept or deny their consent to participate after being read a consent form.

Analysis

Although I did not have access to the raw data, another student researcher reviewed an Excel File and an SPSS data file that was made available to the student researcher by the Psi Beta national office. The other student researcher utilized appropriate statistics to determine response frequencies, averages, and standard deviations as appropriate. Basic inferential statistics (correlations) were used as needed to test the hypotheses as applicable. The other student researcher summarized the result for me and these results are explained below.

Results

This study was used to investigate the hypothesis that within community college students, participants who had completed more psychology courses would score higher on the measure of empathy. Contrary to our hypotheses, the results of the present study did not find a strong relationship between the number of Psychology courses taken and measures of empathy and alter-centrism. We calculated a Spearman rho of the data that gave an r value of 0.043 indicating

that there no correlation between empathy and number of Psychology courses taken. P-value = 0.133
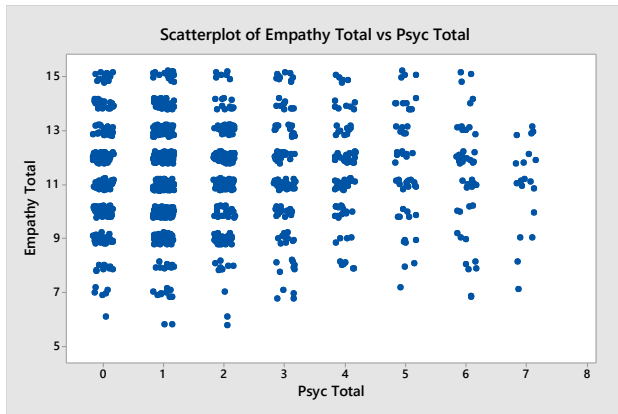
We calculated a Spearman rho of the data that gave an r value of 0.053 indicating that there no correlation between alter-centrism and number of Psychology courses taken. P-value = 0.063
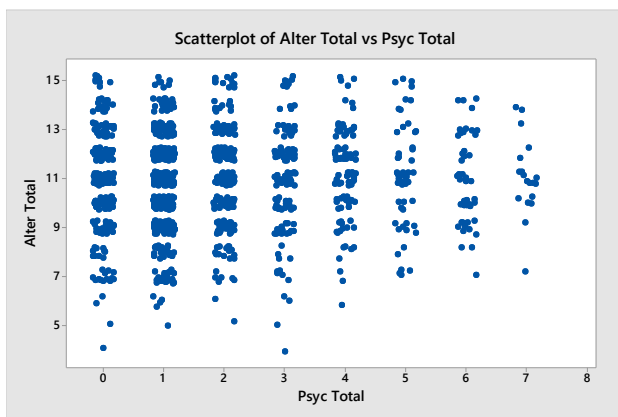
Discussion

After reviewing the results provided by the other student researcher, we speculated that a major limitation of our study was that all participants in this study were recruited through their current Psychology course. The fact that these students were already enrolled in a Psychology course may have biased our sample. Perhaps if we had randomly surveyed community college students rather than purposefully targeting data from Psychology students, we may have seen more

relevant results. Future research can shed more light on the decision to study Psychology and the role of empathy and on the desire to understand and help others.

References

Christov-Moore L., Simpson E., Coude G., Grigaityte K., Iacoboni M., & Ferrari P. (2014). Empathy: gender effects in brain and behavior, neuroscience & biobehavioral reviews. Volume 46, Part 4, pages 604-627.

Courtright, K. E., Mackey, D. A., & Packard, S. H. (2005). Empathy among college students and criminal justice majors: Identifying predispositional traits and the role of education*: JCJE. Journal of Criminal Justice Education, 16(1), 125-144,205-207. Retrieved from https://www.proquest.com/scholarly-journals/empathy-among-college-students-criminal-justice/docview/223376087/se-2?accountid=36653

Duan, C., & Hill, C. E. (1996). The current state of empathy research. Journal of Counseling Psychology, 43(3), 261–274. https://doi.org/10.1037/0022-0167.43.3.261

Dymond, R. 1949. "A Scale for the Measurement of Empathie Ability." Journal of Consulting Psychology 13: 127-33.

Gerace, A. (2018). The Power of Empathy. *InPsych*, *40* (5). https://doi.org/https://www.psychology.org.au/for-members/publications/inpsych/2018/October-Issue-4/The-power-of-empathy

Greenberg, L. S., Elliott, R., Watson, J. C., & Bohart, A. C. (2001). Empathy. Psychotherapy: Theory, Research, Practice, Training, 38(4), 380–384. https://doi.org/10.1037/0033-3204.38.4.380

Han, S , Fan, Y & Mao, L. (2008). Gender difference in empathy for pain: an

electrophysiological investigation. Brain Research, Volume 1196, pages 85-93.

Harton, H. C., & Lyons, P. C. (2003). Gender, empathy, and the choice of the psychology

major. Teaching of Psychology, 30(1), 19–

24. https://doi.org/10.1207/S15328023TOP3001_03

Hogan, R. 1969. "Development of an Empathy Scale." Journal of Consulting and Clinical

Psychology 33: 307-16.

Kampis D, Southgate V. (2020) Altercentric Cognition: How Others Influence Our Cognitive

Processing. Trends Cogn Sci. Nov;24(11):945-959. doi: 10.1016/j.tics.2020.09.003. Epub

2020 Sep 24. PMID: 32981846.

Kaplan, J. T., & Iacoboni, M. (2006). Getting a grip on other minds: Mirror neurons, intention

understanding, and cognitive empathy. Social neuroscience, 1(3-4), 175-183.

Jolliffe, D & Farrington, D. (2006). Development and validation of the basic empathy scale.

Journal of Adolescence, Volume 29, Issue 4

Naufel, K. Z., Appleby, D. C., Young, J., Van Kirk, J. F., Spencer, S. M., Rudmann, J.,

…Richmond, A. S. (2018). The skillful psychology student: Prepared for success in the

21st century workplace. Retrieved from: https://

www.apa.org/careers/resources/guides/transferable-skills.pdf

Novotney, A. (2010, January). A prescription for empathy. Monitor on Psychology.

https://www.apa.org/monitor/2010/01/empathy.

Piaget, J. 1965. The Moral Judgment of the Child. Glencoe, IL: Free Press.

Preston, S. D. (2013). The origins of altruism in offspring care. Psychological Bulletin, 139, 1305–1341. http://dx.doi.org/10.1037/a0031755

Psi Beta's 2019-2020 National Research Project. Psi Beta. (n.d.). https://psibeta.org/psi-betas-2019-2020-national-research-projec/

Rogers, C. R. (1957). The necessary and sufficient conditions of therapeutic personality change. Journal of Consulting Psychology, 21, 95-103.

Yi, Y., & Seo, J. H. (2018). The relationship between communication competence and exercise participation type: focusing on joining clubs and using fitness applications. Journal of exercise rehabilitation, 14(6), 934–938. https://doi.org/10.12965/jer.1836546.273

Empathy, Alter-Centrism and the Study of Psychology in Community College Students

Amanda Broadwater & Lukas Olsen

St. Petersburg College

Abstract

The purpose of this study was to investigate the relationship between taking Psychology courses and measures of empathy and alter-centrism. We hypothesized that there would be a positive correlation between completion of more psychology courses and measures of empathy and alter-centrism as measured by an online questionnaire. Participants (n=1,248) completed an online questionnaire that was part of the provided by the Psi Beta National Honor Society for Psychology Students' 2019-20 National Research Project. Contrary to our hypotheses, the results of the present study did not find a strong relationship between the number of Psychology courses taken and measures of empathy and alter-centrism.

Introduction

The human experiences of empathy and alter-centrism are ties that connect us to one another. Empathy has been described as the accurate perception of others and the ability to understand and share in the internal feelings of others. Empathy is often described as perspective-taking or role-taking and appears to involve an affective experience through emotional connection to another person's situation. Alter-centrism is often described as interest in others and involves paying attention to another person's spoken and unspoken messages. Both empathy and alter-centrism likely play an important role in the field of Psychology. Many studies have explored the role of various psychological factors such as empathy and alter-centrism on professional development in fields such as medicine and psychology. Empathy and alter-centrism can improve patient care by helping professionals be better listeners and thus could improve treatment outcomes. Higher levels of empathy may be related to more cooperation, helping, and beneficial interactions with others. The purpose of this study was to investigate the relationship between taking Psychology courses and measures of empathy and alter-centrism.

Method

The purpose of this study was to investigate the relationship between taking Psychology courses and measures of empathy and alter-centrism. We hypothesized that there would be a positive correlation between completion of more psychology courses and measures of empathy and alter-centrism as measured by an online questionnaire.

Participants (n=1,248) were students enrolled in community college level Psychology courses at St. Petersburg College (SPC) and other community colleges around the United States.

Participants were recruited through the 2019-20 Psi Beta National Research Project and were limited to those 18 years or older. Participants completed an online questionnaire that was part of the provided by the Psi Beta National Honor Society for Psychology Students' 2019-20 National Research Project.

Contrary to our hypotheses, the results of the present study did not find a strong relationship between the number of Psychology courses taken and measures of empathy and alter-centrism.
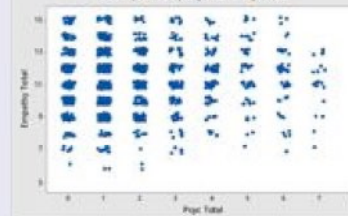
Results

We calculated a Spearman rho of the data that gave an r value of 0.043 indicating that there no correlation between empathy and number of Psychology courses taken. P-value = 0.133
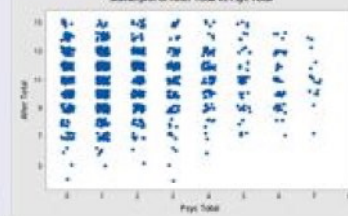
We calculated a Spearman rho of the data that gave an r value of 0.053 indicating that there no correlation between alter-centrism and number of Psychology courses taken. P-value = 0.063

We speculate that a major limitation of our study was that all participants in this study were recruited through their current Psychology course. The fact that these students were already enrolled in a Psychology course may have biased our sample. Perhaps if we had randomly surveyed community college students rather than purposefully targeting data from Psychology students, we may have seen more relevant results. Future research can shed more light on the decision to study Psychology and the role of empathy and on the desire to understand and help others.

Scatterplot of Empathy Total vs Psyc Total

Scatterplot of Alter Total vs Psyc Total

References

- Cortwright, S. F., Mackey, D. A., & Parland, S. H. (2020). Empathy among college students and criminal justice majors: Identifying predisposition traits and barriers to evaluation* ICJE *Journal of Criminal Justice Education*, 31(1), [illegible] Retrieved from https://www-proquest-com/scholarly-journals/empathy-among-college-students-criminal-justice/docview/2317302/Yes/2?accountid=44091
- Duan, C., & Hill, C. E. (1996). The current state of empathy research. *Journal of Counseling Psychology*, 43(3), 261-274. https://doi.org/10.1037/0022-1067.43.3.261
- Cuomo, A. (2016). The Power of Empathy. *ADitch*, 42(1), https://www.apa.org/https://www.psychology.org/[illegible]/en-us/apa-style/ASI/16-tandem-lean/The-power-of-empathy.
- Greenberg, L. S., Elliott, R., Watson, J. C., & Bohart, A. C. (2001). Empathy. *Psychotherapy: Theory, Research, Practice, Training*, 38(4), 380-387. https://doi.org/10.1037/0033-3204.38.4.380
- Hamos, H. C., & Lyons, P. C. (2017). Gender, empathy, and the choice of the psychology major. *Teaching of Psychology*, 44(1), 19-24. https://doi.org/10.1177/0098628316677010
- Kamya D, Kumlhgati V. (2020). Altercentric Cognition How Others Influence Our Cognitive Processing. [illegible] Cogn Sci Mar 2020;18:[illegible]1.0008] doi:.2020.18.003. Epub 2020 Sep 24. PMID: [illegible]
- Nandhi, K. Z., Appleby, D. C., Young, J., Van Kirk, J. F., Spencer, S. M., Backman, J., ... Richmond, A. S. [illegible] The do Ifd psychology student Prepared for careers in the 21st century workplace. Retrieved from https://www.apa.org/careers/resource/guides/bauchelorda-def-kpdf
- Newberry, A. (2016 January) *A young gives for empathy* Monitor on Psychology. https://www.apa.org/monitor/2016/01/empathy
- Rogers, C. R. (1957). The necessary and sufficient conditions of therapeutic personality change. *Journal of Counseling Psychology*, 21, 95-103.
- Yi, V., & Son, J. H. (2020). The relationship between communication competence and exercise participation type: focusing on young adults and using fitness applications. *Journal of exercise rehabilitation*, 16(6), 510-516. https://doi.org/10.12965/jer.1938918.270

8 Week Psychology Research Project
Supervised by Professor Sharon Olsen

Student Name: Amanda Broadwater
Date started:

Title of Project: The Influence of Gender and Number of Psychology Courses on Measures of Empathy in Community College Students

Review of Scholarly Literature

In your own words, please summarize the findings of at least 4 (or more) scholarly sources on the topic of the role of gender on measures of empathy. Each summary should be at least 150 words.

How to search the SPC Library Online Databases:

You can find scholarly sources by going to the SPC library online databases (From the home page of this course, scroll to the bottom of the page and click on Library Resources and Services. From there, you can either do a basic search by typing into the search box, or you can search individual databases by clicking on "Databases A-Z". Some of my favorite databases in the "Databases A-Z" section are: APPI PsychiatryOnline Premium; Biography in Context (Gale); Biography Index (EBSCO); Opposing Viewpoints in Context (Gale); PsycArticles (EBSCO); and Psychology Collection (Gale). Once you are in one of those databases, you can type your search words into the search box.

How to Cite Properly in APA Format:

When creating APA formatted references, use the following as a guide (and please note that the 2nd line in a citation is indented. This is called a "hanging indent".

Author(s) last name, first initial(s). (Year). Title of the article with only the first word capitalized. *Title of Journal, Volume of Journa*l (issue number), page numbers. doi: 00.00xxx0000

Kemps, E., Tiggermann, M., Orr, J., & Grear, J. (2014). Attentional retraining can reduce chocolate consumption. *Journal of Experimental Psychology, 20*(1), 94-102. doi: 10.1037/xap0000005

Parenthetical within text citations have two formats: parenthetical and narrative.
In parenthetical citations, the author name and publication date appear in parentheses.
In narrative citations, the author name is incorporated into the text as part of the sentence and the year follows in parentheses.

See explanations and examples below:

Parenthetical Within Text Citations

Both the author and the date, separated by a comma, appear in parentheses for a parenthetical citation. A parenthetical citation can appear within or at the end of a sentence.

Example of parenthetical within text citation:

Psychology includes the study of conscious and unconscious phenomena (Koehler, 2016).

Narrative Within Text Citations

The author's surname appears in running text, and the date appears in parentheses immediately after the author's name for a narrative citation. The author's name can be included in the sentence in any place it makes sense.

Example of narrative within text citation:

Koehler (2016) noted that psychology includes the study of conscious and unconscious phenomena.

Type Article #1 Citation in APA format below:

Jolliffe, D & Farrington, D. (2006). Development and validation of the basic empathy scale. Journal of Adolescence,Volume 29, Issue 4

Type Article # 1 APA formatted Parenthetical Within Text Citation below:

(Jolliffe, Farrington 2006)

Type Article # 1 Summary Below (minimum 150 words):

This specific journal goes over the facts of how empathy develops and how a lack of empathy can cause someone to be more aggressive and antisocial with the communities that are around them. It also goes into how women tend to have a higher empathy score then men and why it turns out that way based on the studies that they did. They also found that the age of someone and the empathy that they have developed is different too. The journal states that some younger people have higher empathy scores about things then the older generations do. In the tests that they completed in this study they made sure that they had factored in the fact to people tend to answer questions dealing with empathy or responses in a way that shines brighter on them or makes them look like better people even if it is not true. They did this so that they are able to get a more accurate viewpoint on the hypothesis that they were testing.

Type Article #2 Citation in APA format below:

Han, S , Fan, Y & Mao, L. (2008). Gender difference in empathy for pain: an electrophysiological investigation. Brain Research,Volume 1196, pages 85-93.

Type Article # 2 APA formatted Parenthetical Within Text Citation below:

(Han, Fan, Mao 2008)

Type Article # 2 Summary Below (minimum 150 words):

According to part of this study females tend to show more empathy towards someone who is crying then males do. An example of this is when a female has to deal with a crying child and how they deal with it. This report also shows and states the fact that females still tend to have a higher empathetic responses then males tend to have overall. Women have a more psychological response to empathy where males according a study that this journal looked at had more of a physiological response to empathy for something else that someone went through. Their body would tend to make their heart rate go up and/or their skin would become more taught. Even though this study at first was inconclusive because of some of the issues with the test they soon worked out that women still have a more empathetic response then males to a pain that someone is going through whether it is physical or psychological pain.

Type Article #3 Citation in APA format below:

Christov-Moore L., Simpson E., Coude G., Grigaityte K., Iacoboni M., & Ferrari P. (2014). Empathy: gender effects in brain and behavior, neuroscience & biobehavioral reviews. Volume 46, Part 4, pages 604-627.

Type Article # 3 APA formatted Parenthetical Within Text Citation below:

(Christov-Moore et. Al 2014)

Type Article # 3 Summary Below (minimum 150 words):

Empathy is the ability to understand and share in the internal feelings of others. Females in almost all of history have been seen as the Nurturing types as opposed to men who are seen more as the protector of the family. This study goes over how just our gender affects how our empathy develops or if it even develops at all based on the brain and behavior of the person. This also goes over gender and how people who choose which gender they are or decide that they have no gender also have a different form of empathy. This comes from the decision making part of your brain and how you make the conscious choice to be involved in the persons pain and feel empathetic or even sympathetic about it. According to this article there are so many different things that cause empathy in someone of any gender or developmental stage.

Type Article #4 Citation in APA format below:

Harton, Helen C., and Patrick C. Lyons. "Gender, Empathy, and the Choice of the Psychology Major." *Teaching of Psychology*, vol. 30, no. 1, Winter 2003, pp. 19–24.

Type Article # 4 APA formatted Parenthetical Within Text Citation below:

(Harton-Lyons, 2003)

Type Article # 4 Summary Below (minimum 150 words):

       First things first most of the people who graduate with a psychology degree or any type of psychology degree are primarily women in this field, so they are already seen as more empathetic then males based on the other evidences I have found from the other journals. Men if they chose to study psychology they did it because they got higher grades then the classes then they did before. Where if you ask women why they choose to study psychology they did it so that they were able to help others instead of just being able to take care of themselves. This also helps prove that women are more empathetic towards other people then men based on why they chose that specific degree of study. Empathy is a multidimensional study based on the factors of someone's emotions needs and things that happen in their everyday lives. This is the difference between men and women who study the path of psychology or take classes about it.

8 Week Psychology Research Project
Supervised by Professor Sharon Olsen

Student Name: Amanda Broadwater
Date started: February 26

Title of Project: The Influence of Gender and Number of Psychology Courses on Measures of Empathy in Community College Students

Weekly Journal:

Please maintain a weekly journal/report of the research/activities done each week (e.g., literature reviewed, assumptions, and/or conclusions, learning achieved). *This journal will be turned in with the final research paper at the end of the 8 weeks. *

⌐ **Week 1** *February 26*

We went through what was required and expected of the assignment. We then started to brain storm ideas for the project. I thought of one but it needed to be approved so I was told to find 5 sources for it while we figured out if I could do that research assignment.

⌐ **Week 2** *March 1*

Went over my sources and decided that they were good sources for what we thought my research assignment was going to be.

⌐ **Week 3** *March 22*

Skipped two weeks because of spring break and vacations. We went over my new research assignment and I was told to start the research there and what forms I needed to fill out

⌐ **Week 4** *March 29*

Went over my sources and my summeries of the sources and what I needed to add and take away from them. Then was told to find two more websites for the project.

⌐ **Week 5** *April 5*

Went over the sources I had and what final steps of the project I needed to complete. Next week we will be going over the information from the project.

⌐ **Week 6** *April 12*

Couldn't meet this week but I worked on a written outline for my paper so that I could see what I wanted to write in each section.

⌐ **Week 7** *type date here*

Talked about the paper and what needs to be worked on and then discussed that the paper was to be completely done next week

⌐ **Week 8** *type date here*

Went over the graphs from the research that we used and then went over what needed to be turned in by the end of the week.

An Investigation of College Connectedness Factors During a National Pandemic

Destini Bethune & Melina Crowder

Supervised by Sharon Olsen, M.A.

St. Petersburg College

An Investigation of College Connectedness Factors During a National Pandemic

When Covid-19 hit during the Spring 2020 semester, all students had to leave campus and continue their studies fully online. This put a divide between students, professors, and administrators nationwide, including Saint Petersburg College (SPC). SPC endured a fracture in their college connectedness while dealing with Covid-19, as well as many others. To demonstrate, a study at an undergraduate liberal arts college state, "Overall, participants feel less connected to their peers, but felt more connected to their professors when compared to pre-pandemic learning." (Boardman, et al., 2021). As shown, even though students were separated from their professors face-to-face, the students felt more connected when taking classes online. Maybe due to more compassion and understanding of each other because of the hard time everyone is facing. It is also possible that by learning at home on a computer using zoom, it allowed the classes to become more personable. However, this study also states, "Participants also felt less motivated to work and procrastinated noticeably more after the switch to emergency learning." (Boardman, et al..). Many factors can contribute to this feeling and act of procrastination, because of the effect Covid-19 had on mental health. Depression or shock from switching online urgently, some students of which never did online learning before, could have contributed to the procrastination among students.

Other research (Abudu, 2008) has investigated student engagement in college students and what factors or aspects play a role in how engaged a student is in their college. The authors of this study hypothesized that the more a student is integrated and involved, the higher rate of academic success and satisfaction. Over the past 20 years, graduation rates have not improved and it has been discovered that it is taking more time to earn degrees rather than less. Since student engagement and academic success have been shown to be related, retention rates can

provide insight on a student's academic success. When trying to understand the relationship between student success and engagement, assessing professors can be an aspect to look into more. The only issue is that when assessing educators with all of their different teaching styles it can be hard to pinpoint which teaching approaches are the most beneficial to the students. In conclusion it has been found that self- assessments and self-regulation are crucial in a student's success as well as mindfulness and the student's perception.

In another study conducted by (Jorgenson, Farrell, Fudge, Pritchard 2018), researchers found that students need a clear definition of connectedness. They provide practical suggestions for higher education institutions to use to help students feel more connected to their campus. In this article as well, the ideas of social identity theory and student involvement theory are used to better understand connectedness from the perspective of students. In the first study it was found that there is a relationship of tension between what kind of experience students expected in their college career and what they have done in their college years so far. In the results for the first study it was also found that relationships with instructors and the overlap of social and institution connectedness are important themes in student connectedness as well. Findings in the second study find that different forms of connectedness like student connectedness and connectedness to old friends play various important roles overall.

When looking at traits and factors that impact college connectedness for students, shyness should be considered. Shyness not only impacts emotions, behaviors and reactions, but it creates a sensitivity to actions that could lead to feelings of rejection. In addition to being in college during a national pandemic, students with shy personalities have an even harder time feeling connected to their campus. (Abudu, 2008) studied the relationship between college connectedness and students with shy personalities, the strongest correlation was with shyness

and attachment to college and social adjustment. It has been found that high levels of shyness have a strong correlation between low levels of academic adjustment and personal-emotion as well. To help these students feel more connected it is recommended that college counselors encourage students to get involved in social and academic programs to assist them in navigating the college environment. These same programs that help shy students can be very beneficial for students who haven't been connected to college due to the pandemic as well.

In another study (Boardman, Vargas, Cotler, Burshteyn, 2021), due to the national pandemic, an undergraduate liberal arts college had to transition to online learning for the time being. In this study, an online survey was conducted to better understand the effects and overall impact of this switch from on campus to online. It was found that many students in this study felt a disconnect between their peers but felt more connected to their professors. With that being said, students still felt as though they prefer the normal, face-to-face interactions with their instructors instead. As a possible benefit of this switch to online, it was found that shy students may feel more comfortable sharing and engaging in classes due to the lack of peer pressure and being able to join class from home. As a result of this study it was found that Zoom meetings and email were the main factors of why students don't feel completely alienated and are able to communicate with professors. In conclusion, it has been found that connections between students are very significant for not only academic success but personal motivation as well.

The purpose of the present study will investigate the impact of the Covid-19 pandemic on how connected students feel towards their college/campus (i.e., "campus connectedness"). This study aims to add to the current understanding of the importance of campus connectedness in students enrolled in a community college. It is hypothesized that compared to previous years, students will score lower on measures of campus connectedness as measured by an online

questionnaire provided by the Psi Beta National Honor Society for Psychology Students'

National Research Project. The importance of campus connectedness will be discussed, with a

focus on ways that colleges can improve student engagement and connectedness. The target

population is students enrolled in community colleges. Because this is a national research project

that is coordinated through the Psi Beta national office, they provide IRB approval through the

Psychology Department's Institutional Review Board at Irvine Valley College.

Method

This study is part of the 2021-22 Psi Beta National Research Project. This study will

investigate the impact of the Covid-19 Pandemic on how connected students feel towards their

college/campus (i.e. "campus connectedness"). We hypothesize that the current average "campus

connectedness" scores will be lower than the average connectedness scores from several years

ago (prior to Covid-19). The importance of campus connectedness will be discussed, with a

focus on ways that colleges can improve student engagement and connectedness. The target

population is students enrolled in community colleges. Because this is a national research project

that is coordinated through the Psi Beta national office, they provide IRB approval through the

Psychology Department's Institutional Review Board at Irvine Valley College. Irvine Valley

College's IRB is registered with the federal Office for Human Research Protections (OHRP) as

Institutional Review Board (IRB # IRB00009084 This study is exempt in accordance with

institutional policy 6Hx23-3.908 and institutional procedure P6Hx23-3.908 governing the St.

Petersburg College Research Review Committee.

The data collection period will begin in the Spring semester of 2022. SPC students ages

18 and up enrolled in PSY1012, DEP2004, and CLP2140 will be asked to voluntarily participate

in the study. Subjects will be currently enrolled SPC students who are enrolled in PSY1012,

DEP2004 and CLP2140 courses at the St. Petersburg College. Subjects will be recruited via an email sent from the principal investigator through MyCourses and students will be asked to volunteer to complete the online questionnaire. A script will be used to recruit volunteers (see attached). Students who choose to participate will then complete the online informed consent. Students will be debriefed at the end of the study. Participants will anonymously complete the self-report questionnaire via a web link. No personal information will be collected from students, aside from a confirmation that the participant is over the age of 18. At the end of the study, all subjects will receive a debriefing form and a brief description of the study. All students will receive the contact information of the primary investigator in case they want more information.

The data collection period will end on February 15, 2022. At that time, Psi Beta will remove all identifying information, make the raw data file available to participating chapters, and provide tutorials on how to cleanse and prepare the data, and analyze the data using introductory-level statistical tests. Psi Beta students, working alone or in groups, will have the options of forming and testing hypotheses, and preparing research poster and/or paper on their findings. The study's data will be downloaded as a spreadsheet to the PI's desktop computer. All identifying information will be stripped from the file, and the file will be cleansed and prepared for analysis. The file will be kept on a backup drive in the PI's home office. The identifying information will be deleted from the file within two days after the data gathering phase ends. The file prepared for analysis will be made available to research students until March 30, 2022.The final data file will be archived for 7 years in case another research entity requests a copy of the data.

Student engagement and campus connectedness correlates strongly with college success. This study will investigate the impact of the Covid-19 pandemic campus connectedness and student engagement. This research will also review ways that colleges can improve campus connectedness for students. This research will benefit public knowledge by extending our understanding of campus connectedness in community colleges as it relates to the experience of the Covid-19 Pandemic. Student researchers will benefit from learning about the research and data collection process.

References

Abudu, J. (2008, December). College Adjustment and the Shy Student. Pittsburg State

    University Library Services. Retrieved from

    https://digitalcommons.pittstate.edu/etd/186/.

Boardman, K. L., Vargas, S. A., Cotler, J. L., & Burshteyn, D. (2021). Effects of

    Emergency Online Learning during COVID-19 Pandemic on Student Performance and

    Connectedness. *Information Systems Education Journal*, *19*(4), 23-36.

Campus Connectedness (Tucker & Rudmann, 2008). Unpublished instrument, Irvine Valley

    College Department of Psychology.

Caruth, G. D. (2018). Student Engagement, Retention, and Motivation: Assessing Academic

    Success in Today's College Students . Participatory Educational Research , 5 (1) , 17-30 .

    DOI: 10.17275/per.18.4.5.1

Gosling, S. D., Rentfrow, P. J., & Swann, W. B., Jr.(2003). A Very Brief Measure of the Big

    FivePersonality Domains. Journal of Research in Personality,37, 504-528.

Horzum, M. H. (2016). Examining the relationship to gender and personality on the purpose of

    Facebook usage of Turkish university students. Computers in Human Behavior, 64, 319-

    328. http://doi.org/10.1016/j.chb.2016.06.010

Interpersonal Communication Efficacy Scales – (Tucker & Rudmann, 2009). Unpublished

    instrument, Irvine Valley College Department of Psychology.

Jorgenson, D. A., Farrell, L. C., Fudge, J. L., & Pritchard, A. (2018). College connectedness: The

    student perspective. Journal of the Scholarship of Teaching and Learning, 18(1), 75-95.

Weyer, C. Y., & Carducci, B. J. (2001, August). The three-component model of shyness:

   Conceptual, correlational, and treatment considerations. Post presentation at the annual

   meeting of the American Psychological Association, San Francisco.

Xanidis, N., & Brignell, C. M. (2016). The association between the use of social network sites,

   sleep quality and cognitive function during the day. Computers in Human Behavior, 55,

   121–126. https://doi.org/10.1016/j.chb.2015.09.004

8 Week Psychology Research Project
Supervised by Professor Sharon Olsen

Student Name: Destini Bethune
Date started: 10/25/2021

Title of Project: An Investigation of College Connectedness Factors During a National Pandemic

Review of Scholarly Literature

In your own words, please summarize the findings of at least 4 (or more) scholarly sources on the topic of college connectedness, Campus Connectedness, Each summary should be at least 150 words.

How to search the SPC Library Online Databases:

You can find scholarly sources by going to the SPC library online databases (From the home page of this course, scroll to the bottom of the page and click on Library Resources and Services. From there, you can either do a basic search by typing into the search box, or you can search individual databases by clicking on "Databases A-Z". Some of my favorite databases in the "Databases A-Z" section are: APPI PsychiatryOnline Premium; Biography in Context (Gale); Biography Index (EBSCO); Opposing Viewpoints in Context (Gale); PsycArticles (EBSCO); and Psychology Collection (Gale). Once you are in one of those databases, you can type your search words into the search box. Try search words like "campus connectedness", "College success", "student engagement".

As a sample article, you can read this article for more ideas:
https://files.eric.ed.gov/fulltext/EJ1169938.pdf

How to Cite Properly in APA Format:

When creating APA formatted references, use the following as a guide (and please note that the 2nd line in a citation is indented. This is called a "hanging indent".

Author(s) last name, first initial(s). (Year). Title of the article with only the first word
    capitalized. *Title of Journal, Volume of Journa*l (issue number), page numbers. doi:
    00.00xxx0000

Kemps, E., Tiggermann, M., Orr, J., & Grear, J. (2014). Attentional retraining can reduce
    chocolate consumption. *Journal of Experimental Psychology, 20*(1), 94-102. doi:
    10.1037/xap0000005

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In parenthetical citations, the author name and publication date appear in parentheses.
In narrative citations, the author name is incorporated into the text as part of the sentence and the year follows in parentheses.

See explanations and examples below:

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Both the author and the date, separated by a comma, appear in parentheses for a parenthetical citation. A parenthetical citation can appear within or at the end of a sentence.

Example of parenthetical within text citation:

Psychology includes the study of conscious and unconscious phenomena (Koehler, 2016).

Narrative Within Text Citations
The author's surname appears in running text, and the date appears in parentheses immediately after the author's name for a narrative citation. The author's name can be included in the sentence in any place it makes sense.

Example of narrative within text citation:

Koehler (2016) noted that psychology includes the study of conscious and unconscious phenomena.

Below is a sample of what you will submit to me:

Type Article #1 Citation in APA format below:

Jolliffe, D & Farrington, D. (2006). Development and validation of the basic empathy scale.
　　　Journal of Adolescence,Volume 29, Issue 4

Sample Article # 1 APA formatted Parenthetical Within Text Citation below:

(Jolliffe, Farrington 2006)

Sample Article # 1 Summary Below (minimum 150 words):

This specific journal goes over the facts of how empathy develops and how a lack of empathy can cause someone to be more aggressive and antisocial with the communities that are around them. It also goes into how women tend to have a higher empathy score then men and why it turns out that way based on the studies that they did. They also found that the age of someone and the empathy that they have developed is different too. The journal states that some younger people have higher empathy scores about things then the older generations do. In the tests that they completed in this study they made sure that they had factored in the fact to people tend to answer questions dealing with empathy or responses in a way that shines brighter on them or makes them look like better people even if it is not true. They did this so that they are able to get a more accurate viewpoint on the hypothesis that they were testing.

Type Article #1 Citation in APA format below:

Jorgenson, D. A., Farrell, L. C., Fudge, J. L., & Pritchard, A. (2018). College connectedness: The student perspective. *Journal of the Scholarship of Teaching and Learning, 18*(1), 75-95.

Type Article # 1 APA formatted Parenthetical Within Text Citation below:

(Jorgenson, Farrell, Fudge, Pritchard 2018)

Type Article # 1 Summary Below (minimum 150 words)

The main finding of the studies conducted in this article is that students need a clear definition of connectedness and provide practical suggestions for higher education institutions to use to help students feel more connected to their campus. In this article as well, the ideas of social identity theory and student involvement theory are used to better understand connectedness from the perspective of students. In the first study it was found that there is a relationship of tension between what kind of experience students expected in their college career and what they have done in their college years so far. In the results for the first study it was also found that relationships with instructors and the overlap of social and institution connectedness are important themes in student connectedness as well. Findings in the second study find that different forms of connectedness like student connectedness and connectedness to old friends play various important roles overall.

Type Article #2 Citation in APA format below:

Caruth, G. D. (2018). Student Engagement, Retention, and Motivation: Assessing Academic Success in Today's College Students . Participatory Educational Research , 5 (1) , 17-30 . DOI: 10.17275/per.18.4.5.1

Type Article # 2 APA formatted Parenthetical Within Text Citation below:

   (Abudu, 2008)

Type Article # 2 Summary Below (minimum 150 words):

Overall this specific article discusses student engagement in college students and what factors or aspects play a role in how engaged a student is in their college. The main hypothesis is that the more a student is integrated and involved, the higher rate of academic success and satisfaction. Over the past 20 years, graduation rates have not improved and it has been discovered that it is taking more time to earn degrees rather than less. Since student engagement and academic success have been shown to be related, retention rates can provide insight on a student's academic success. When trying to understand the relationship between student success and engagement, assessing professors can be an aspect to look into more. The only issue is that when assessing educators, with all of their different teaching styles it can be hard to pinpoint which teaching approaches are the most beneficial to the students. In conclusion it has been found that self- assessments and self-regulation are crucial in a student's success as well as mindfulness and the student's perception.

Type Article #3 Citation in APA format below:

Abudu, J. (2008, December). *College Adjustment and the Shy Student*. Pittsburg State University Library Services from https://digitalcommons.pittstate.edu/etd/186/.

Type Article # 3 APA formatted Parenthetical Within Text Citation below:

(Abudu, 2008)

Type Article # 3 Summary Below (minimum 150 words):

When looking at traits and factors that impact college connectedness for students, shyness should be considered. Shyness not only impacts emotions, behaviors and reactions, but it creates a sensitivity to actions that could lead to feelings of rejection. In addition to being in college during a national pandemic, students with shy personalities have an even harder time feeling connected to their campus. As a result of this research in the relationship between college connectedness and students with shy personalities, the strongest correlation was with shyness and attachment to college and social adjustment. It has been found that high levels of shyness have a strong correlation between low levels of academic adjustment and personal-emotion as well. To help these students feel more connected it is recommended that college counselors encourage students to get involved in social and academic programs to assist them in navigating the college environment. These same programs that help shy students can be very beneficial for students who haven't been connected to college due to the pandemic as well.

Type Article #4 Citation in APA format below:

Boardman, K. L., Vargas, S. A., Cotler, J. L., & Burshteyn, D. (2021, July 31). *Effects of emergency online learning during COVID-19 pandemic on student performance and connectedness.* Information Systems Education Journal. Retrieved from https://eric.ed.gov/?q=college&id=EJ1310048.

Type Article # 4 APA formatted Parenthetical Within Text Citation below:

(Boardman, Vargas, Cotler, Burshteyn, 2021)

Type Article # 4 Summary Below (minimum 150 words):

Due to the national pandemic an undergraduate liberal arts college had to transition to online learning for the time being. In this study, an online survey was conducted to better understand the effects and overall impact of this switch from on campus to online. It was found that many students in this study felt a disconnect between their peers but felt more connected to their professors. With that being said, students still felt as though they prefer the normal, face-to-face interactions with their instructors instead. As a possible benefit of this switch to online, it was found that shy students may feel more comfortable sharing and engaging in classes due to the lack of peer pressure and being able to join class from home. As a result of this study it was found that Zoom meetings and email were the main factors of why students don't feel completely alienated and are able to communicate with professors. In conclusion, it has been found that

connections between students are very significant for not only academic success but personal motivation as well.

8 Week Psychology Research Project
Supervised by Professor Sharon Olsen

Student Name: Destini Bethune
Date started: 10/25/2021

Title of Project: An Investigation of College Connectedness Factors During a National Pandemic

Weekly Journal:

Please maintain a weekly journal/report of the research/activities done each week (e.g., literature reviewed, assumptions, and/or conclusions, learning achieved). *This journal will be turned in with the final research paper at the end of the 8 weeks. *

⬚ **Week 1** *October 25, 2021*

In today's meeting Professor Olsen and I introduced ourselves and discussed what is expected for during these eight weeks. We discussed possible topics for our research project this year and after the meeting during this week, I researched general information on a few of different topics choices.

⬚ **Week 2** *November 1, 2021*

This week, we decided our topic would be the impact of campus connectedness during a national pandemic (COVID-19). Our hypothesis is that students feel less connected to their campus during this pandemic. We also reviewed the previous research projects for examples of what to do for this year.

⬚ **Week 3** *November 8, 2021*

This week we had a brief meeting. Professor Olsen and I checked in to check my progress with this project for the week. This week I found two sources, but only summarized one.

⬚ **Week 4** *November 15, 2021*

In this meeting, Melina and I shared our research so far with one another. We took a look at the forms that need to be completed and the criteria for the research to be conducted. In addition I summarized my second article I found.

⬚ **Week 5** *November 22, 2021*

There was no Zoom meeting this week, so I conducted more research to find more articles that fit our study and research paper.

⬚ **Week 6** *November 29, 2021*

In this week's meeting, we shared our research via Zoom. We made a plan to begin our research paper today so I created a Google Docs form for us to work on this paper collectively. I found two more articles and summarized them to add to our paper as well.

⬚ Week 7 *December 6, 2021*

As this URE comes to an end this week was all for wrapping up this project for now. I added all of my research summaries and references to the final paper for the end of this 8- week project. In our meeting we discussed what is to be turned in by the end of the week and what will come after the holiday break

⬚ Week 8 *December 13, 2021*

Although my eight weeks of this research project are coming to an end, I still plan on working on this project in the Spring. Professor Olsen and I discussed the next steps of this project and a general time frame for the poster presentation portion and the publication. During these eight weeks I have learned about the data collection process, reviewing academic journals and writing a research paper for a conducted study.

SPC St. Petersburg College

Student Research Final Report

Name: Madison Gauley   **Professor:** Kim Molinaro, M.Ed

Date: 4/20/21

Age and Content of Earliest Childhood Memory Outline of Responsibilities

- Performing primary literature research on the age and content of earliest childhood memories, including a rating of high-social, low-social, and non-social, and identification of emotions during recall in accordance with the Gottman Feeling Wheel.

- Performing structured interviews for data collection.

- Meeting with Professor Molinaro via Zoom on a weekly basis for status updates and determination of the next week's goals.

- Measures of central tendency will be calculated to discuss the age of the recollection of the participants' earliest childhood memories. Next, the content of the recollection will be coded as high-social, low-social, or non-social (Speer & Delgado, 2020). The emotions identified on the Gottman wheel will be associated with the high-social, low-social, or non-social rating.

- Completing compiled report of the research/activities done each week (e.g. results observed, assumptions, and/or conclusions, learning achieved).

Literature Review and Purpose of Project

The dynamics associated with childhood memories are multifaceted. Childhood amnesia makes accessing early memory more complicated. In contrast, autobiographical memory connects memory to the person's sense of self, particularly as related to one's own recall ability as opposed to what a person has been told, seen, or heard. Childhood memory also adds interpretation more so than factual recall (Pasupathi & Wainryb, 2010). Even during early childhood, a layer of interpretation may be added to the memory recall (Pasupathi & Wainryb, 2010). Consequently, the factual recall of childhood memory tends to depend on multiple factors, including age and the actual content of the memory.

Childhood amnesia is the earliest age at which a child cannot recall some kind of memory from their past (Loftus, 1993). Most memories are not recalled before the age of 3 or 4. Sometimes, the lack of ability to recall memories is due to the repression of memories. Sigmund Freud originally believed

that childhood amnesia was the result of repression due to the aggressive and sexual content embedded within those memories, even though the memories themselves were in excellent condition (Tustin & Hayne, 2010). These memories may be accessed through the use of cues to assist in the recollection process, but over the course of development, early memories eventually become inaccessible (Wang & Peterson, 2014). The earlier that a memory was encoded, the greater the risk for a dating error to occur as time progresses. Thinking about positive memories can help to counteract the negative memories of early childhood. These positive memories are a reminder that we do have people who support us (Speer & Delgado, 2020).

Autobiographical memory is a memory related to the self. Loftus (1993) found that in a study by Usher and Neisser (1993), adults were able to recall memories from when they were two years of age. These memories consisted of the birth of a sibling. They had to answer 17 questions related to the event and the mother of the participant was able to attest to the accuracy of their answer. Almost 60% of the adults were able to meet the specific criteria of answering at least three questions accurately. Eighty percent of the participants reported having an external source that helped them with their recollection. In autobiographical memory, the memory has to be completely their own without the help of an external source of information, such as hearing a story from their childhood told by someone else or by viewing a picture.

According to Tustin and Hayne (2010), external information may not assist recall ability. Having some kind of reminder for participants to recall a memory of the birth of a sibling did not help them to remember any more detail than they had already given, and the majority of the earliest memories fell between 2 and 4 years of age (Tustin & Hayne, 2010). The current age of the participants also seemed to influence the resulting age of their earliest memory. Younger children were able to recall memories with an earlier age than adolescents or adults (Tustin & Hayne, 2010). The older the chronological age, the more difficult it is for one to access their earliest memories.

Most people usually postdate their memories, meaning that they remember events happening more recently than they actually did (Wang & Peterson, 2014). According to Wang and Peterson (2014), when an external information source was presented, 94% of the children were able to recall at least one memory and the date of the memory. Older children more accurately recalled overlapping memories than did younger children. Accordingly, older children tended to be better at retaining autobiographical memories for a longer period of time, unlike the younger children (Wang & Peterson, 2014). As the child gets older, postdating will increase, resulting in memories being encoded as later than they really occurred.

Autobiographical memories are easier to recall when it is a shared memory in a high-social situation (Pasupathi & Wainryb, 2010). This means that memories involving the people we care about are easier to remember, rather than a memory from a low-social (acquaintances), or non-social (alone) setting (Speer & Delgado, 2020). Memories appear to provide a sense of identity. Emotions, thoughts, and ideas are essential to make an experience meaningful for a person (Pasupathi & Wainryb, 2010). Children often have more detailed memories because they elaborate more on what they believe happened (Pasupathi & Wainryb, 2010). These interpretations can include factual information (like the actions that occurred), but it does not make up the entirety of the memory. As an individual grows older, they begin to develop their own life story, and they can generate and elaborate on the episodes

within it (Pasupathi & Wainryb, 2010). Older children and adolescents appear to have an increased ability to elaborate on interpretive content in their narration of memories.

The purpose of this research study is to implement a structured interview to identify the age and content of the earliest childhood memory the participants can independently recall. At the beginning of each structured interview, Informed Consent will be discussed and collected for each participant. The participants will be asked in accordance with the Gottman Institute Feeling Wheel to identify the core emotion experienced during their recall of the earliest childhood memory in terms of sad, mad, scared, joyful, powerful, and peaceful, which are the interior emotions of the Gottman Feeling Wheel. Depending on the identified emotion, participants will be asked to identify a more specific adjective related to their emotional recall of the experience consistent with the next layer of emotions on the Gottman Wheel. After the data collection, measures of central tendency will be calculated to discuss the age of the recollection of the participants' earliest childhood memories. Next, the content of the recollection will be coded as high-social, low-social, or non-social (Speer & Delgado, 2020). The emotions identified on the Gottman wheel will be associated with the high-social, low-social, or non-social rating. In addition, the recollection of a family story or photo was related to the age of the participant at the time of the memory recalled.

References

Loftus, E. F. (1993). Desperately seeking memories of the first few years of childhood: The reality of early memories. *Journal of Experimental Psychology: General*, *122*(2), 274–277. https://doi.org/10.1037/0096-3445.122.2.274

Pasupathi, M., & Wainryb, C. (2010). On telling the whole story: Facts and interpretations in autobiographical memory narratives from childhood through midadolescence. *Developmental Psychology*, *46*(3), 735–746. https://doi.org/10.1037/a0018897

Speer, M. E., & Delgado, M. R. (2020). The social value of positive autobiographical memory retrieval. *Journal of Experimental Psychology: General*, *149*(4), 790–799. https://doi.org/10.1037/xge0000671.supp (Supplemental)

Tustin, K., & Hayne, H. (2010). Defining the boundary: Age-related changes in childhood amnesia. *Developmental Psychology*, *46*(5), 1049–1061. https://doi.org/10.1037/a0020105

Wang, Q., & Peterson, C. (2014). Your earliest memory may be earlier than you think: Prospective studies of children's dating of earliest childhood memories. *Developmental Psychology*, *50*(6), 1680–1686. https://doi.org/10.1037/a0036001

Weekly Reports and Data

-        Meeting #1 (Week 1: February 23, 2021) Meeting with Professor Molinaro to discuss six research ideas, from which we selected one. The research question is "What is the age and content of people's earliest childhood memory?" We discussed the literature review process, how to read research studies, and we identified PsychArticles are the key database for academic literature. We also discussed citations and the steps for the literature review. Action items for next meeting were established as identifying and reviewing three academic articles related to my research questions.   Next meeting date was established for March 2nd at 8:15 AM though Zoom.

-        Meeting #2 (Week 2: March 2, 2021) Meeting with Professor Molinaro to discuss autobiographical articles related to my research topic to finish the literature review. We discussed a few standards of beginning a convenience study sample. We also discussed how to draft an APA style literature review. We identified the two different articles of autobiographical memory through the PsychArticles Database and discussed the specific steps in formulating a literature review in psychology. Action items for this next week is to develop the rest of my literature review articles and to work on drafting the body portion of my literature review. Next meeting date was established for March 16th at 8:15 AM through Zoom.

-        Meeting #3 (Week 3: March 16th 2021) Meeting with Professor Molinaro to discuss and edit the body of the literature review. Together we wrote and edited the introduction of the literature review. Week 3 Meeting #2 was established for Thursday, March 18th at 8:15 AM through Zoom. We will discuss the conclusion of the literature review and plan the research methodology for the study.

-         Meeting #4 (Week 3: March 18th 2021) Meeting with Professor Molinaro to establish the research methodology, the structured interview format, the data collection and complete the literature review, including the purpose of this study. The Gottman Wheel was selected to code the selection of the memory recalled (see Figure 1). Next meeting was established for Tuesday, the 23rd at 8:15 AM via Zoom.
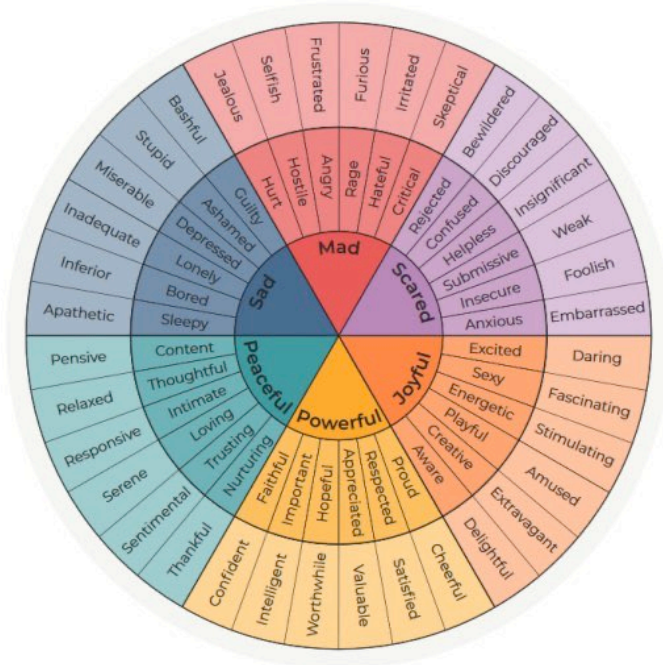
Figure 1: The Gottman Feeling Wheel

[The Gottman Feeling Wheel - Bing images](#)

-        Meeting #5 (Week 4: March 23rd 2021) Meeting with Professor Molinaro to discuss the methodology of the convenience study at Abundant Life Ministries. We agreed that I would contact Pastor Anthony McDaniel for approval of the location where I would do the structured interviews for the next two weeks. I would also work to gather my group of 16 participants and the times to meet with them. We finalized Informed Consent (see Figure 2). We also established the questions I will ask my participants (see Figure 3). The next meeting was established for Tuesday, March 30th, via Zoom.

-        Meeting #6 (Week 5: March 30th 2021) Meeting with Professor Molinaro to review the second week of data collection. Data collection will be completed for the 16 participants by Wednesday, March 31st. We problem solved a standardization concern, discussed confidentiality with use of the random number generator: https://www.calculator.net/random-number-generator.html, and identified the method to synthesize the researcher's notes during the structured interview with the transcript from Otter AI. Our next meeting was established for Tuesday, April 6th, via Zoom.

INFORMED CONSENT

This is a structured interview study that explores the age and content of the earliest childhood memory the participants can independently recall. At the beginning of each structured interview, Informed Consent will be discussed and collected for each participant. Participants will be selected through a sample of convenience from members of Abundant life Ministries. Upon arrival, participants will experience the following:

- Researcher will verbally discuss the Informed Consent with the participant.
- Participants will be asked a series of questions related to the age and content of their earliest childhood memories in a structured interview format.

Participation in this structured interview is voluntary and therefore any participant who wishes to withdraw may do so at any time. In conducting this structured interview, we are hoping to add to the research that has been conducted with similar techniques about the age and content of childhood memories. Participants have limited confidentiality.

Each participant is randomly assigned numbers through the sampling procedure. Names and corresponding numbers are maintained on a master list exclusively for the purpose of accuracy of age and content of childhood memories. The list is confidential, and the names of each participant are known only by Madison Gauley.

If you have any questions during the experiment, please feel free to ask. For more information about this research or for any questions concerning participation in this experiment contact Madison Gauley at 727-337-1472 or mgauley907@gmail.com. I have read and understood the above information.

_____   _____

        Signature   Date

Figure 2: Informed Consent

1. Tell me about the earliest childhood memory you can remember on your own.
2. What is your best estimate of the age of this childhood memory?
3. When you recalled the early childhood memory, which of the following emotions best captures your feelings at the time of the memory and now while you recall it? (It can be the same emotion or different.)
   a) Sad, Mad, Scared, Joyful, Powerful, Peaceful, or Other and if Other, the participant will self-identify the feeling.
   b) Then, dependent on the feeling they identify, you will ask which of the next layer of emotions on the Gottman Feeling Wheel best describes their experience then and now regarding the childhood memory.
4. Can you recall any photographs that related to this memory, or any family stories about this memory?
5. What year were you born?

Figure 3: Structured Interview

-       Meeting #7 (Week 6: April 6th 2021) Meeting with Professor Molinaro to identify and standardize data calculations as follows:

Step #1: Assigning subjects a random number via the use of a Random Number Generator.

Step #2: Determining the Mean, Mode, and Median of the subjects' estimated age of the memory recalled.

Step #3: Calculating the percentages of the emotions identified by the subjects in the first and second layers of the Gottman Feeling Wheel.

Step #4: Rating the memory as high-social, low-social, or non-social based on the closeness of the relationship of the subject to those in the memory (High-social, such as nuclear family, named best friends, grandparents; Low-social: non-named acquaintances, non-named/non-nuclear family members; Non-social: alone).

Step #5: Reporting those findings of sociability in percentages once calculated.

Step #6: Looking at the social rating and connecting it to the core emotion most identified based on the interior layer of the Gottman Wheel.

Step #7: Determining if the subject could recall any photographs or family stories and calculate the percentage of those who said yes and those who said no.

Step #8: Determining the Mean, Mode, and Median of all of the subjects within the study.

Step #9: Connecting the range of age to the response of whether there were photos or family stories associated with the recalled memory. (Age range 18-35 and 36 -72). Calculating the percentage of age range and a yes response and age range of no.

Next meeting was established for Tuesday, April 13th, via Zoom.

- Meeting #8 (Week 7: April 13th 2021) Meeting with Professor Molinaro to write up the narrative form of the results of the study. Determined the use of Pie Charts would be the most effective way to relate the data. Included another article to explain the age range of autobiographical memory relating to the ages of the participants when the memory took place. Action steps for next meeting is to complete the narrative of the results and create pie charts to represent the data. Next meeting was established for Tuesday, April 20th, via Zoom.

- Meeting #9 (Week 8: April 20th 2021) Meeting with Professor Molinaro to refine and finalize the student report and conclusions. Discussed lessons learned, identified strengths of the research process, and reflected on the research experience.

Conclusions

        The participants were asked to identify the age at which they can independently recall their earliest childhood memory. The Mean age of the recalled memory was 3, the Mode was 2, and the Median was 3. There were some participants who listed two ages when recalling a memory, and the earlier age was used in this study. Fifty percent of the participants identified two ages, and there was only a one year gap between the recalled ages, such as between 1 and 2 years old. Even though the participants were asked to independently recall a memory, half of them reported either hearing family stories or seeing photographs relating to the memory they specified. Consequently, priming of the recalled memory through photos or family stories may have influenced the participants' recollection of the memory reported during this data collection.

        The identified age range of the participants at the time of data collection was between 18 and 72 years of age. The Mean was 37.25, the Mode was 30, and the Median was 31.5. The age range was split into two groups: 18-35 years of age and 36-72 years of age. Of those participants identified to be between 18-35 years of age, 75% recalled a family story or photo. Twenty-five percent of the participants between the age of 36-72 recalled a family story or photo.

        According to Ross, Hutchinson, and Cunningham (2020), autographical memory has limits to the earliest age of recall. Developmental theory suggests the earliest age of recall for autobiographical memory is between 3 years old and 6 years old (Ross, Hutchinson, and Cunningham, 2020). Consequently, 43.75% of the participants of this study fell below the age threshold, reporting age of memory at 1 or 2 years old.

        During this data collection, participants were asked to identify the core emotion associated with the recalled memory, using the Gottman Feeling Wheel. Fifty percent reported Joyful, 25% reported Scared, 13% reported Other, 6% reported Peaceful, 6% reported Sad, and 0% reported Powerful and Mad.
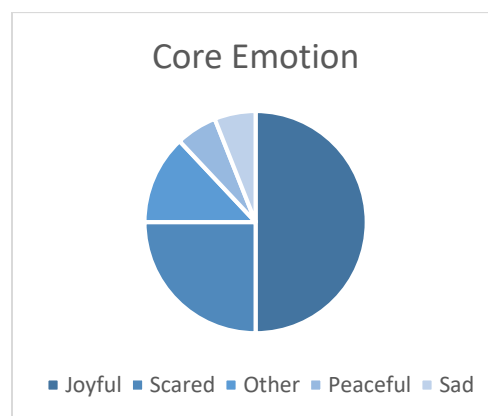

Figure 4: Core Emotion Identified

      Of those who reported Joyful, 50% reported Excited and 50% reported Playful. Of those who selected Other, 50% selected Excited, and 50% reported Confused. Of those who reported Scared, 50% reported Helpless, 25% reported Anxious, and 25% reported Confused. Zero percent reported Powerful

and Mad, so there were no choices within this subdivision. Of those who reported Peaceful, 100% reported feeling Loved. Of those who reported feeling Sad, 100% reported feeling Lonely.
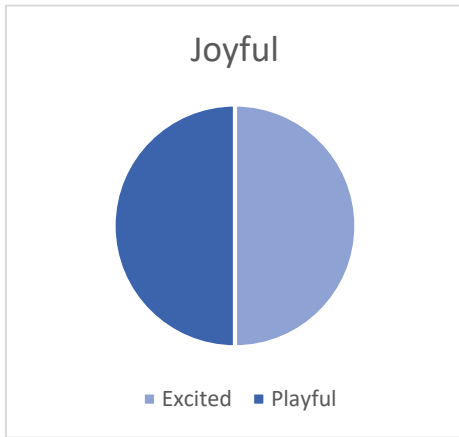
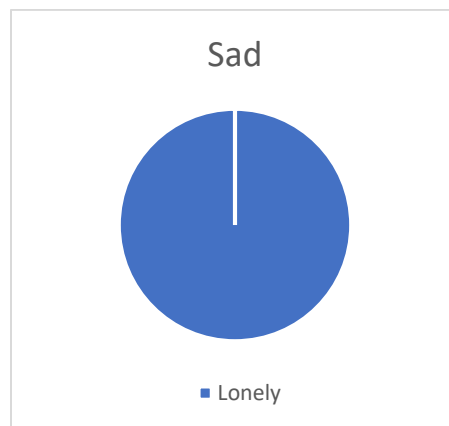*Figure 5: Joyful Subdivisions*
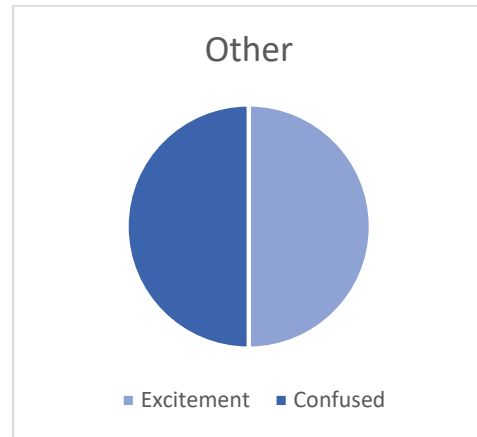
Figure 6: Other Subdivisions

*Figure 7: Scared Subdivisions*



Figure 8: Peaceful Subdivisions

Figure 9: Sad Subdivisions

The sociability of the participants in relation to the memory was established. High-social was defined as "socially close others," such as nuclear family members, grandparents, and named best friends. Low-social was defined as acquaintances, such as friends or other non-named people, or non-named other family members. Non-social was defined as alone. Seventy-five percent of participants had a high-social memory, 19% had a non-social memory, and 6% had a low-social memory.
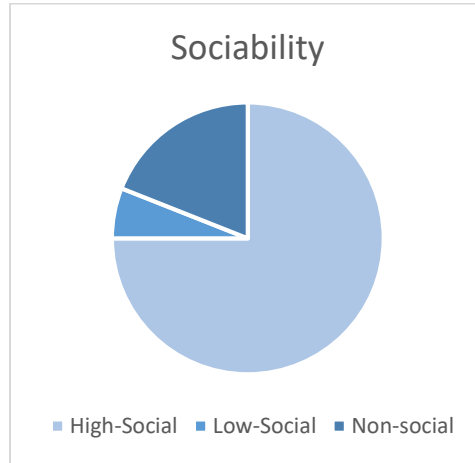

Figure 10: Social-Rating

Of those who were determined to have a high-social memory, 50% reported feeling Joyful, 25% reported feeling Scared, 17% reported feeling Other, and 8% reported felling Peaceful. Of those who were determined to have a low-social memory, 100% of participants reported feeling Scared. Of those who were determined to have a non-social memory, 67% reported feeling Joyful, and 33% reported feeling Sad.
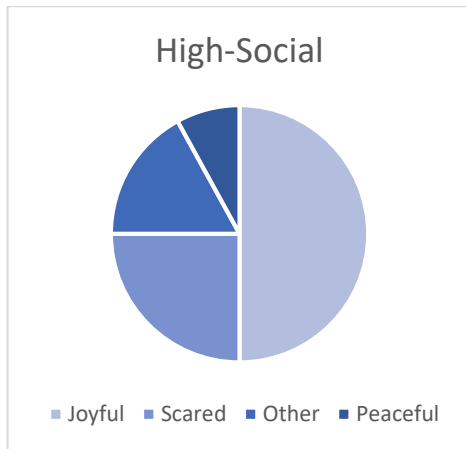
Figure 11: High-Social Core Emotion
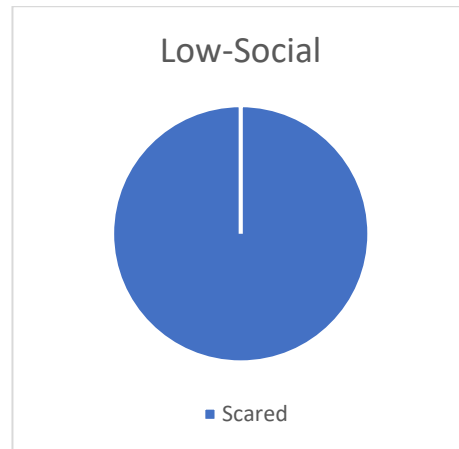
Figure 12: Low-Social Core Emotion

![St. Petersburg College logo - SPC St. Petersburg College]
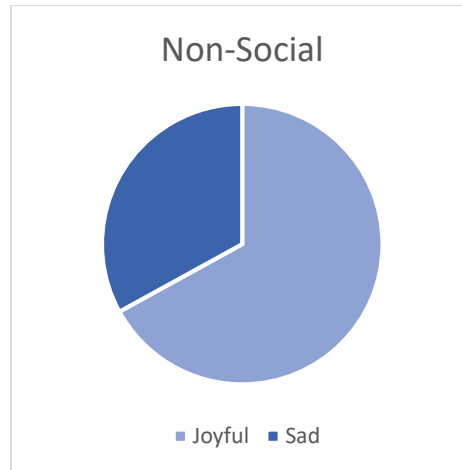
Figure 13: Non-Social Core Emotions

References

Loftus, E. F. (1993). Desperately seeking memories of the first few years of childhood: The reality of early memories. *Journal of Experimental Psychology: General*, *122*(2), 274–277. https://doi.org/10.1037/0096-3445.122.2.274

Pasupathi, M., & Wainryb, C. (2010). On telling the whole story: Facts and interpretations in autobiographical memory narratives from childhood through midadolescence. *Developmental Psychology*, *46*(3), 735–746. https://doi.org/10.1037/a0018897

Ross, J., Hutchison, J., & Cunningham, S. J. (2020). The me in memory: The role of the self in autobiographical memory development. *Child Development, 91*(2), 299-314. doi:10.1111/cdev.13211

Speer, M. E., & Delgado, M. R. (2020). The social value of positive autobiographical memory retrieval. *Journal of Experimental Psychology: General*, *149*(4), 790–799. https://doi.org/10.1037/xge0000671.supp (Supplemental)

Tustin, K., & Hayne, H. (2010). Defining the boundary: Age-related changes in childhood amnesia. *Developmental Psychology*, *46*(5), 1049–1061. https://doi.org/10.1037/a0020105

Wang, Q., & Peterson, C. (2014). Your earliest memory may be earlier than you think: Prospective studies of children's dating of earliest childhood memories. *Developmental Psychology*, *50*(6), 1680–1686. https://doi.org/10.1037/a0036001

Techniques and Procedures Utilized

Literature research skills:

- Reading and summarizing scientific studies.
- Discerning and synthesizing scientific studies to create a Literature Review.
- Fine-tuning research methodology for current study based on published scientific studies.

Data collection techniques learned:

- Identifying the methodology for standardizing the sample of convenience.
- Learning how to formulate and implement Informed Consent based on the American Psychological Association.
- Formulating, standardizing, and implementing a structured interview.

Data analysis techniques learned:

- Standardization of data collection with use of narratives and transcripts of structured interviews.
- Interpreting the data by creating graphs to show the different patterns and trends.
- Writing up the major results of the study.

Student Research Final Report

Name: Dakota Lawson   **Professor:** Kim Molinaro, M. Ed

Date: 11/23/2021

Parenting by Lying: Mitigating Factors and Consequences into Adulthood

Outline of Responsibilities

- Performing primary literature research on parenting by lying and the affects it has on children into adulthood.

- Performing structured interviews for data collection.

- Meeting with Professor Molinaro via Zoom on a weekly basis for status updates and determination of the next week's goals.

- Measures that compare feelings about the lie at the time are contrasted by feelings about the lie in hindsight. Similarly, the perception of the relationship is contrasted in childhood as compared to currently. Open-ended questions explored the impact of parenting by lying, including each subjects' assessment of their own use or potential use of parenting by lying.

- Completing compiled report of the research/activities done each week (e.g. results observed, assumptions, and/or conclusions, learning achieved).

Literature Review and Purpose of Project

Parenting by lying is a phenomenon where parents are dishonest with children in order to manipulate their emotions and behaviors. Research on lying dates back to the introduction of Developmental Psychology (e.g., Binet, 1896; Darwin, 1877; Piaget, 1932). Through this perspective, lying was identified as morally unacceptable in social situations. There are two differentiating definitions when it comes to lying: Antisocial lying and prosocial lying. Antisocial lying is defined as dishonesty to benefit oneself (Ma et al., 2012), which is more consistent with the way lying was researched in Developmental Psychology.

Prosocial lying is when you are dishonest with an individual in order to keep from harming them or hurting their feelings (Ma et al., 2012). For example, a prosocial lie may look like telling someone you enjoyed something they have cooked for you, even when you did not. While this is technically still a lie, it likely holds a positive value. In terms of parenting, prosocial lies may facilitate social development about how to treat others. Sweetser (1987) suggested that prosocial lies may not even be considered lies at all. According to Heyman et al. (2009; 2013), parenting by lying is relatively common in the United States with 84 percent of parents reporting engaging in telling their children fabrications. In China, the frequency was reported as 98 percent (Heyman et al., 2009; 2013; Setoh et al., 2019b). Prosocial lies by parents may be well-intentioned, such as done out of protection of the child in order to spare them from adult stressors. Though these small fabrications may seem harmless, a recent study confirmed that lying could hinder trust and cause children to lie to parents (Santos et al., 2017). According to Liu and Wei (2020), parenting by lying may be associated with adolescent depression into adulthood. Anxiety has also manifested as early as adolescence and has been correlated with parenting by lying (Liu & Wei, 2021).

Negative consequences, such as distrust, depression, and anxiety, may be mitigated by healthy, secure parent-child attachment. Children rely on security and trust in their caregivers. When a child is secure in their environment, they may develop an "internal working model" (Liu & Wei, 2021, pg. 114). Internal working model is defined by Liu and Wei (2021) as a frame-of-reference developed by the child that interprets the intentions of the parents as good and in the child's best interest. Consequently, if the Liu and Wei (2021) assertions are accurate, children of secure attachments have an increased likelihood of developing an internal working model, which in turn, will mitigate negative consequences of prosocial lying by parents.

Many children grow up hearing that lying is unacceptable under all circumstances; however, they also remember their parents telling them prosocial lies (Heyman, Luu, & Lee, 2009). There has been little research about how these lies, prosocial or antisocial, affect a person into adulthood. Setoh et al., (2019a) studied 379 adults who had been lied to in their childhood and found parenting by lying correlated with lying issues and psychological maladjustments, such as trust issues. The purpose of this study is to conduct structured interviews to explore the impact of parenting by lying.

References

Heyman, G. D., Luu, D. H., & Lee, K. (2009). Parenting by lying. *Journal of Moral Education*. Retrieved November 9, 2021, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2949975/.

Liu, M., & Wei, H. (1970). The Dark Side of White Lies: Parenting by lying in childhood and adolescent anxiety, the mediation of parent-child attachment and gender difference. *Children and Youth Services Review*. Retrieved November 23, 2021, from https://econpapers.repec.org/article/eeecysrev/v_3a119_3ay_3a2020_3ai_3ac_3as0190740920320582.htm.

Santos, R. M., Zanette, S., Kwok, S. M., Heyman, G. D., & Lee, K. (2017). Exposure to parenting by lying in childhood: Associations with negative outcomes in adulthood. *Frontiers*. Retrieved November 9, 2021, from https://www.frontiersin.org/articles/10.3389/fpsyg.2017.01240/full.

Setoh, P., Zhao, S., Santos, R., Heyman, G. D., & Lee, K. (2019a). Parenting by lying in childhood is associated with negative developmental outcomes in adulthood. *Journal of Experimental Child Psychology*. Retrieved November 9, 2021, from https://www.sciencedirect.com/science/article/abs/pii/S002209651830540X.

Setoh, P., Zhao, S., Santos, R., Heyman, G. D., & Lee, K. (2019b). Dataset on childhood exposure to parenting by lying and its associations with adulthood psychosocial outcomes in a Singapore sample. *Data in Brief*. Retrieved November 15, 2021, from https://www.sciencedirect.com/science/article/pii/S2352340919308273.

Wei, H., & Liu, M. (2021). Dramaturgical perspective mediates the association between parenting by lying in childhood and adolescent depression and the protective role of parent-child attachment. *Child Abuse & Neglect*. Retrieved November 9, 2021, from https://www.sciencedirect.com/science/article/pii/S0145213421000582.

Weekly Reports and Data

-        Meeting #1 (Week 1: 9/23/2021) Meeting with Professor Molinaro to discuss four research ideas, from which we selected one. The research questions are: What types of experiences influence a parent, out of fear and protection, to withhold or minimize providing accurate information about the experience to children living in the household? What is the impact on the children?" We discussed the literature review process, how to read research studies, and we identified PsychArticles are the key database for academic literature. We also discussed citations and the steps for the literature review. Action items for next meeting were established as identifying and reviewing three academic articles related to the research questions.   Next meeting date was established for October 5th at 8:00 AM though Zoom.

-        Meeting #2 (Week 2: 10/5/2021) Meeting with Professor Molinaro to compose the literature review of the three articles selected thus far. We also discussed how to draft an APA style literature review. We identified the two different articles of on parenting by lying and discussed the specific steps in formulating the remainder of the literature review in psychology. Action items for this next week is to develop the rest of my literature review articles and to work on drafting the body portion of my literature review. Next meeting date was established for October 12th at 8:00 AM through Zoom.

-        Meeting #3 (Week 3: 10/12/2021) Meeting with Professor Molinaro to discuss and edit the body of the literature review. Together we wrote and edited the introduction of the literature review and established the research methodology as a structured interview. We also discussed Informed Consent and identified a sample from which to work. We also drafted the

structured interview questions. Meeting #4 was established for Tuesday, 10/19/2021 at 8:00 AM through Zoom to finalize Informed Consent, the subjects, and the research methodology for the study.

- Meeting #4 (October 19th 2021) Meeting with Professor Molinaro to complete the literature review, establish the research methodology, evaluate informed consent, and established the structured interview questions. Next goals include APA references for the literature review and beginning the data collection. Next meeting was established for Tuesday, the 26th at 8:00 AM via Zoom.

- Meeting #5 (10/26/2021) Meeting with Professor Molinaro to discuss the structured interview data collection completed thus far. Four interviews were completed, and a minimum of 6 more interviews will be conducted over this next week. We problem-solved a question about use of Otter AI, which is creating the transcripts of the interviews. The decision was made to collect data from female-only subjects. For the remainder of our meeting, careers in psychology and my questions regarding academics were discussed. The next meeting was established for Tuesday, Nov. 2nd, 2021 at 8 AM via Zoom.

- Meeting #6 (Week 6: November 9, 2021) Meeting with Professor Molinaro to review the second week of data collection. Data collection will be completed for the 10 participants by Sunday, October 31st. Identified the method to synthesize the researcher's notes during the structured interview with the transcript from Otter AI. Established the guideline for data collection. The tasks for next meeting include data collection review the references for the literature review. Our next meeting was established for Tuesday, 16th, via Zoom.

INFORMED CONSENT

This is a structured interview study that explores the effects of parenting by lying, that the participants can independently recall. At the beginning of each structured interview, Informed Consent will be discussed and collected for each participant. Participants will be selected through a sample of convenience. Upon arrival, participants will experience the following:

- Researcher will verbally discuss the Informed Consent with the participant.
- Participants will be asked a series of questions related to a memory they have of a parent being dishonest with them in their childhood.

Participation in this structured interview is voluntary and therefore any participant who wishes to withdraw may do so at any time. In conducting this structured interview, we are hoping to add to the research that has been conducted with understanding how children are affected when they are not told the truth. Participants have limited confidentiality.

If you have any questions during the experiment, please feel free to ask. For more information about this research or for any questions concerning participation in this experiment contact Dakota Lawson at 727-227-1287 or kodylawson11@gmail.com. I have read and understood the above information.

_____   _____

Signature   Date

Figure 2: Informed Consent

I am an undergraduate research student, and I am collecting data to explore the impact on children when their parent or caregiver tells them a lie. Lying isn't always bad; prosocial lying is when a parent or caregiver tells their child a lie to protect them from what they may perceive to be "adult" problems.

Think about a time when your parent or caregiver did not tell you the truth about a situation that directly or indirectly impacted you. Explain the situation.

How did this make you feel at the time?

On the following scale, how would you rate the way the lie made you feel at that time of your childhood?

Negatively   Somewhat Negatively   Neutral   Somewhat Positively   Positively

As an adult, when you reflect on that experience, how would you rate the way the lie made you feel?

Negatively   Somewhat Negatively   Neutral   Somewhat Positively   Positively

How would you describe your relationship with your parent or caregiver at that time in your childhood?

Negatively   Somewhat Negatively   Neutral   Somewhat Positively   Positively

How would you describe your current relationship with your parent or caregiver?

Negatively   Somewhat Negatively   Neutral   Somewhat Positively   Positively

As an adult, what feelings come to mind when you think about the situation?

In your opinion, if your parent or caregiver told you the truth about the situation during your childhood, how would the truth have impacted you?

If you were the parent or caregiver in this situation, what would you have done?

Are you a parent? If so, have you even told your child a prosocial lie? If so, what motivated you to tell your child the prosocial lie?

Figure 3: Structured Interview

- Meeting #7 (Week 7: Nov 16th 2021) Meeting with Professor Molinaro to identify and standardize data calculations as follows:

Step #1: Determining the Mean, Mode, and Median of the subjects' responses to the Likert scales.

Step #2: Calculating the percentages for the remaining question in the interview.

Next meeting was established for Tuesday, November 23rd, via Zoom.

- Meeting #8 (Week 8: November 23rd, 2021) Meeting with Professor Molinaro to write up the narrative form of the results of the study. Focused on proofreading the final report and completed the conclusions. Professor Molinaro will submit the final copy to the college.

Conclusions

Of the 10 female participants ranging in age from 18-50, 90 percent reported that as a child, they experienced parenting by lying. Of those participants that reported parenting by lying, 56 percent recalled a lie that was classified as lying by omission regarding a significant life experience. Lying by omission was defined as withholding relevant information. An example given by a subject that was classified as lying by omission was that a parent had a previous marriage and had not told the participant about it until she was a teenager. In addition, 89 percent of the participants that reported parenting by lying stated the situation directly involved them. For example, a lie that was classified as parenting by lying that directly involved the participant was recalled by the subject as, when 8 years old, she recalled being suddenly uprooted to move out of state. One participant did not recall parenting by lying in her childhood. She reported that her parents were very honest with her, and she had a great relationship with them.

Sixty percent of the participants are currently a parent of at least one child. Of the 60 percent, 66 percent of them reported their own childhood experiences with parenting by lying affected their own parenting. For example, one participant recalled her parents lying about their drug use. As a parent, the participant reported because of this experience, she would never allow drugs around her two children. She also reported using no substances herself. Another impact of parenting by lying on a participant's current parenting was explained by a participant's refusal to engage in parenting by lying with her own three children. This participant shared that when her 11-year-old son asks her questions about her past, she responds truthfully.

Of the 10 participants, 50 percent of them had parents who were both still living. Twenty percent had one deceased parent and 30 percent of the participants had two deceased parents. Of the participants interviewed, 50 percent displayed an internal working model. An internal working model is defined by Liu and Wei (2021) as a frame-of-reference developed by the child that interprets the intentions of the parents as good and in the child's best interest. An example of an internal working model was inferred when participants highlighted trust for their parents' choice to use parenting by lying. Forty percent of the participants reported that their parents lied to protect or shelter them. An example of parenting by lying to protect is when a participant recalled her parents going through a

divorce without telling her. This participant also spoke about being unsure if she would have told the truth if she were the parent in the situation.

Out of the 10 females interviewed, one participant reported her parents lied to manipulate her behavior. An example she gave of lying to manipulate was that they were religious and would tell her she would "go to hell" if she was not a certain way. This damaged their relationship in her teenage years, but she now understands her parents were only doing what they believed was best for her. According to the participant, her relationship is improving with her parents as she finds her own way.

In response to the question: *Think about a time when your parent or caregiver did not tell you the truth about a situation that directly or indirectly impacted you*, 70 percent of the participants recalled their event without hesitation. An example of immediacy of a recalled event was when one participant spoke of her father leaving her stepmother and the broken promise of when they eventually got back together. She did not have to think about the answer to the question, it was something she had on her mind immediately.

Eighty percent of the participants reported that the situation they recalled involved parental issues. Examples of this would be relationship problems, drug use, divorce, etc. For example, a participant recalled her parents falling asleep while doing drugs. They told her that they were falling asleep because they were just tired.

Using a Likert scale, participants were asked to recall their relationship with their parent or caregiver and how parenting by lying has made them feel as a child and then as an adult. The results are as follows:

Of those with parents still living, participants scored on a Likert scale their relationship with the living parent:

Mean: 3.4 (between somewhat positively and positively)

Median: 4 (positively)

Mode: 4 (positively)

*0 (negatively); 1 (somewhat negatively); 2 (neutral); 3 (somewhat positively); 4 (positively)

Of the participants with at least one deceased parent, participants scored on a Likert scale their relationship with their deceased parent during their adulthood:

Mean: 3.3 (between somewhat positively and positively)

Median: 4 (positively)

Mode: 4 (positively)

*0 (negatively); 1 (somewhat negatively); 2 (neutral); 3 (somewhat positively); 4 (positively)

On a Likert scale, the participants rated how the lie made them feel during their childhood:

Mean: 1.56

Median: 1

Mode: 3

*Please note: 1 subject reported no parenting by lying and did not respond to this question.

*0 (negatively); 1 (somewhat negatively); 2 (neutral); 3 (somewhat positively); 4 (positively)

On a Likert scale, the participants rated how the lie made them feel during their adulthood?

Mean: 3.2

Median: 4

Mode: 4

Please note: 1 subject reported no parenting by lying and did not respond to this question.

*0 (negatively); 1 (somewhat negatively); 2 (neutral); 3 (somewhat positively); 4 (positively)

On a Likert scale, participants rated their relationship with their parent/caregiver as a child:

Mean: 2.9

Median: 4

Mode: 4

*0 (negatively); 1 (somewhat negatively); 2 (neutral); 3 (somewhat positively); 4 (positively)

       During this research project, results showed the majority of the participants reported having experienced parenting by lying. Of those participants, the majority reported parenting by lying did not affect their relationship with their parents in a negative way. While it did affect them more negatively during their childhood, many of the participants reported that as an adult, they were able to understand their parents were only lying to them with the belief they were only doing what was best for their child. An internal working model was displayed in some of the participants. Future research needs to expand the sample size. Future research may benefit from tightening the age group to a three year range. In addition, future research might use objective assessments to measure anxiety and depression.

<div align="center">Reference</div>

Liu, M., & Wei, H. (1970). The Dark Side of White Lies: Parenting by lying in childhood and adolescent anxiety, the mediation of parent-child attachment and gender difference. *Children and Youth Services Review*. Retrieved November 23, 2021, from https://econpapers.repec.org/article/eeecysrev/v_3a119_3ay_3a2020_3ai_3ac_3as0190740920320582.htm.

Techniques and Procedures Utilized

Literature research skills:

- Reading and summarizing scientific studies.
- Discerning and synthesizing scientific studies to create a Literature Review.
- Fine-tuning research methodology for current study based on published scientific studies.

Data collection techniques learned:

- Identifying the methodology for standardizing the sample of convenience.
- Learning how to formulate and implement Informed Consent based on the American Psychological Association.
- Formulating, standardizing, and implementing a structured interview.

Data analysis techniques learned:

- Standardization of data collection with use of narratives and transcripts of structured interviews.
- Interpreting the data.
- Writing up the major results of the study.

Contact Information

Please address any questions or comments regarding this report to:

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SPC St. Petersburg College

Undergraduate Research Experience Commitment and Agreement

SPC St. Petersburg College

APPENDIX A

Congratulations! You have been offered an Undergraduate Research Experience (URE) opportunity!

Timeline: 8-week session

Upon completing the learning activities listed below you will receive a $250 stipend.

- Attending a weekly meeting Microbiology Research meeting at agreed time
- Performing primary literature research and/or laboratory experiments
- Meeting with Professor either by phone or in person on a weekly basis for status updates and determination of the following week's goals
- Completing compiled report of the research/activities done each week (e.g. results observed, assumptions, and/or conclusions, learning achieved)

Note that the stipend may be subject to taxes, and student financial aid may be affected.

Do you work at SPC?   ____Yes   ____No

Do you wish to "Accept" or "Decline" this opportunity?

[X] Accept

[ ] Decline

I fully understand that to receive the $250 stipend, I must complete the activities listed above during the 8-week period. If I am unable to be present for any mandatory activity, I will alert the professor as soon as I am aware.

Please sign below attesting to your understanding and agreement of these requirements.

Student: Professor:

_____   _____

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