Expression of *Ssr2* in a Mouse Model of Congenital Hypopituitarism

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Background

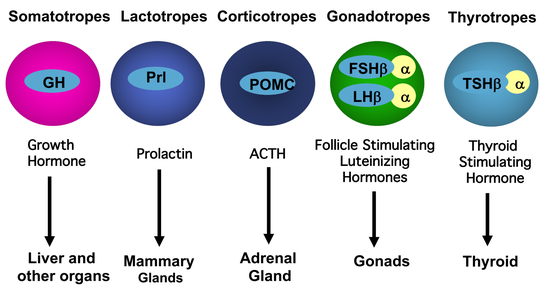

Figure 1. The pituitary is crucial for the maintenance of various homeostatic functions including growth, metabolism, and reproduction. The pituitary gland consists of three lobes. The anterior, posterior, and intermediate lobes. The anterior produces and secretes hormones while the posterior lobe does not produce hormones but releases them into circulation. The anterior produces six hormones: **growth hormone (GH**), **thyroid stimulating hormone (TSH), adrenocorticotropic hormone (ACTH**), a **follicle stimulating hormone (FSH), luteinizing hormone (LH) and prolactin.**

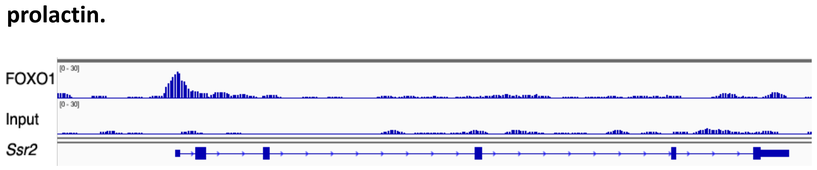

Figure 2. FOXO1 may regulate *Ssr2* expression. We have found that Foxo1 binds to the gene for *Ssr2*, suggesting that FOXO1 may regulate expression of the *Ssr2* gene. This may be one aspect explaining how FOXO1 regulates somatotroph differentiation. Linear representation of ChIPseq data for the *Ssr2* gene. ChIPseq data for Foxo1 and input samples are shown at the top. Rat gene structure from Integrative Genomics Viewer (IGV) is at the bottom. IGV gene features include introns in thin blue lines and exons as thick lines. Arrows indicate the direction of gene transcription.

Methodology

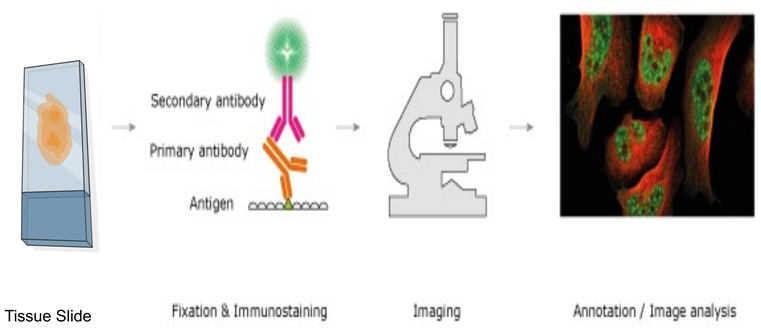

Figure 3. Four main steps of Immunohistochemistry (IHC). 1) Tissue Fixation (2) Antigen Retrieval (3) Blocking (4) Antibody Labeling/Visualization.

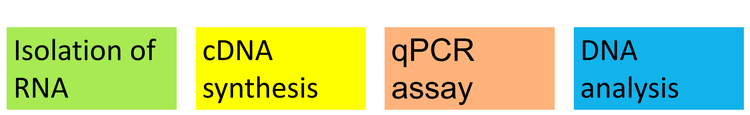

Figure 4 . **Workflow of RT-qPCR experiment**. RNA isolation from cells. RNA is used as a template to synthesize cDNA. PCR uses cDNA to make more DNA through annealing. Fluorescence is detected during PCR and used to generate an amplification curve. This curve is used to quantify the target sample during data analysis.

Results

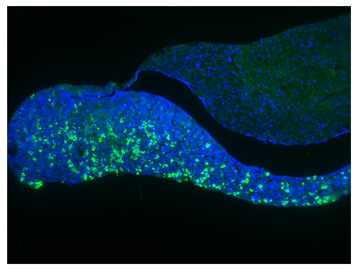

Figure 5. SSR2 is present in anterior pituitary gland. Coronal section were used in IHC to label SSR2 (green). DAPI (blue) was used to label the nucleus. We find that SSR2 is present in the anterior pituitary, but not in the intermediate or posterior lobes. This image was taken at 100x .

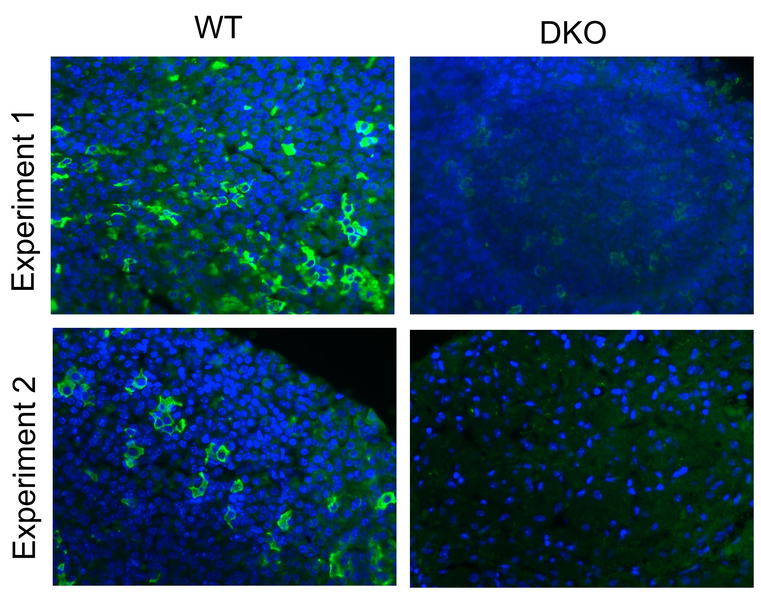

Figure 6. IHC technique: SSR2 expression is decreased in DKO mice. IHC for *SSR2* (green) was performed on coronal sections of WT and DKO mice at 6 weeks of age. DKO are mice with the *Foxo3* and *Foxo1* genes deleted in the pituitary gland. The DAPI (blue) used to label nucleus. These pictures were taken at 400x mag.

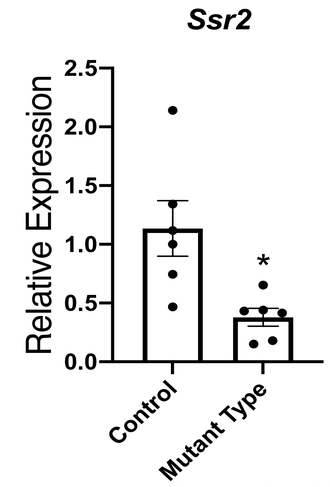

Figure 7 . **SSR2 expression is reduced in cells where Foxo1 is deleted**. RtqPCR was used to measure mRNA levels in control cells and cells in which Foxo1 was deleted**.** *Ssr2* expression is reduced in the mutant type. These results correlate with the IHC technique. Data was analyzed by more in control mice than the mutant type. These results correlate with the IHC technique. Data was analyzed by Student's test, * $p<0.05$.

Conclusion

- Ssr2 is present in anterior pituitary gland.
- SSR2 is visibly reduced in DKO mice.
- Expression of *Ssr2*, which may be one aspect to explain how FOXO1 regulates somatotroph differentiation in congenital hypopituitarism.

References

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Acknowledgements

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Illinois College Preparation

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Purpose: Does Illinois High Schools properly prepare their students for college? Which region of Illinois does the best colle ge preparation for high school students?

Factors

EARLY COLLEGE COURSEWORK
The total number of students taking early college courses in 2018 was 168,043. About 27.3% of all students in Illinois public schools are enrolled in early college coursework.(Illinois Report Card).

In grade 12, about 55,838 students take one or more AP courses (Illinois Report Card).

In grade 12 ,about 33,555 students take one or more dual credit courses (Illinois Report Card).

COUNSELING
Counselors in predominately poor schools with large numbers of racial minorities cannot provide adequate guidance (Hinton & Adams, 2006). When counselor to student ratios are high, counselors have limited time to advise each student.

McDonough (1997) also noted the extent to which counselors helped students in the college preparation process varied by the organizational capacity of schools. School size, resources, and competing priorities overwhelmed counselors in less affluent schools.

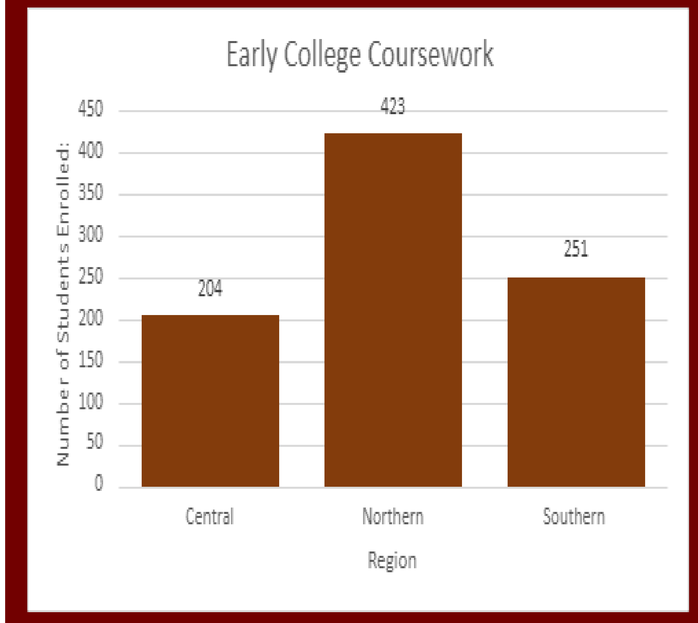
TESTING
The average Scholastic Assessment Test (SAT) score for all students in Illinois in 2018 for the English Language Arts was 505.7, which falls in the approaching standards category. (Illinois Report Card)

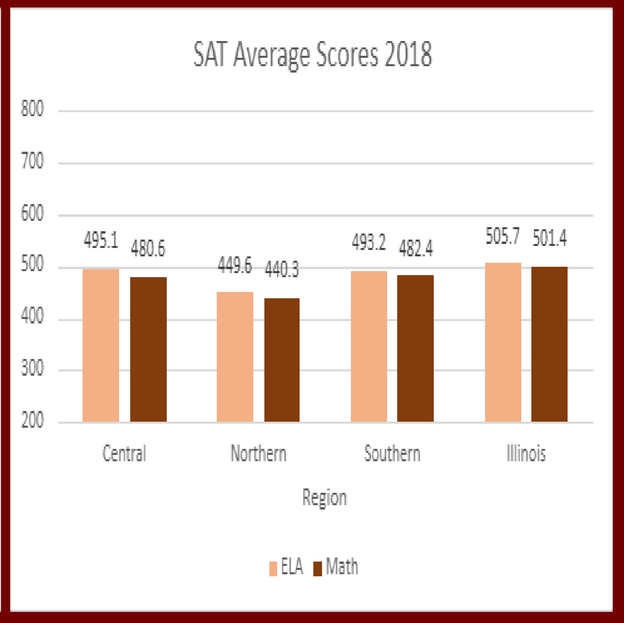
The average Scholastic Assessment Test score for all students in Illinois in 2018 for the Math section was 501.4, which is the approaching standards category. (Illinois Report Card)

Methodology

- Data collected from Illinois School Report Card database
- Randomly selected 60 high schools
- Took the mean of all data collected

Results





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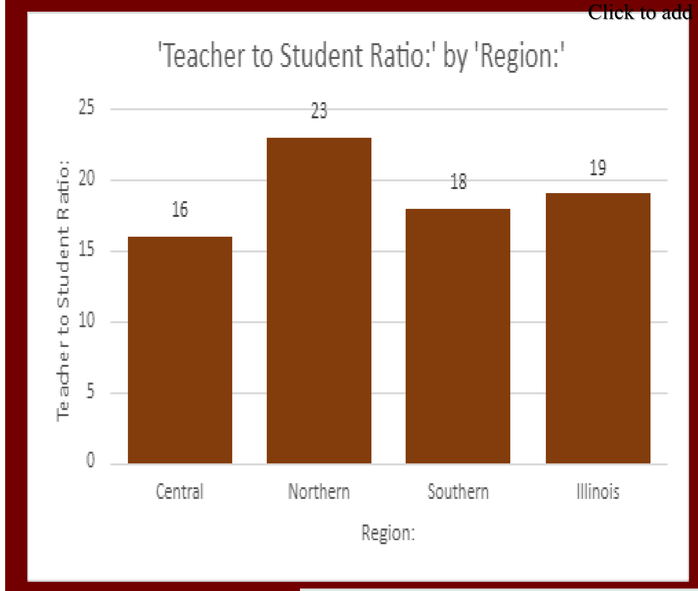

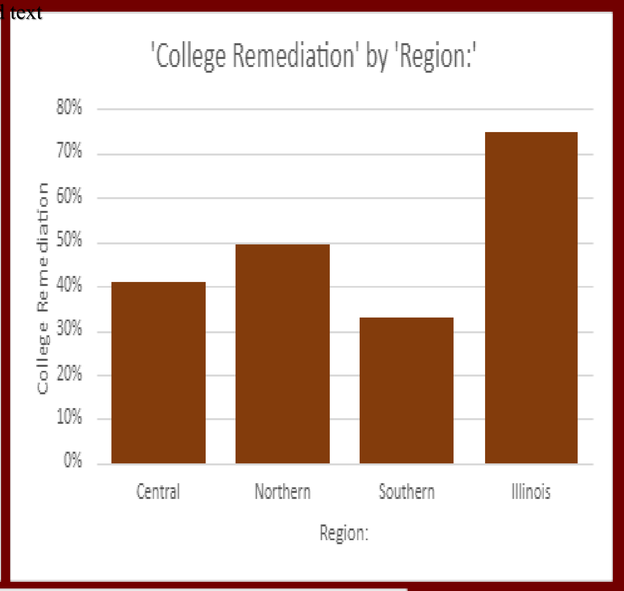

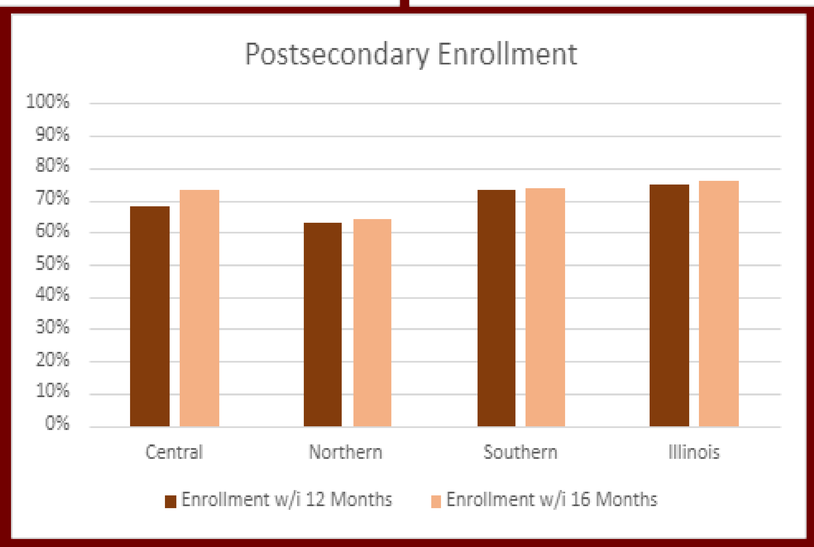

Discussion

- Early College Coursework, Teacher to student ratio, and SAT Averages are link to Postsecondary Enrollment and College Remediation
- Southern Illinois and Central Illinois had similar pairings across the graphs.
- Northern Illinois has the largest number of students enrolled in early college coursework. Considering majority of the schools collected were in Cook county there would be more students enrolled. However, it still falls behind on all other measures.
- Southern Illinois Region is meeting the standards for student to teacher ratio, SAT average scores, college remediation, and Postsecondary enrollment.

Future Implications

- This data can illustrate what type of students are likely to be accepted by colleges and universities.
- This can help institutions properly serve their students' needs including offering extra support services.
- Consider the number of students graduating from four- year universities.
- Consider having more counselors and more funding per pupil.
- Look into the reasons why students' test scores are just approaching standards in the state of Illinois.
- There should be a study on what type of college coursework is more beneficial for college admissions and persistence to reduce the need for remediation courses.

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Sensitivity of Germinating Hemp Seeds to Glyphosate Residue in Soil

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Introduction

Hemp (*Cannabis sativa* L.) has been cultivated since ancient times, and is harvested for its seeds, oil, fiber, and medicinal properties. Hemp production is growing, and the market value of hemp is expected to increase. However, basic agronomic information is lacking since the 1970 Controlled Substances Act prohibited hemp cultivation until the 2014 and 2018 Farm Bills (H.R.2 2018). As with any cultivated crop, weed control is considered one of the most important factors in crop success, and hemp appears to be most affected by weeds in the seedling stage, making a weed free field desirable for planting hemp (Gage, unpublished). However, the use of herbicide to prepare a weed free field in "burndown" applications may affect the germination of hemp seeds. Currently, the herbicide glyphosate (Roundup®) is the most used herbicide, worldwide and is often used in burndown applications. While glyphosate is promoted as having no residual activity in the soil after application (Roundup® PowerMAX3 2020), sensitivity of germinating seeds has been documented for other crops (Helander et al. 2019). Initial observations suggest that hemp appears to be highly sensitive to glyphosate, compared to surrounding weedy vegetation, and therefore, sowing of hemp seed may require a waiting period between glyphosate burndown application and planting. **The objective of this study is to determine the sensitivity of germinating hemp seeds to glyphosate at various planting timings following glyphosate application, testing the null hypotheses: *There is no difference in sensitivity of hemp at any planting date following a glyphosate application*.** An understanding of hemp production and glyphosate usage will become increasingly important information to add to knowledge of best management practices for hemp growers.

Materials and Methods

- A benchtop germination study was conducted at the SIUC Horticultural Research Center using seeds of the hemp cultivar 'Jinma' under supplemental lighting at 200 µmol/m^2/sec.
- A mixture 1:1:1 of field soil, sand, and a peat mixture was placed in each of six cells of a 601 tray (Fig. 1). Each cell was a treatment, and there were six trays, or replicates.
- Glyphosate (Roundup PowerMax®) application was made in an herbicide spray chamber to deliver a uniform, controlled application to all treatments. The typical glyphosate burndown use rate of 32 fl. oz/ac was applied. The control cell in each tray was removed prior to spraying to prevent glyphosate application. The remaining cells received an application of glyphosate at the same time.
- Twenty hemp seeds were planted at a 0.25" depth at 0, 3, 6, and 12 Days After Application (DAA) of glyphosate in a randomly assigned, pre-labeled cell (Fig. 1). Initially a 24 DAA planting was planned but was later deemed unnecessary.
- Hemp seeds germinate within three days of planting under optimal conditions, so counts of live and dead seedlings were taken at 5 and 10 Days After Planting (DAP).
- Data analysis was conducted in SAS 9.4 using a One-Way ANalysis Of VAriance (ANOVA) with treatment (planting time DAA) as the independent variable and seedling counts (live and dead, 5 and 10 DAP) as dependent variables. Means were separated at α=0.05 using Tukey's HSD test.
- Tray (replicate) 6 appeared to be an outlier with high mortality in the control and other treatments and was dropped from the analysis.

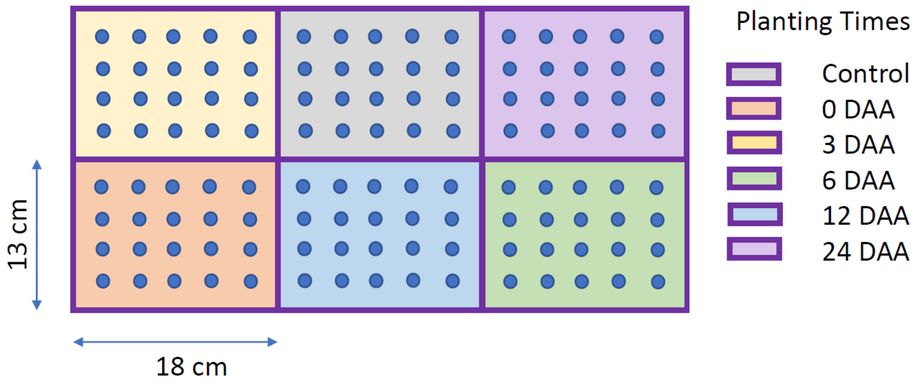

Figure 1. Example of one replicate for glyphosate seedling sensitivity study. The diagram represents one 601 tray with 6 inserts, filled with soil. Treatments are: control (no glyphosate application), 0DAA – planting 0 days after glyphosate application, 3 DAA – planting 3 days after, and so on, to 12 DAA.

Results

- There was no difference in counts of living plants at 5 Days After Planting (DAP) (Fig. 2.A). According to the overall model, there were differences in the number of dead plants at 5 DAP (P=0.05), but Tukey's HSD comparison did not show significant comparisons at α = 0.05 (Fig. 2.B).
- There was no difference in counts of living plants at 10 DAP (Fig. 2.C). There were differences in the number of dead plants at 10 DAP. The 0 DAA planting date had the highest mortality but was not significantly different than 3 DAA or the control (Fig. 2.D).

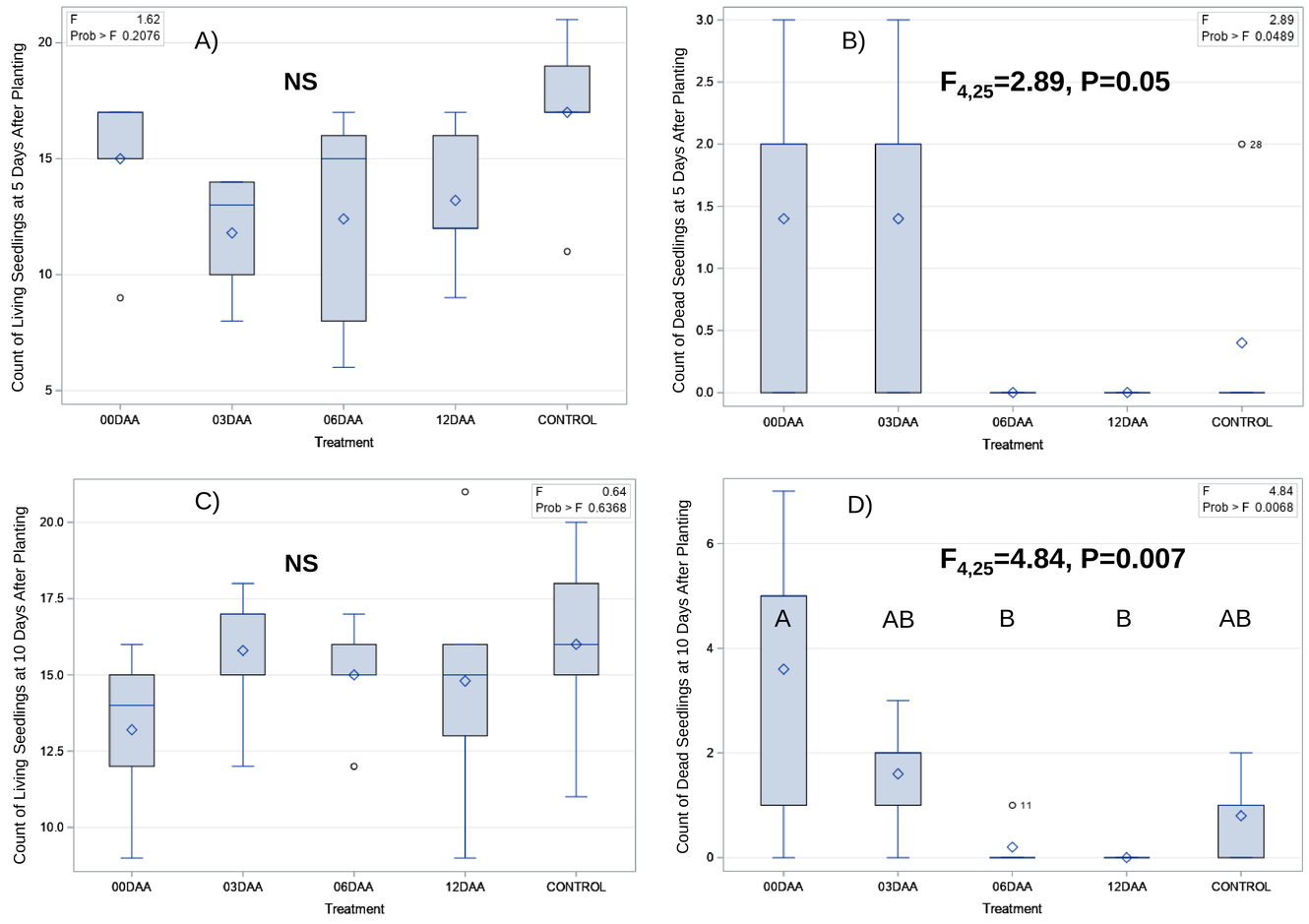

Figure 2. Hemp seedling counts by planting date treatment at 5 Days After Planting (DAP) and 10 DAP. A) Count of living seedlings by planting date at 5 DAP; non-significant (**NS**). B) Count of dead seedlings by planting date at 5 DAP (**P=0.05**); overall model was significant, but pairwise comparisons were not significant. C) Count of living seedlings by planting date at 10 DAP; **NS**. D) Count of dead seedlings by planting date at 10 DAP (**P=0.007**); treatments that share the same letters are not significantly different according to Tukey's HSD test.

Conclusions and Implications

- There was no evidence that glyphosate affected germination of the 'Jinma' cultivar of hemp seed. However, differences were observed in the count of dead plants at 5 DAP. Results at 5 and 10 DAP did indicate that there could be an effect on seedling survival. However, further research is needed with an increased sample size to determine the cause of mortality after planting. Variable germination and mortality in the control treatment suggest that findings should be cautiously interpreted.
- Mortality may be associated with other environmental variables. Future studies should be conducted in a growth chamber where variations in watering schedule and amounts, temperature, and lighting could be avoided.
- While results are not conclusive, this study suggests that cautious hemp growers may need to wait 6 days after glyphosate application to plant a crop. These results can be added to the knowledge of best management practices for hemp production.

Thank you to the McNair Scholars Program for funding.

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Does dehydration change the cell wall polymers in the food-conducting cells of the moss *Polytrichum*?

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Introduction

Cell walls are made up of a complex and dynamic network of polysaccharides and other polymers that are involved in several vital functions such as imparting mechanical strength, withstands turgor pressure, signaling, nutrient transport and biotic and abiotic stress responses (Cosgrove 2005). Studies have shown that osmotic stress and drying impact the composition of cell walls (Vicente et al. 2005). It has also been demonstrated that food-conducting cells in leptoids of *Polytrichum commune* form wall ingrowths when drying occurs. When rehydrated, these wall ingrowths disappear (Pressel et al. 2006). The present study was designed to follow-up on Pressel et al. (2006) by examining cell wall constituents of food-conducting cells of this moss before and after dehydration.

Materials and Methods

Specimen preparation: Stems were fixed overnight in 3% glutaraldehyde in 0.5M phosphate buffer pH7.2, rinsed 3 times in buffer for 15 minutes each. Plants were post-fixed in osmium tetroxide and rinsed with autoclaved water. Specimens were dehydrated in a graded ethanol series, embedded in LR white resin, cured at 65°C, and sectioned with an ultramicrotome. Monitor sections were stained with toluidine blue and imaged on a light microscope.
Immunogold Labeling: Sections were collected on 200 mesh Ni grids, blocked in BSA/PBS, and put into one of four primary antibodies overnight. Following four washes BSA/PBS, grids were placed in the secondary antibody, rinsed and dried. Grids were observed on a TEM at the IMAGE center and digital pictures captured.

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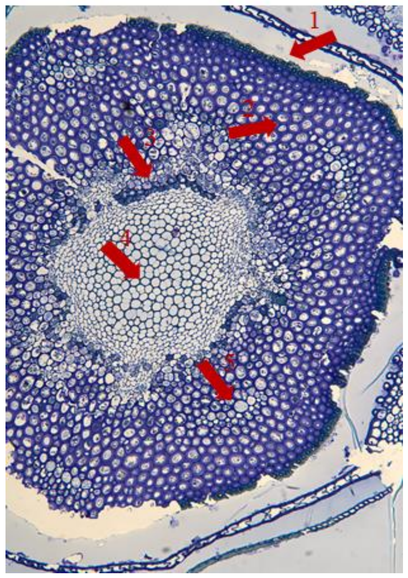

Figure 1 Cross section of stem showing tissue (arrows) from outside in. 1) Epidermis 2) Cortex 3) Leptome 4) Hydrome 5) Leaf trace

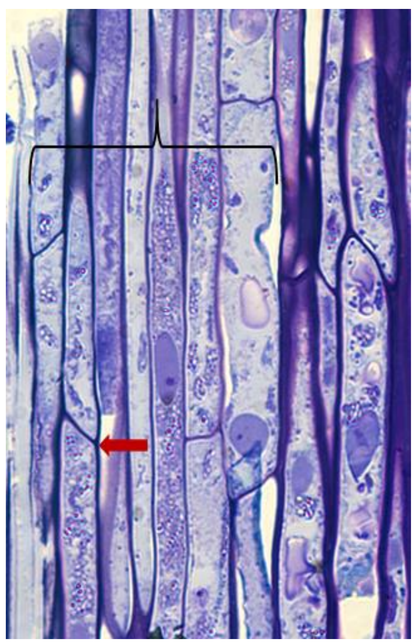

Figure 2 Longitudinal section of leptoids (bracket) showing oblique end wall (arrow).

Acknowledgements

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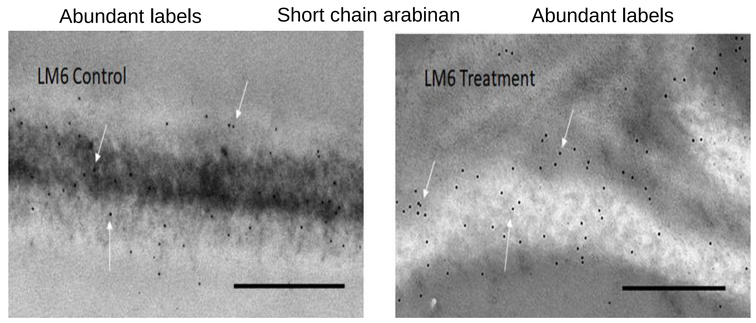
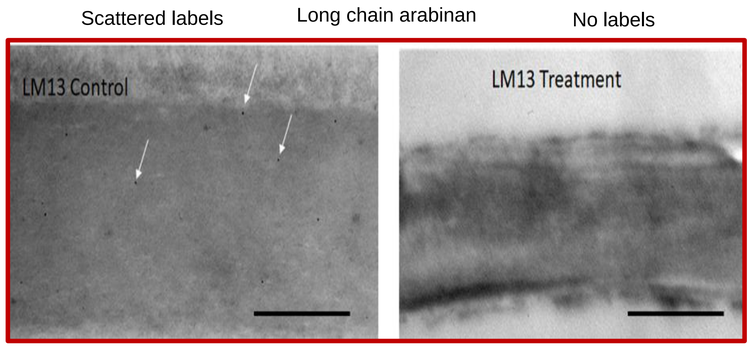
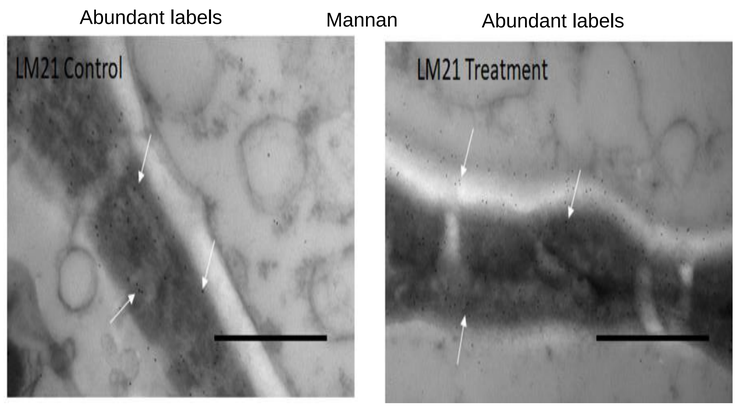
Results

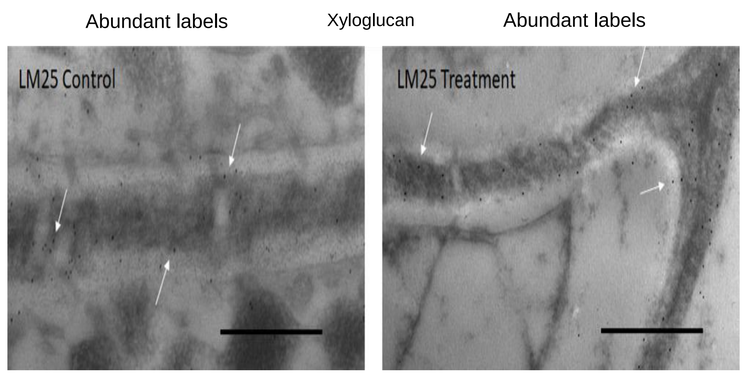
Pectins





Hemicelluloses





No changes in labeling were visible between controls and dehydrated plants, except for with LM13 (outlined in red), a pectin antibody that recognizes long chains of arabinans. Arrows point to gold labels. Bars = 50 µm.

Discussion

Pectins provide porosity, elasticity, and flexibility to cell walls (Table 1) and have been implicated as the wall polymers that are affected most significantly when plants undergo significant drying (Vicente et al. 2005). Of the two antibodies (LM6 and LM13) used in this study to localize pectins, only LM13 showed changes from being present in controls to absent after drying. Labeling with the LM6 antibody was abundant in both controls and treatment. The LM6 antibody recognizes short chains of arabinan on the pectin molecule, while LM13 recognizes long chains of arabinans. Labeling was not changed for either hemicellulose antibody (LM21 and LM25) in controls and dried plants. Mannan-containing hemicelluloses are labeled with LM21 and they are known to be involved in hydration and dehydration cycles and nutrient uptake (Table 1). Xyloglucans, localized with the LM25 antibody, give the cell wall expansibility and tethering properties (Table 1).

Table 1: Cell wall polymers and select properties (Henry et al. 2020).

Cell wall polymer	Cell wall properties
RGI Pectin - Arabinan	Flexibility, Porosity, Expandability, Elasticity
Hemicellulose - Xyloglucan	Expansibility, Cell-to-cell adhesion, Cross linkage, Tethering
Hemicellulose - Mannans	Nutrient uptake, Hydrated/ dehydrated cycles

Conclusion

Of the four antibodies used in this study, changes were seen only in the pectin antibody that recognizes side chains made of numerous arabinans (LM13). It is possible that drying disrupted the long arabinan side chains converting them to short chains. This work is preliminary and suggests there are modifications in food-conducting cell walls in mosses after dehydration.

Future Research

I will conduct additional dehydration experiments using conditions that are more in line with the physiology of mosses such as drying for extended periods at ambient temperatures. This approach may lead to more conclusive results that parallel the plant's response to drying in the natural environment. Future work will also concentrate on additional cell wall polymers such as arabinogalactan proteins that have been shown to play an essential role in wall response to osmotic (water) stress.

An Exploration of the Digestibility of Proteins using a Modified Three-Step in Vitro Procedure

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Abstract

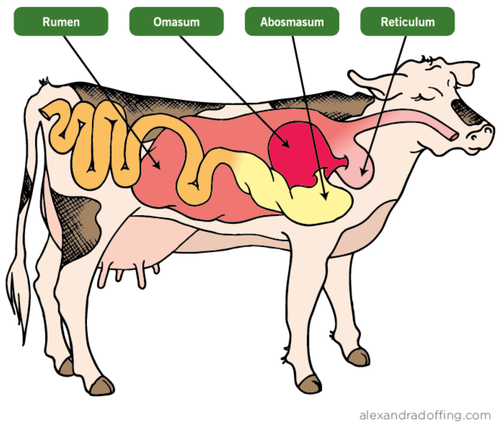
A ruminant animal with a Cannula port was used in addition to a modified version of a well-known in vitro procedure in hopes of reducing the associated cost and labor required to investigate the intestinal digestion of proteins within various feeds. Nylon bags were used to incase the feed samples, crucial for allowing protein digestion within the rumen without degradation of the bag or disruption of the remaining Amino Acids. The experiment was conducted by allowing protein samples to incubate in the rumen of a canulated cow for 16 hours to estimate Rumen Degradable Protein (RDP) and Rumen Undegradable Protein (RUP). The RUP portion was then incubated in Daisy jars in a liquid solution containing different proteolytic enzymes to simulate the environment of the small intestine to estimate intestinal protein digestion of different commercial protein sources. The results showed that the hypothesis of the researchers was supported, and that the modified in-vitro procedure could be used to simulate the small intestine when determining protein digestion. The average protein sources and digestability levels were found for each feed sample and recorded in the results.

***Image 1**: Cow at Southern Illinois University Beef Farm pictured with Canula used for scientific study.*

***Image 2:** Commercial cattle feeds in aluminum tins prepped to be dried in the oven to determine the weight without moisture.*

Objective

The objective of this study was to determine the protein digestability of various feeds, and more critically, to measure which portion of the protein being digested could be categorized as Rumen Undegradable Protein (RUP) and Rumen Degradable Protein (RDP). The data collected from this process will be used by a commercial feed company to gain insight into their feeds 'nutritional components.



Methodology

MATERIALS:

Small aluminum tin trays Scale Water	amylase enzyme Diffusible Nylon bags LECO N analyzing machine	DAISY Incubator Large Glass jars Cannula port cable Zip Ties

Pre-Rumen Digestion

Specialized bags (Dacron bags) were prepped and filled with a similar amount (grams) of various protein sources. Each bag was placed in the cow's rumen after being attached to a specialized cord designed to allow entry and exit via the cannula port more reliable. The samples were then left there for sixteen hours to allow for adequate digestion and consistency of time length between each protein source being tested. It was necessary to dry each sample, weigh them, and measure the protein in the feed prior to digestion using the LECO analysis machine to collect data on the existing protein percentage that could be compared with the samples post-digestion. Lastly, the bags were removed from the rumen, washed several times with cold water to remove bacteria, and then returned to the lab for further analysis.

Post Rumen Digestion

After the protein samples were retrieved from the rumen, they were analyzed using the LECO N analyzer to determine how much of the initial protein was remaining after the sixteen-hour period. Based on how much of the protein was intact, it was then determined how much of the original sample could be categorized as either RDP or RUP. After identifying the Rumen Undegradable Protein, the remaining proteins (RUP fraction) were incubated for 24 hours in buffer solutions containing pepsin and pancreatin enzymes that was rotated 360˚ continuously within the DAISY incubator machine to estimate the intestinal protein digestion under in vitro conditions.

***Image 3:** Nylon bags attached to a specialize cable to allow easy placement and removal from the Canula.*

***Image 4:** Nylon bags being prepped for the rumen by being weighed and filled with each feed sample.*

***Image 5:** Nylon bags are shown submerged in the amylase enzyme solution to determine how much RUP would be digested within the solution.*

Results

The results of this experiment concluded the average percentage of protein digestion that would occur in both the rumen and small intestine for various commercial cattle feeds. It was found that the modified in-vitro procedure could adequately replicate the conditions of the small intestine when replicated using an α-amylase enzyme solution.

Sample Name	Average Crude Protein (%)	Average Rumen Undegradable Protein % (RUP)	Average Rumen Degradable Protein % (RDP)	Average RUP % Digestion in Amylase Enzyme
1	34.89	47.66	52.34	79.07
2	32.07	69.89	30.11	82.27
3	43.40	72.50	27.50	96.78
4	33.59	47.42	52.58	96.78
5	45.03	61.85	52.34	96.78

***Table 1:** Shows the results collected from four sample sets to determine the average sample crude Protein, RUP, and RDP levels. It also shows the average percentage of digestion that would take place in the small intestine.*

Conclusion

Studying the nutritional components of commercial feeds is crucial in determining feed rations and keeping the animals healthy. Knowing the levels of RUP and RDP helps to ensure that rumen microbes within a cow's digestive system are thriving and functioning as they should. This experiment while not new in its design, held a practical and "real world" importance that added to its significance. The data collected will be passed on to the feed company so that it can be used to further their understanding of their product and improve in areas where necessary. Future studies could explore different areas of nutrition and expand to test different variables and their impact on digestion.

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Adverse Childhood Experiences, School Bullying Retrospection & the Impact on Resilience in Adulthood

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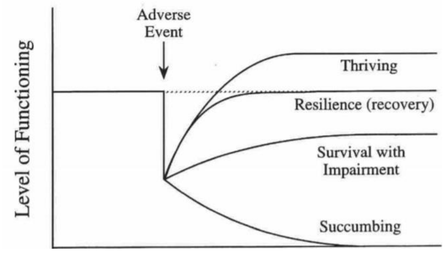
Background

- An individual's ability to recover adaptively from adversity is vital to their ability to navigate adulthood effectively and is referred to as **resilience.**
- **Adverse childhood experiences** (ACEs) have been repeatedly documented to have substantial effects on individual resilience scores in adulthood.
- Children who were involved in **bullying or adverse childhood experiences** are also significantly more likely to be disengaged from school (Baiden et al., 2020). Children who are **disengaged from school** are significantly more likely to drop out of school and experience substantial behavioral problems (Henry et al., 2011). Individuals who have experienced frequent bullying are at a greater risk of experiencing suicidality, diagnosis of depression, anxiety disorders, alcohol dependence, psychological distress, and decreased general health, cognitive functioning, socioeconomic status, social relationships, and general well-being for nearly four decades (Takizawa et al., 2014).
- There is a gap in research on the way ACEs and bullying may affect and compound each of their effects on resilience in adulthood. The **purpose of this study** was to examine the effects of ACES and retrospective reports of bullying on resilience with a sample of 350 adults under age 40 who were registered MTurk workers in the U.S. selected by CloudResearch.

Hypotheses

- H1: Adverse childhood experiences and bullying victimization will result in lower resilience.
- H2: When bullying and ACEs cooccur, the effect on resilience will be exacerbated.



Methods

Qualtrics Online Survey

ACES-10 Questionnaire

▪10-item questionnaire asking about specific childhood experiences (see chart 1).

Forms of Bullying (FBS) (Victimization and Perpetration)

10 item likert scales designed to measure victimization and participation in bullying

Connor-Davidson Resilience Scale 25 (CD-RISC25)

25 item likert scale designed to measure resilience levels

DEMOGRAPHICS N-255

Gender	Race/Ethnicity	Age	Income Median	Government Assistance
Female=48.6% Male=49.4% Other=2%	0.8% Native American 11% Asian 13.3% Black or African American 8.2% Hispanic or Latino 71.4% White or Caucasian	m= 32.19	$35,000-$54,999	Yes – 21.2% No – 78.8%

Results

Table 1. Total ACEs

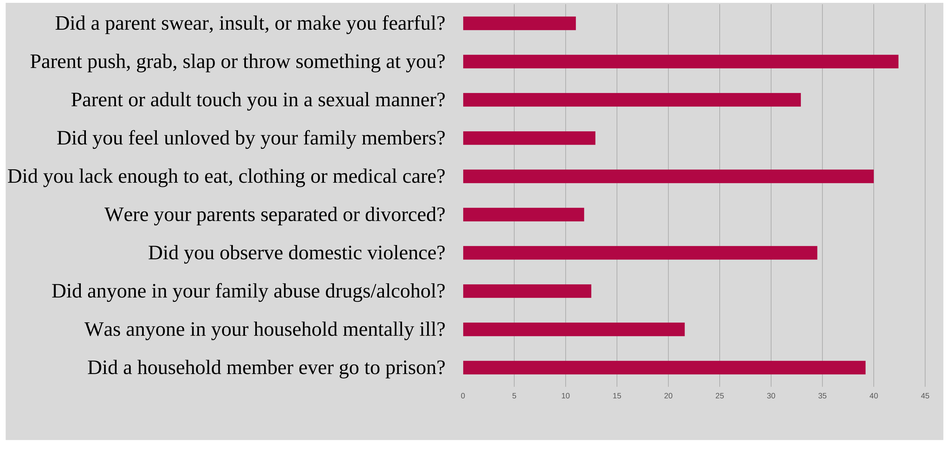
Level	Frequency	Percentage
0	67	26.3
1	39	15.3
2	42	16.5
3	31	12.2
4	25	9.8
5	17	6.7
6	15	5.9
7	8	3.1
8	6	2.4
9	1	0.4
10	4	1.6

Table 2. Bullying Victimization

Period	Frequency	Percent
Elementary	47	18.4
Middle	95	37.3
High	36	14.1
Other	1	0.4
Total	179	70.2

Table 3.	Uns. B	Coef. Std. Err	Standard. Coef. Beta	T	Sig.
FBS-V Total	3.353	1.639	.171	2.047	0.042
ACEs 10 Total	-0.63	0.586	-0.09	-1.075	0.284

Chart 1. Percent of Sample Reporting ACEs



- Among the 255 participants, 73.7% reported experiencing one or more adverse events (Table 1).
- 179 participants reported experiencing bullying during elementary, middle, or high school (Table 2).
- A linear regression analysis was performed to determine the impact of bullying and ACEs on resilience scores in adulthood. While the overall model was significant, ACEs negatively predicted resilience score totals but was not statistically significant. In contrast, bullying victimization positively predicted resilience scores and was statistically significant.

Table 3 includes outcomes for our main analysis.

- **H1** Was not supported; ACEs were negatively related to resilience, but not statistically significant, whereas the experience of bullying predicted higher resilience scores and was statistically significant.
- **H2** Was not supported, as both variables did not have a simultaneously statistically significant effect on resilience scores, the interaction was not statistically significant.

Discussion & Conclusions

•The results of this study were somewhat surprising and stand in contrast to prior research. Our sample reported unusual frequencies of adverse childhood experiences (m. 2.5255) and bullying victimization (70.1%), that was nearly twice that of averages in prior studies. Only 26% of our participants reported zero ACEs, whereas most other studies examining the general population arrive at percentages closer to 46%-52% (Bethell et al., 2014). In other samples around one third or lower of the population reports involvement in bullying (Baiden et al., 2020). Additionally, our mean score for resilience was 63.53, which is about 17 points lower than the average scores reported for this measure (80.4) and in the lowest quartile (Connor & Davidson, 2003). It should be noted that the COVID-19 pandemic may have had an impact on perceived resilience.

•Contrary to expectations, reported experiences of bullying victimization were positively related to reported resilience, whereas the reported experience of childhood adverse experiences demonstrated no significant relationship with resilience scores. These results are surprising and may be an artifact of using an MTurk sample. MTurk workers may be less representative of other community samples than previously reported in the research. However, the positive relationship observed between scores for bullying and resilience are somewhat consistent with observations made by Mash & Barkley (2014), who noted that overcoming mild to moderate adversity facilitates the development of resilience among youth.

•The principal limitations for this study were the cross-sectional (as opposed to longitudinal) design, convenience sample, and web-based survey administration.

•Future studies will need to replicate these findings and ideally incorporate other samples of community adults and youth. Future studies ideally will examine other intervening variables that may play role in the process.

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Impact of student presence on space-use of SIU white-tailed deer

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Introduction

- White-tailed deer are a part of the natural fauna of Carbondale and easily spotted on SIU's campus and around town.
- The goal of the overall project is to evaluate how deer on SIU's campus may change their behavior as the student population on campus fluctuates.
- This preliminary project evaluated characteristics of deer hotspots during the summer when campus population is smaller.

Methodology

- Deer were captured using clover traps and protocols approved by IACUC.
- GPS collars were placed on 4 males and 3 females.
- GPS collars transmit deer location every 30 minutes for females and 60 minutes for males.
- Using a "geographic information system (GIS)", coordinates of the five main hotspots were extracted.
- Each hotspot was paired with a random point within a 500m buffer.
- For each hotspot and random point, lateral cover and vegetation (shrubs, forbs, and grass) were evaluated.

Figure 1: Humane capture and handling of white-tailed deer using clover trap to apply GPS collar.

Results

- Hotspots of deer were distributed across campus (Fig. 1)
- Hotspots differed based on the cover and vegetation offered (Fig. 2)
- No patterns emerged from comparing hotspot attributes to random points (Fig. 2)

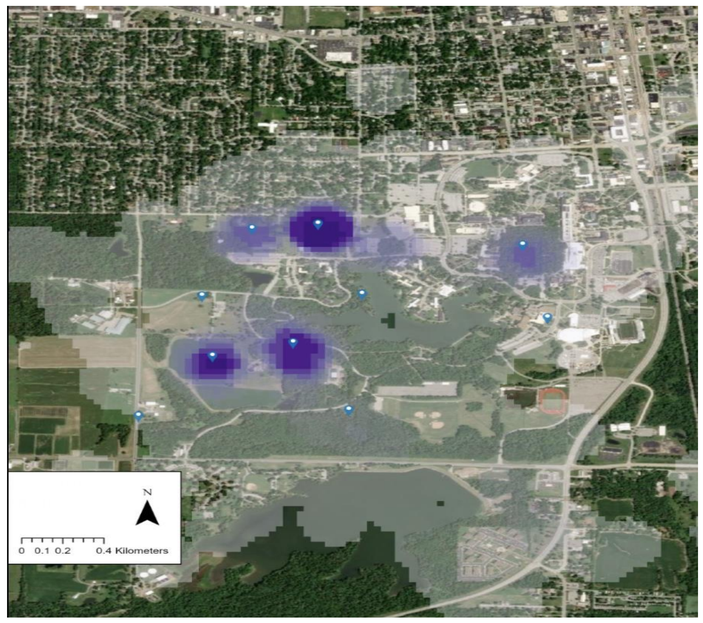

Figure 2: Locations of hotspots and random points of deer on SIU campus. Hotspots are indicated by the dark and light purple areas on the map.

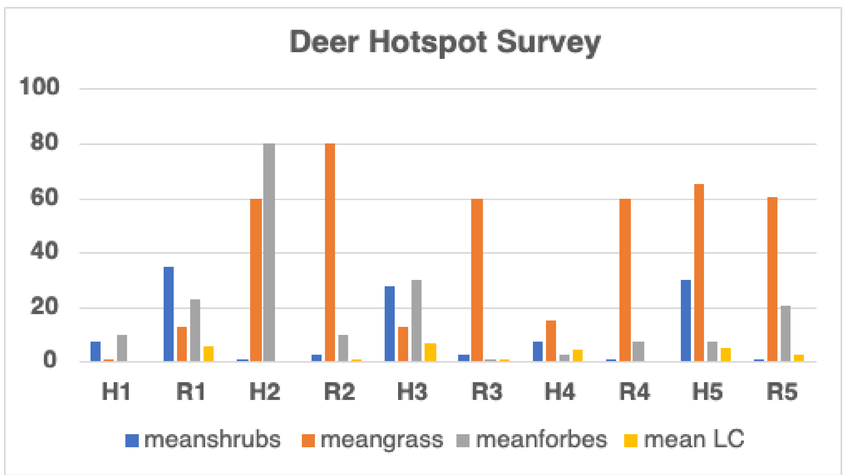

Figure 3: Bar plot shows variation in lateral cover and availability of different types of vegetation between hotspots and random spots.

Conclusion

- Hotspots were either used for foraging (hotspots with greater amount of vegetation) or used for resting or thermoregulation (hotspots with more cover).
- Future analyses of hotspots will evaluate if the properties of the hotspots will change as student numbers increase.

Figure 4: Camera trap photo of collared white-tailed deer and her fawn near H3 hotspot.

Acknowledgements

We would like to thank the SIU Foundation for supporting the collaring of the deer used in this study. We would like to thank the McNair Scholars Program for assistance with funding for this project.

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