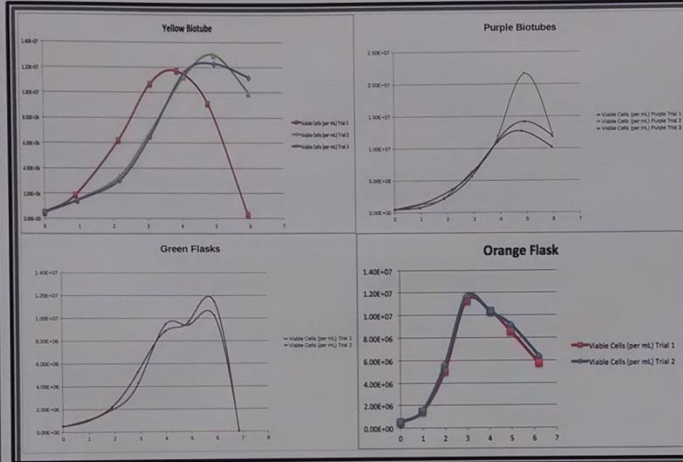


Abstract

In the research conducted, we are tested the growth capacities for different vessels that may be beneficial in growing capacity and cost difference. This research is not only important for the matters of cost effectiveness and optimizing growth conditions of cells that we are given, but also in experiments across the globe in the same aspects. In the research we are grew Sf9 cells in Expression System medium ESF-921, it would appear that between the two different biotubes that we used there was not much of a difference in the growing capacity. These biotubes were a general purple centrifuge tube with a loose cap and a yellow biotube with a membrane cap. These results would help conclude that there was not much need for the more expensive membrane caped yellow Biotubes. The Green and Orange Flasks used were generally more clumpy and had much lower density rates compared to the flasks. Overall, it would appear that not only are the Biotubes a better option but also that the Purple, cheaper Biotubes, had the best cells/mL density.



Methods

All experiments were conducted in the WSU Biology Department Animal Cell Culture Facility using good aseptic technique. Cells were cultured in the absence of antibiotic to allow for rapid detection of contamination, which was not encountered.

The experiment was set up so that each day the tubes could be counted. From there, mapping the counts of Sf9 cells and the time of day until the cells started to die off. We could calculate the viability of the cells.

Each tube/flask was set up with 20mL of ESF 921 medium from Expression Systems, with a starting Sf9 cell count of $.5 \times 10^6$ cells/mL. Samples for cell counts were done by taking .45mL of the cells and .05 mL of Trypan Blue in a microcentrifuge tube, and counted on a hemacytometer. 2 counts were taken per sample to calculate the average density of the vessel.

The density of the vessel was taken by:

(the average count on the hemacytometer) * 1.1×10^4

Introduction

Sf9 cells generally have a doubling time of 24-30 hours. They are Spherical shaped contained from Insect cell lines. The cells grow in a medium ESF-921 which has been donated from Expression Systems. Sf9 cells generally grow better in a suspension culture but can also grow in a monolayer.

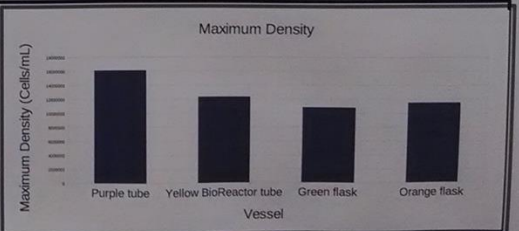
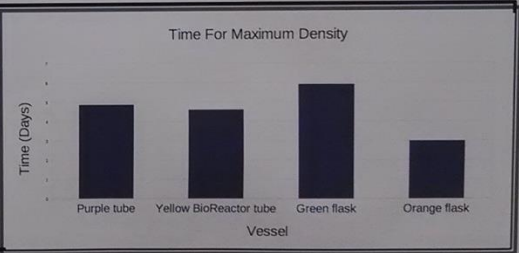
Cells generally grow slower in temperatures under 26 degrees C and increase the doubling times of the cells between 28 and 30 degrees. According to this statement 27 degrees is the generally used temperature to grow Sf9 cells. Anything above 30 degrees and the cells should not be used, they decrease viabilities and are no longer healthy and may have degraded the cells.

Results and Discussion

The Yellow Biotubes were initially compared to the Purple Biotubes because of cost differences. The Yellow Biotubes followed the similar pattern of the Purple Biotubes in the growth curve. However the Purple Biotubes, on average, reached a much higher density than the other vessels. The Yellow and Purple Biotubes followed a similar pattern as was expected in any growth curve of Sf9 cells. The relative time length to meet the maximum density for cells were similar between the Purple and Yellow Biotubes, concluding that this was not to much of a differential factor in the benefits between the to tubes.

As for the flasks they did not reach the densities that the Biotubes reached. The Green Flasks had a problem with clumping, making counting, where the density may have been the highest, very difficult. The Orange Flasks did not clump as much as the Green Flasks but they didn't thrive to the high quantities that the Biotubes reached. The Green Flask also took the longest to reach the highest density it could which would be beneficial if the cells didn't clump so easily.

Based on the data from the graphs above and the table representing the Maximum Density Summary, the Purple Biotubes represented the best option for growing Sf9 cells at 27 degreesC. It represented the highest Sf9 cell count, very similar data between trials and an average amount of time to hit the highest density.



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Life technologies, invitrogen (2013) Insect Cell Lines Manual, Document Number 25-0127 Catalog Numbers B821-01, B825-01, B855-02.

Future Work

Multiple trials need to be completed to determine whether the data is reliable and a demonstration of how the Sf9 cells will continue to work between different times of the year. Different factors such as weather and dry air may play a huge role in these experiments based on the the growing conditions. These may have factored into some of the data on the early trials starting in November up to the latest trials starting in March.

ABSTRACT

Reference/Citation: Godek SF, Bartolozzi AR, Burkholder R, et al. Core temperature and percentage of dehydration in professional football linemen and backs during pre-season practices. *Journal of Athletic Training*. 2006; 41(1): 8-14.

Clinical Question: How does the hydration status of an athlete affect the core body temperature in relation to heat related illness?

Data Sources: Studies published in English were identified through database searches on PubMed, Academic Search Premier, and EBSCOhost (2007-2014) using the terms hydration status, core body temperature, heat related illnesses, and exercise. These terms were used in a variety of combinations in the search to find suitable articles.

Study Selection: Studies were included that provided participant eligibility criteria and, therefore, could be assessed using the Physiotherapy Evidence Database (PEDro) scale. Studies were selected based on hydration status data and its correlation to core body temperature. Selection was also based on how core body temperature was measured and whether it was affected by outside measures.

Data Extraction: The abstracts that were located through the search strategies were reviewed, and potentially relevant abstracts were selected. At least 3 outcomes that were measured pre and post exercise had to be reported such as changes in core temperature (T_{re}) over time, group differences in T_{re} and %DHY and the relationships between T_{re} and %DHY. Despite reports of a direct relationship between hydration status and T_{re} , the inability to detect a correlation in field studies should not be viewed as unusual, particularly at mild to moderate levels of dehydration.

Main Results: Statistically significant changes were observed within Division II football players during a singular pre-season practice. Outcomes included gastrointestinal temperature (T_{re}) pre-practice 37.35 + 0.34 and post-practice 37.89 + 0.49 ($p < 0.0001$), urine-specific gravity pre-practice 1.009 + 0.008 and post-practice 1.020 + 0.001 ($p < 0.0001$) and body weight (kg) changes pre-practice 84.90 + 7.85 to post-practice 83.97 + 7.62 ($p < 0.0001$). There was a noted linear trend in core temperature for Linemen and Backs during pre-season practice and maximal core temperature was also higher in Linemen (38.65 + 0.48°C) than Backs (38.44 + 0.32°C). As core body temperature rose participants consuming cold water had significantly ($p = 0.024$) smaller rises in core temperature (0.83°C) compared to room temperature water (1.13°C). Drinking cold water can significantly mediate and delay the increase in T_{re} during a practice.

Conclusions: Considerable controversy regarding fluid replacement during exercise exists as the hydration status of an athlete is an important aspect of preventing heat related illnesses. However, maximal core body temperature is not associated with sweat rate in Division II football pre-season practices and therefore should not be the single greatest factor when dealing with prevention of heat related illness. The most influential factor affecting the rise in core temperature is exercise intensity and/or the inability to dissipate heat.

Key Words: hydration status, heat related illnesses, core body temperature, exercise

INTRODUCTION

- The body's hydration status plays a significant role in the body's core temperature regulation
- The body's core temperature is the biggest component in heat related illnesses and being able to tell which heat related illness is present in an athlete
- There have been many studies on what has the greatest effect on the core body temperature when exercising in the heat and humidity
- Hydration status of a patient and how to rehydrate a patient after practice has become a large topic that has been cropping up in the field of Athletic Training
- The body's hydration status plays a significant role in the body's core temperature regulation

- The body's core temperature is the biggest component in heat related illnesses and being able to tell which heat related illness is present in an athlete
- There have been many studies on what has the greatest effect on the core body temperature when exercising in the heat and humidity
- Hydration status of a patient and how to rehydrate a patient after practice has become a large topic that has been cropping up in the field of Athletic Training
- Voluntary fluid intake and sweat responses, even when athletes do the same exercise at the same time in the same environment vary between individuals.
- According to research, if athletes allow themselves to become dehydrated during exercise, they will experience reduced sweat rates and elevations in core body temperature, which increase their risk of developing a life threatening heat disorder
- Although some research states that hypohydration is not associated with increases in core body temperature to levels that would be considered excessive
- Core temperature increases with increasing water deficit indicates that physiologic adjustments are both necessary and effective for maintaining heat loss when sweat rate and skin blood flow are reduced
- Hydration status of a patient and how to rehydrate a patient after practice has become a large topic that has been cropping up in the field of Athletic Training
- Exertional heat illness occurs when the body is unable to effectively cool itself during exercise and lacks the ability to properly replenish the energy spent on exercise
- Dehydration, measured by 1-2% of the pre-activity body weight, disturbs physiologic function and increases the risk of developing exertional heat illness
- Research has investigated the impact of water temperature on performance measures as well as core temperature regulation to determine the ideal fluid choice for optimal exercise performances
- Pre-hydrating and acute cold exposures are accompanied by concomitant increases in diuresis, which may limit their usefulness prior to prolonged event.
- If athletic trainers can prevent heat related illnesses by properly hydrating their patients, then preventing heat related illnesses just got a lot easier

CLINICAL QUESTION

How does the hydration status of an athlete affect the core body temperature in relation to heat related illnesses?

DATA EXTRACTION

- Randomized cross-over study design
 - The randomized cross-over design is beneficial as it is easier to control outside biases
- Body weight measured before and after activity
 - The body mass weighing looks for differences in water weight lost throughout activity
- Body temperature measured by:
 - Ingestible thermometers, Rectal thermometers, Skin temperature
 - Body temperature is useful to determine how the body reacts to stresses placed upon it during activity
- Fluid intake measured during activity
 - Measuring fluid intake is useful to determine how fluid affects body temperature during activity
- Urine specific gravity measured pre-activity
- Urine output measured post-activity
- Heart rate and blood pressure measured pre/during/post activity

MAIN RESULTS

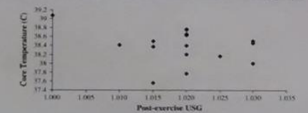
Changes Observed During Practice Session (T_{re} = Gastrointestinal Temperature; USG = Urine Specific Gravity)

	Pre exercise	Post exercise	t	p
T_{re} (°C)	37.35 ± 0.34	37.89 ± 0.49	8.23	< 0.0001
USG	1.009 ± 0.008	1.020 ± 0.001	7.58	< 0.0001
Body weight (kg)	84.90 ± 7.85	83.97 ± 7.62	9.25	< 0.0001

Batchelder BC, Krause BA, Seegmiller JG, Starkey CA. Gastrointestinal temperature increases and hypohydration states after collegiate men's ice hockey participation. *Journal of Strength and Conditioning Research*. 2010; 24(3):68-73.

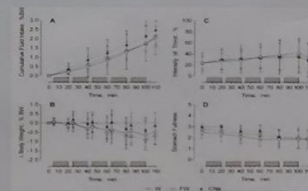
- As core body temperature increases, the total body weight in kg decreases

Correlation Between The Change in Urine Specific Gravity (USG) And The Change in T_{re} ($r = 0.31$):



Batchelder BC, Krause BA, Seegmiller JG, Starkey CA. Gastrointestinal temperature increases and hypohydration states after collegiate men's ice hockey participation. *Journal of Strength and Conditioning Research*. 2010; 24(3):68-73.

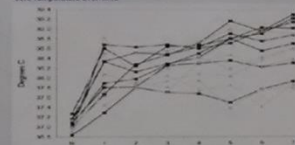
- As core body temperature increases, the urine specific gravity increases as well



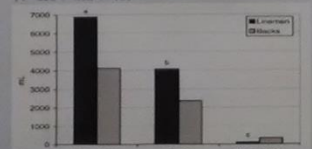
Wilf, B. Timmons, B. Bar-Or, O. Voluntary fluid intake, hydration status, and aerobic performance of adolescent athletes in the heat. *Applied Physiological Nutrition Metabolism*.

- A = The better tasting fluid, the more likely that subject was to replenish the fluid lost
- B = Decreased thirst
- C = Lower loss of body weight during exercise)

Core Temperature Over Time

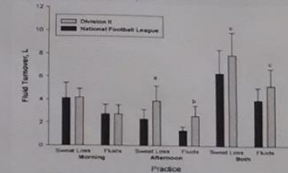


Godek SF, Bartolozzi AR, Burkholder R, et al. Core temperature and percentage of dehydration in professional football linemen and backs during pre-season practices. *Journal of Athletic Training*. 43(1): 8-14.



Godek SF, Bartolozzi AR, Burkholder R, et al. Core temperature and percentage of dehydration in professional football linemen and backs during pre-season practices. *Journal of Athletic Training*. 43(1): 8-14.

Fluid Turnover Between National Football League And Division II Players in Morning Practices, Afternoon Practices And Both Practices ($P < 0.01$; $P < 0.002$; $P < 0.05$)



Godek SF, Bartolozzi AR, Peduzzi C, et al. Fluid Consumption and Sweating in National Football League and Collegiate Football Players With Different Access to Fluids During Practice. *Journal of Athletic Training*. 43(2): 128-135.

CONCLUSIONS

- Hydration status and restrictive clothing impeded appropriate heat dissipation and strained athletes thermoregulation systems which leads to an increased core body temperature and possible heat related illnesses
- Hyperhydration decreases cardiovascular and thermoregulatory stress on the body
- Core temperature is not necessarily associated with either percentage of dehydration or sweat rate
- Replacing large daily sweat losses with hypotonic fluids may predispose athletes to low blood-sodium levels
- Players that get water only during water breaks replaced the same volume of fluid as those players that had constant access to both water and sport drinks
- No link can be found between body mass loss and core temperature or the development of hyperthermia in the field

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Introduction

The Survey of Attitudes Towards Statistics (SATS) is a tool widely used by statistics educators to help gain insight into students' attitudes and how they impact teaching and learning in introductory statistics courses. Three instructors at Winona State University have been administering this survey to students both at the beginning and end of several semesters. This study involved an analysis of the data collected in these courses to investigate students' attitudes towards statistics and how they change throughout the semester. The results were also compared to national norms. Finally, an exploratory factor analysis was conducted using the data collected from the Winona State University courses to investigate the construct validity of the SATS tool.

Description of the SATS

The SATS-28 was initially created as a survey with 28 questions which measured the first four components shown in **Table 1**. It was recently revised to become the SATS-36 which uses 36 questions to measure the original four components in addition to two more: *Interest* and *Effort*. These 36 questions and the specific components they are intended to measure are shown in **Figure 1**. The first component, *Affect*, uses six questions to measure students' feelings regarding statistics. *Cognitive Competence* measures students' attitudes about their skills when applied to statistics using six questions. The third component, *Value*, uses nine questions to measure how students feel about the usefulness and relevance of statistics in their life. Using seven questions, *Difficulty* measures how difficult the students believe statistics is. With only four questions, *Interest* measures the students' level of interest in statistics. The last component, *Effort*, measures how much time the student intends to put into the class using four questions. The possible range of scores for each component is between 1 and 7. Using the 7-point response scale, higher scores correspond to more positive attitudes.

Methods & Objectives

Three professors at Winona State University collected data from students in their introductory statistics courses over many different semesters. The final data set used in the analysis consisted of a total of 707 responses to the pre-test and 488 responses to the post-test. A matched-pairs analysis was conducted using only the 486 students who responded to both the pre- and post-test.

The averages and standard deviations for each of the six component scores were found for both the pre- and post-test results. The averages and standard deviations were also found for the mean differences (post - pre). Paired t-tests were used to determine whether a significant change occurred in any of the six components throughout the semester, and 95% confidence intervals for each of the six mean differences were obtained.

The pre-test data was also used to conduct an exploratory factor analysis to investigate the validity of the SATS tool.

Analysis of Students' Attitudes

Table 1: Averages and Standard Deviations for Pre Scores, Post Scores, and Mean Differences

Component	Pre-test (n=707)		Post-test (n=488)		Mean Difference (n=486)		95% CI for Mean Difference		p-value
	M	SD	M	SD	M	SD			
Affect	4.20	1.09	4.55	1.22	0.38	1.29	(0.26, 1.49)	< 0.0001	
Cog Com	4.78	1.03	5.00	1.16	0.26	1.17	(0.15, 0.36)	< 0.0001	
Value	4.96	0.99	4.83	1.07	-0.07	0.97	(-0.12, 0.02)	0.1364	
Difficulty	3.71	0.73	4.04	0.84	0.35	0.89	(0.27, 0.43)	< 0.0001	
Interest	4.61	1.13	4.23	1.24	-0.30	1.23	(-0.42, -0.19)	< 0.0001	
Effort	6.44	1.04	6.13	1.00	-0.32	1.30	(-0.44, -0.20)	< 0.0001	

Exploratory Factor Analysis

Figure 1: Exploratory Factor Analysis Results

Question	Original SATS					Factors			
	Affect	Cog Comp	Value	Difficulty	Interest	1	2	3	4
1- I plan to complete all of my statistics assignments.									
2- I plan to work hard in my statistics courses.									
3- I will like statistics.									
4- I will feel insecure when I have to do statistics problems.									
5- I will have trouble understanding statistics because of how I think.									
6- Statistics formulas are easy to understand.									
7- Statistics is worthless.									
8- Statistics is a complicated subject.									
9- Statistics should be a required part of my professional training.									
10- Statistical skills will make me more employable.									
11- I will have no idea what's going on in this statistics course.									
12- I am interested in being able to communicate statistical information to others.									
13- Statistics is not useful to the typical professional.									
14- I plan to study hard for every statistics test.									
15- I will get frustrated going over statistics tests in class.									
16- Statistical thinking is not applicable in my life outside my job.									
17- I use statistics in my everyday life.									
18- I will be under stress during statistics courses.									
19- I will enjoy taking statistics courses.									
20- I am interested in using statistics.									
21- Statistics conclusions are rarely presented in everyday life.									
22- Statistics is a subject quickly learned by most people.									
23- I am interested in understanding statistical information.									
24- Learning statistics requires a great deal of discipline.									
25- I will have no application for statistics in my profession.									
26- I will make a lot of math errors in statistics.									
27- I plan to attend every statistics class session.									
28- I am scared by statistics.									
29- I am interested in learning statistics.									
30- Statistics involves massive computations.									
31- I can learn statistics.									
32- I will understand statistics equations.									
33- Statistics is irrelevant in my life.									
34- Statistics is highly technical.									
35- I will find it difficult to understand statistical concepts.									
36- Most people have to learn a new way of thinking to do statistics.									

A factor analysis was conducted using the pre-test data, and it was found that four factors explained 93.58% of the variability. A scree plot also confirmed the use of four factors. **Figure 1** shows both the original SATS questions and the corresponding components they were intended to measure. It also shows which questions loaded on each factor in the factor analysis. For example, Question 14, originally intended to measure *Effort*, loaded on Factor 4. The other three *Effort* questions also loaded on Factor 4.

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Results & Conclusions

Table 1 displays the averages and standard deviations for the pre-test scores, post-test scores, and the differences in scores for each of the six components. It also shows the 95% confidence intervals for each component's mean difference and the p-values from paired t-tests. Because the mean differences were found by subtracting the pre-scores from the post-scores, a positive difference is desired to show that the students' attitude scores have increased. The creators of the SATS revealed the survey's national norms in a personal communication with the professors involved in this study. As shown in **Table 1**, *Value* has decreased; however, this decrease was not significant ($p = 0.1364$). *Interest* and *Effort* were found to have decreased significantly ($p < 0.0001$). This was in line with what is typically observed nationally. After taking the course, however, students in these Winona State University classes have significantly higher attitude scores relating to *Affect*, *Cognitive Competence*, and *Difficulty* ($p < .0001$). This is not typically observed; national norms indicate that *Difficulty* usually tends to decrease, while *Affect* and *Cognitive Competence* stay about the same.

The factor analysis also revealed some very interesting results, which are shown in **Figure 1**. Factors 3 and 4 mostly group together items measuring *Value* and *Effort*, respectively. This indicates that this survey may in fact distinctly measure these components. The other four components, however, are mixed together in the first two factors. These results are similar to those obtained by Nolan et al. (2012) and Vanhoof et al. (2011). This may indicate that the SATS isn't actually measuring six unique components as the authors claim it is measuring. Instead, the *Affect*, *Cognitive Competence*, *Difficulty*, and *Interest* scales could be combined into only two unique factors which measure both interest and different aspects of how a student feels he or she will perform in a statistics course.

Future studies should be conducted to investigate the relationship between *Affect*, *Cognitive Competence*, *Difficulty*, and *Interest* in more detail. Furthermore, instructors using this tool should be made aware that the existing SATS may not be measuring six unique components as claimed. Instructors may want to consider measuring only *Value* and *Effort* using the existing SATS scales and then combining the other items into only two factors to measure how confident students are in their ability to learn statistics.

Introduction

- 25.8 million people in the U.S. have diabetes¹, 3 million live with Type 1 diabetes⁶
- Diabetes is the 7th leading cause of death; death is twice as likely for people with diabetes¹
- Management can affect emotions such as anxiety, stress, anger, depression, and denial¹
- Despite the increased risk, diabetes can be controlled and risks minimized by adherence to self-care behaviors²
- A lack of social support and presence of stigma are theorized to have a negative effect on adherence³
- Higher self-efficacy is associated with higher self-rated adherence⁴
- The self-as-doer identity (i.e., the degree to which individuals perceived themselves as the doer of their behaviors) predicted greater frequency of exercise, insulin adherence, eating a healthy diet, and foot checking⁵
- Research on how stigma and a self-as-doer identity affect individuals with diabetes is limited

Hypotheses

- Social support, self-efficacy, and motivation will have a positive relationship with self-care behaviors
- Stigma will have a negative relationship with self-care behaviors
- Social support, self-efficacy, and motivation will predict an increase in self-care behaviors
- Stigma will predict a decrease in self-care behaviors

Discussion

- Overall, hypotheses were partially supported. Results suggest that support attitudes, self-efficacy, and a doer identity may help individuals with diabetes adhere to a treatment regimen
- Health care providers might consider interventions focused on developing a self-as-doer identity for self-care behaviors and building self-efficacy related to diabetes care. Additionally addressing attitudes about support might also improve self-care behaviors
- Contrary to our hypotheses, diabetes-specific social support needs and support received were not associated with self-care behaviors.
 - Perhaps general social support or support in other areas of life not related to diabetes self-care may be more beneficial for adherence to self-care behaviors
- Stigma was also not related to diabetes self-care behaviors, which is contrary to the hypotheses
 - Type 1 diabetes may not be seen as a stigmatizing disease due to the easily hidden self-care behaviors and that certain self-care behaviors are not stigmatizing, such as eating a healthy diet
 - Stigma may therefore not be as important of a concern in treatment adherence for diabetes as it is with other chronic illnesses.
- Future research might include using a different definition of social support and different recruitment methods. Researchers might also continue to explore causal effects of self-as-doer identity and self-care behaviors.

Methods

Participants

- 166 Participants
 - 134 Women; 31 Men
- Ages 18-64 years old
 - ($M=30.99$, $SD=10.71$)
- Diagnosed for an average of 16.87 years ($SD=11.30$)
- 89.8% Caucasian, 2.4% African American, 2.4% Biracial, 5.4% Other

Procedures

- Participants completed an online survey

Analysis

- Pearson's correlations
- Multiple linear regressions

Measures

- Demographics
- Summary of Diabetes Self-Care Activities¹
- Self-as-Doer Diabetes²
- Treatment Self-Regulation Questionnaire³
- Diabetes Care Profile (Social Support Subscale Only)⁴
- Stigma Scale for Chronic Illness⁵
- Diabetes Self-Efficacy⁶

¹Robert, Hampson, & Garage, 2006; ²Brouwer & Mosack, 2013; ³Williams, Freedman, & Dool, 1996; ⁴Fitzgerald, Davis, Connell, Hess, Funnell, & Heil, 1996; ⁵Bao et al., 2009; ⁶Van der Bij & Shortridge-Ragatz, 2011

Results

Means, Standard Deviations, and Correlation Coefficients

Variables	M (SD)	1	2	3	4	5	6	7	8
1. Self-Care Behaviors	4.64 (.93)								
2. Self-as-doer	3.37 (.54)	.48**							
3. Support Needs	3.10 (1.15)	-.12	-.18*						
4. Support Received	3.11 (1.14)	.05	.18*	.28**					
5. Support Attitudes	3.90 (.82)	-.14	.14	-.06	.35**				
6. Self-Efficacy	4.05 (.64)	.59**	.43**	-.11	.17	.06			
7. Stigma	1.84 (.69)	-.07	-.08	.19*	-.13	-.41**	-.19*		
8. Controlled Motivation	34.48 (8.92)	.17*	.18*	.33**	.47**	.03	.13	.13	
9. Autonomous Motivation	31.91 (5.82)	.27**	.38**	.05	.33**	.07	.26	-.08	.52**

* $p < .05$ ** $p < .01$



Regression Analyses for Predicting Self-Care Behaviors

	B	SE	β	sr^2	p
Self-as-Doer	.42	.14	.25	.05	<.01
Support Needs	-.06	.07	-.07	.004	.37
Support Received	-.02	.10	.02	.0002	.84
Support Attitudes	-.25	.11	-.22	.04	<.01
Self-Efficacy	.60	.11	.43	.15	<.001
Stigma	-.08	.01	-.06	.0027	.47
Controlled Motivation	.01	.01	.06	.002	.53
Autonomous Motivation	.01	.01	.07	.003	.44

- All factors contributed approximately 43.1% of the total variance in self-care behaviors, $R^2 = .431$, $\Delta F(8, 111) = 10.51$, $p < .001$.
- Self-efficacy, support attitudes, and self-as-doer identity were significant individual contributors
- Self-efficacy was the strongest individual contributor

Abstract

Our goal for our project was to figure out what made Paperny decide to make an unethical decision and Andre make a ethical one.

Introduction

We interviewed Professor Andre about his ethical dilemma and compared it to Justin Paperny's unethical decisions.

Professor Andre

Professor Andre had been working in his Industry for 28 years when he was confronted with an ethical dilemma. He had a family to support and a mortgage to pay for, yet he still decided to resign. His values of religion, family, and reputation helped him make his decision.

Justin Paperny

Justin was fresh out of college and trying to make a name for himself when he took his opportunity to steal from his boss and participate in a Ponzi Scheme. Justin, once a student athlete with high principles, turned into a felon who served 18-months for fraud.

Dilemmas

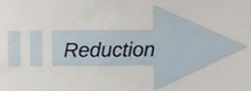
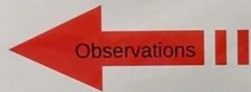
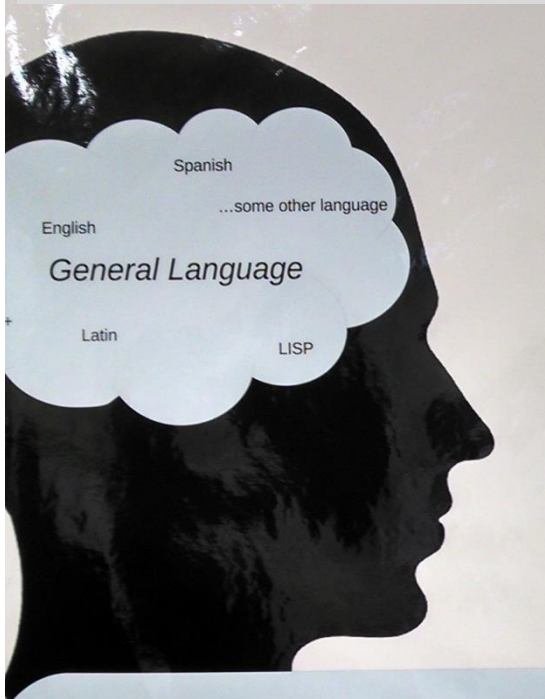
Professor Andre was asked to fix the books at a previous employer. Justin was taking commision without his Senior Partner knowing, then got sucked into a Ponzi Scheme.

Conclusion

What we have concluded about the ethical dilemma between Justin Paperny and Professor Andre is that experience contributes to the most to an ethical dilemma. What we got out of our project was that even with similar upbringings, when an opportunity arises, experience help in determining which decision to make.

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Reduction

General intelligence possesses a primitive decision-making process that correlates critical observations. This process lowers the complexity of the decision-making process by removing unnecessary intermediate steps. In other words, an intelligent agent must be able to take an observation series $A \rightarrow B \rightarrow C$, and simplify it to decide that observation A may directly indicate C without regard to the presence of observation B, where applicable. We call this decision-making process *reduction*.

Reduction is manifested as a primitive language processing tool that demonstrates intelligence. An intelligent system that performs reduction can simplify the complexity of interpreting phrases. For example, the following reduction can be performed by an intelligent English user:

"Enough humidity has gathered in the atmosphere as to generate clouds of an unmaintainable density." \rightarrow *"It is raining"*

These two phrases mean the same thing, but the reduced form is significantly less complex to process. Thus, any reduction algorithm R must meet three criteria:

$$R(P, L) = R(p, L)$$

$$P() = p()$$

$$O(p()) \leq O(P())$$

Where P is a phrase existing in language L , and p is the result of reduction on P .

Introduction

The original goal of Artificial General Intelligence is to simulate intelligent behavior at or above human level. This goal necessitates a means of comparison between intelligent agents. One such comparison method is to measure the efficiency with which the agent arrives at correct decisions. In other words, when an agent is given some problem, its intelligence with respect to that problem is a combination of the amount of time it takes to find a solution, and how accurate that solution is. From this, we can argue that general intelligence should demonstrate speed and accuracy in solving not only predefined problems, but in general, an evolving scope of problems.

Humans use intelligence by reasoning over observations. This reasoning falls under various forms of deductive, inductive, or abductive reasoning. Deductive reasoning is precise and exhaustive, whereas inductive reasoning is fast but less accurate. Abductive reasoning allows the use of mental shortcuts, and gives way to expertise through experience. Since inductive and abductive reasoning are inherently uncertain, they are of particular interest for solving problems suited for general intelligence, which usually involve a high degree of uncertainty. Such problems include machine learning, pattern classification, natural language processing, statistical analysis, computer vision, and data compression.

Natural languages, the primary visible forum for intelligence, are incremental, self-evolving, self-mutating, and the evaluation of a statement using all language generates another statement in the same language. Natural languages encompass deductive, inductive, and abductive reasoning. All decisions in a natural language are based on previous experiences. Previously unknown expressions are either deemed irrelevant (and hence discarded) or considered acceptable new knowledge that is integrated into the language. This process of learning, and subsequent correlation between cause and effect observations, is elementary in demonstrative intelligence.

The goal of this research is to:

- Define a universal language for general intelligence
- Develop a model programming language to implement this universal language
- Develop a reduction process that emulates abductive reasoning to mimic human intelligence

General Language

For the purposes of developing an intelligent machine we describe the notion of an unrestricted general language. This general language behaves as a superset of all languages. Thus, a means of applying reduction to the general language can be used on any language. The general language must satisfy the following three criteria:

- General language must accept all possible strings*
- General language must be Turing-complete*
- General language must be interpretable in-order*

We have designed and implemented a programming language Eesk that attempts to meet these three criteria. Our approach is based on modification of the lambda calculus, which allows for the general language to be implemented mechanically.

With a mechanical implementation of the general language, we can implement a reduction algorithm on any learned subset of the general language. This allows for reduction of natural languages, which is traditionally a task only accomplished well by human intelligence.

Reduction has been successfully achieved for all examined halting inputs of our implementation of the general language.



Objectives

This study examined fish abundance and diversity in different habitat patches within a large floodplain river to determine:

- if there is a relationship between total number of individuals and gross primary production (GPP) or ecosystem size;
- if there is a relationship between number of species present and GPP or ecosystem size.

Methods

Study Area

Samples were collected between July and August 2014 in the Upper Mississippi River between Brownsville, MN and Alma, WI. The Upper Mississippi River is a complex, large river system with many branches frequently entering and exiting the main channel. Slackwater patches, areas of little or no flow are also abundant across the riverine landscape. Samples were taken from connected backwaters and floodplain lakes within the riverine landscape.

Sample Methods

- Fish were collected using a boat electrofisher and captured by net during three 4 - 8 min runs for each site.
- Catch per unit effort (CPUE) was calculated for each species within a site as well as the total number of species and CPUE for total number of individuals collected.
- Net primary production and respiration was calculated using the light bottle/dark bottle technique. Five-L cubitainers (n = 3) were placed in the water at each site 4 - 6 hr.
- Ecosystem size of each site was measured using ArcGIS and digital topographic maps provided by the Upper Midwest Environmental Sciences Center, US Geological Survey, La Crosse, WI.
- Linear regression analysis in SAS was used to determine if relationships existed.

Representative Study Site

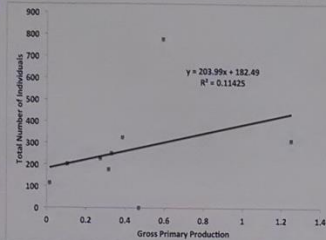


Figure 1. Relationship between gross primary production (mg O₂/L/hr) and the total number of individual fish caught (CPUE). Fish were collected in habitats in the Upper Mississippi River between July and August 2014. There was no significant relationship (p = 0.3105).

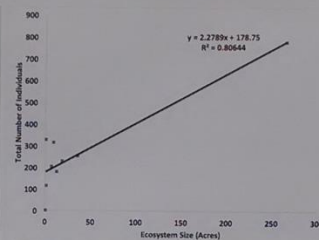


Figure 2. The relationship between ecosystem size (acres) and total number number of fish (CPUE). Fish were collected in habitats in the Upper Mississippi River between July and August 2014. The relationship was significant (p = 0.0010).

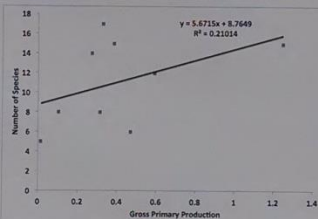


Figure 3. Relationship between gross primary production (mg O₂/L/hr) and total number of fish species. Fish were collected in habitats in the Upper Mississippi River between July and August 2014. There was no significant relationship (p = 0.1695).

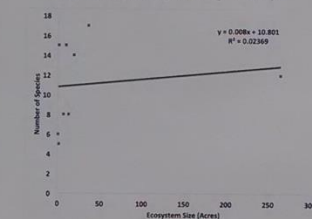


Figure 4. Relationship between ecosystem size (acres) and total number of fish species. Fish were collected in habitats in the Upper Mississippi River between July and August 2014. There was no significant relationship (p = 0.6925).

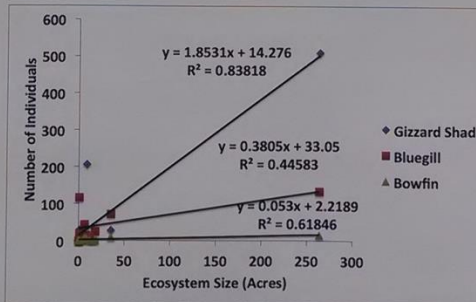


Figure 5. Relationship between ecosystem size and the CPUE of bluegill, bowfin, and gizzard shad. Fish were collected in habitats in the Upper Mississippi River between July and August 2014. These were the only species with a significant response to ecosystem size (p < 0.05).

Results

- No correlation was evident between gross primary production and the number of individuals present (Figure 1).
- There was a significant correlation between ecosystem size and the number of individuals present (Figure 2).
- No relationship was seen between gross primary production and the number of species present (Figure 3).
- No relationship between ecosystem size and the number of species present (Figure 4).
- There was a significant correlation between ecosystem size and the CPUE of bluegill, bowfin, and gizzard shad (Figure 5).

Conclusions

- The lack of a correlation between GPP and number of species and total abundance of fish indicates that productivity is not a driver of community structure. Productivity has also been shown to not influence food chain length in aquatic ecosystems (e.g., Vander Zanden & Fetzer 2007).
- We hypothesized that the number of species would increase with ecosystem size through greater availability of niches. This was not the case, as evidenced in the lack of correlation between patch size and number of fish species present. Instead, total number of individuals increased for species commonly found in slackwater patches.

Two possible reasons for a numerical response to ecosystem size are: (1) greater patch size leads to greater availability of resources; and (2) another physical attribute accounts for changes in species composition. Ecosystem size has been attributed to longer food chains (Post 2000) but increased niche availability was proposed as the primary causal mechanism. As we describe, our study does not support this. More likely, a combination of size and the physical complexity (e.g., measures of habitat morphometry) form the basis of shaping community structure. Large patches can be either quite simple or complex depending on the range of depths present and other structures (different substrate types, woody debris) that define their character. Examination of these features along with measures of community composition are needed to better understand the nature of riverine landscapes.

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Acknowledgements

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INTRODUCTION

Whole Kids Outreach (WKO) is a non-for-profit organization that provides over 200-300 low-income pregnant women and families with education and guidance for raising children. The Outreach Specialists who are trained to treat and educate these families currently track their client's information using paper forms, which is very time consuming and a waste of resources. A customized web-based application was created for the WKO staff to educate and treat their clients more efficiently.

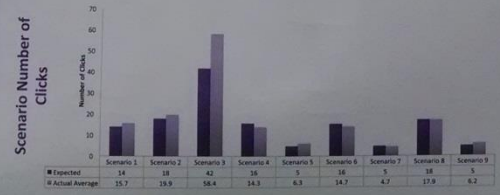
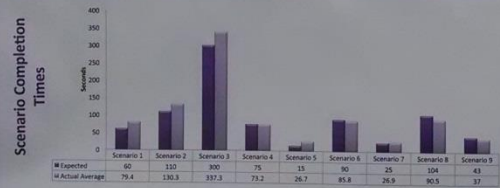
A formal usability study consisting of tasks/scenarios and a pre-and post-questionnaire to test for predictability, synthesizability, familiarity, and observability was administered to ten participants; five WKO staff members completed the post-questionnaire as well. This data was compared and analyzed to determine the usability and efficiency of the application, in addition to finding any improvements to increase the usability.

METHOD

The formal usability study consisted of four females and six males between the ages of 19 to 58. Each participant filled out a pre-questionnaire and waiver that gave background information and permission to use their results. There was a total of nine scenarios for each participant that were derived from the Outreach Specialists two main functions: tracking and recording the client visit results and tracking a client's overall progress. Each scenario tested for one or more of the listed usability principles. The WKO web application beta edition being tested runs on a Macbook Pro running Xampp Apache Web Server.

The Participants were read each scenario and told to let us know when they believed to have completed the scenario. The user's interactions and results (success rate(0-2), time, number of clicks, errors) from the scenarios were recorded. After each participant completed the nine scenarios, they filled out the post-questionnaire evaluating the application. These evaluations were compared with those from the WKO staff.

Home Page | Search Database | My Clients | My Visits | Review Visits | Whole Kids Outreach Home Visit Application



HYPOTHESIS

The assessment of a formal usability study on the Whole Kids Outreach Web Application will show that, with minimal training, the custom user interface is easy to use and more efficient than the current paper-based system.

RESULTS

The time and number of clicks of each user were compared to an expected time and number of clicks determined for each scenario. We found that the users' time and number of clicks went down, on average, in comparison to the expected outcome. After the first three scenarios, the times and number of clicks decreased. Scenario 3 had a longer average time and click count due to the amount of information being entered, and the various ways the user entered in data. Scenario 5 had a longer average time and click count as well due to an alternate path that half of the participants used to complete the scenario. There was a total of 90 scenarios tested, where 89 of them were completed. 80 out of the 89 were easily completed with no help.

We compared the participants' and WKO staff's ratings for ease of use and experience. Even with minimal training compared to the WKO staff members training, the participants found the application easy to use.

	Participants from study	WKO Members
Ease of Use	4.4	5
Experience	4.6	4.6

CONCLUSION

The quantitative and qualitative results from the questionnaire's and test scenarios showed that, with minimal training, users found the WKO application easy to use and more efficient than a similar paper based system.



Introduction

Healthy Eating and Dieting

- In 2012, 23% of women reported being on a diet¹
- Most women on a diet show maladaptive weight loss behaviors *rather than increasing healthy food*^{1,2}
- Media messages might be to blame as they:
 - correlate with obesity and negative body image, possibly leading to disordered eating behaviors³
 - raise social expectations of body image and may influence disordered eating⁴
- These factors may influence how one perceives what it means to be a healthy eater
- I explored the relationship between a healthy eater identity, dieting behaviors and attitudes, disparity between ideal and actual weight, and physical activity.

¹NDP Group, 2012; ²Malinatoskas et al., 2006
³Derenne & Beresin, 2006; ⁴Pedlow & Teal, 2013

Hypotheses

- Healthy eater identity will correlate positively with physical activity level
- Healthy eater identity will correlate negatively with the disparity between ideal and actual weight a due to the participant's satisfaction with their bodies
- Healthy eater identity will correlate negatively with restrictive eating behaviors

Participants

- 79 College Women
- Ages 15-53
- M=22.92, SD=6.92
- 79.7% Caucasian, 7.6% African American, 5.1% Asian, 7.6% other
- Physical Activity Level:
 - Low = 21.5%
 - Moderate = 46.8%
 - Intense = 31.6%

Procedure

- Participants completed a survey
- Actual and ideal weight were measured

Methods

Measures

- Demographics: Age, school year, relationship status, race
- Restrained Eating Scale (0-35)²
- Healthy-Eater Identity Measure (0-7)¹
- Physical activity level: 3 category scale
- Weight disparity
 - Actual - Ideal weight

¹Herman & Polivy (1975)
²Strachan & Brawley (2000)

Analysis

- A secondary analysis of a larger study exploring healthy eating behaviors was conducted
- Spearman's and Pearson's bivariate correlations were performed to explore relationships among variables.

Results

	M	SD
BMI	25.87	6.54
Healthy Eater Identity	4.93	1.24
Weight Disparity	18.79	18.18
Restrictive Eating	14.75	5.03

- The relationship between healthy eater identity and:
 - Physical activity was strong, positive and significant
 - Weight disparity was moderate, negative and significant
 - Restrictive eating habits was moderate, positive and significant

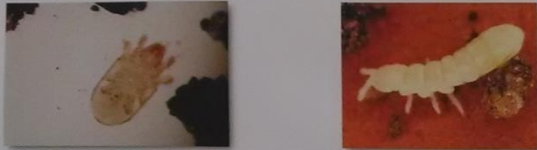


	1	2	3
1. Healthy Eater Identity			
2. Physical Activity	.46***		
3. Weight Disparity	-.28*	-.28*	
4. Restrictive Eating	.31**	.16	.43***

* p <.05; ** p <.01; *** p <.001

Discussion

- Results suggest that the closer someone approaches their ideal weight, the more they identify with being a healthy eater
 - Women may be equating healthy eating behaviors with restricting food intake rather than increasing their intake of healthy foods
 - They may also perceive that they are eating healthier if their actual weight more closely resembles their ideal weight
- The strong relationship between healthy eater identity and physical activity suggests women perceive themselves as a healthier eater if they exercise more
- Contrary to the hypothesis, healthy eater identity positively correlated with restrictive eating habits, suggesting that women may be equating a healthy eater identity with restricting food intake and going on a diet rather than increasing their intake of healthy foods such as fruits or vegetables as a healthy eater identity might suggest.
- Interventions could focus on the problem of disordered eating and change the way that people think about healthy eating by putting more focus on overall body health by eating the best foods for one's body rather than restricting food intake, which can sometimes be unhealthy for the body
- Further studies might focus on cognitive perceptions of the definition of a healthy diet



Abstract

Invertebrates play an important role in the soil. They help with the decomposition process and help with soil aeration, along with many other services. The purpose of this research was to determine the soil diversity and abundance of invertebrates in selected areas around the Winona State University campus. It was hypothesized that species diversity and abundance would be highest at locations which are not affected by pesticides application or by soil compaction caused by high traffic areas (pedestrians, motor vehicles). Soil samples were taken from locations (n=4) on campus, and these included: west campus, IWC, Main campus and Garvin Heights. Samples (1 per location) were collected once in November, 2013 and later on (3 per location) during spring 2014. The soil invertebrates were collected from each soil sample using the Berlese Apparatus. The computation of species richness and abundance was pursued through an employment of the Simpson Index of diversity. A presentation of the findings from this study will be provided with this poster and with more discussion and implications for the importance of biodiversity in soil systems.

Introduction

Soil invertebrates relationship with soil hasn't received much attention until more recent years. In fact, without the organisms, the soil wouldn't be anything like it is today (Lavelle et al., 2006). Soil invertebrates are needed in the soil to help with soil aeration and decomposition. These soil organisms play an important role in "recycling" plant and animal debris, where in many cases the organic matter released from the decomposer is often consumed many different times by different organisms in the soil (Nardi, 2003). The organic matter being released from the decomposers will eventually transform into Humus—an important part to maintain healthy soil. Humus is made up of plant materials that are hard to digest, like cell walls, and also bacteria from the digestive tract of these decomposers. Humus contains nutrients along with water and attaches to minerals which make it easy to reach plant roots. The higher the population and diversity of organisms in the soil, leads to healthier and a more functional soil food web, since organisms play different roles in the soil (Nardi, 2003).

Materials and Methods

Soil was sampled once during fall 2013 and three times during the spring 2014 semester. All samples were approximately 16 ounces of soil, which were placed into the Berlese Apparatus shown in Figure 1. Soil was dried using the heat lamps, and invertebrates in the soil would go through a filter into 70% ethanol container. Samples were then observed under microscope and counted based on the number of species and population of each. Simpson's Index was then used to calculate diversity.



Figure 1. Berlese Apparatus

Data

Fall 2013			Spring 2014 (Sample 1)		
Species (i)	Abundance (n)	Relative Abundance (Pi)	Species (i)	Abundance (n)	Relative Abundance (Pi)
White Mite	11	0.140	White Mite	12	0.176
Spider Mite	10	0.132	Spider Mite	16	0.235
Nematode	10	0.132	Nematode	11	0.162
Brown Mite	14	0.184	Brown Mite	13	0.191
Springtails	18	0.237	Springtails	15	0.191
Ant	1	0.016	Ant	0	0.000
Flies	6	0.079	Flies	0	0.000
Small Worm	2	0.026	Small Worm	3	0.044
Total	76		Total	68	

Spring 2014 (Sample 2)			Spring 2014 (Sample 3)		
Species (i)	Abundance (n)	Relative Abundance (Pi)	Species (i)	Abundance (n)	Relative Abundance (Pi)
White Mite	11	0.156	White Mite	21	0.311
Spider Mite	19	0.269	Spider Mite	13	0.194
Nematode	3	0.054	Nematode	1	0.015
Brown Mite	16	0.226	Brown Mite	21	0.311
Springtails	4	0.057	Springtails	8	0.119
Ant	0	0.000	Ant	0	0.000
Flies	0	0.000	Flies	0	0.000
Small Worm	3	0.054	Small Worm	3	0.045
Total	56		Total	67	

Table 1. Abundance of species at all locations.

Garvin Heights, Species					West Campus, Species				
Species (i)	Abundance (n)	Relative Abundance (Pi)	Mean	Standard Deviation	Species (i)	Abundance (n)	Relative Abundance (Pi)	Mean	Standard Deviation
White Mite	6	0.263	0.263	0.000	White Mite	6	0.212	0.212	0.000
Spider Mite	6	0.263	0.263	0.000	Spider Mite	10	0.182	0.182	0.000
Nematode	6	0.263	0.263	0.000	Nematode	7	0.112	0.112	0.000
Brown Mite	6	0.263	0.263	0.000	Brown Mite	8	0.132	0.132	0.000
Springtails	6	0.263	0.263	0.000	Springtails	14	0.242	0.242	0.000
Ant	6	0.263	0.263	0.000	Ant	4	0.067	0.067	0.000
Flies	6	0.263	0.263	0.000	Flies	3	0.052	0.052	0.000
Small Worm	6	0.263	0.263	0.000	Small Worm	3	0.052	0.052	0.000
Total	42	1.000	0.263	0.000	Total	67	1.000	0.212	0.000

SLC Garden, Species					Main Campus, Species				
Species (i)	Abundance (n)	Relative Abundance (Pi)	Mean	Standard Deviation	Species (i)	Abundance (n)	Relative Abundance (Pi)	Mean	Standard Deviation
White Mite	10	0.213	0.213	0.000	White Mite	6	0.112	0.112	0.000
Spider Mite	10	0.213	0.213	0.000	Spider Mite	10	0.182	0.182	0.000
Nematode	10	0.213	0.213	0.000	Nematode	10	0.182	0.182	0.000
Brown Mite	10	0.213	0.213	0.000	Brown Mite	10	0.182	0.182	0.000
Springtails	10	0.213	0.213	0.000	Springtails	10	0.182	0.182	0.000
Ant	10	0.213	0.213	0.000	Ant	10	0.182	0.182	0.000
Flies	10	0.213	0.213	0.000	Flies	10	0.182	0.182	0.000
Small Worm	10	0.213	0.213	0.000	Small Worm	10	0.182	0.182	0.000
Total	42	1.000	0.213	0.000	Total	67	1.000	0.182	0.000

Table 2. Comparison of species by location to determine their diversity and abundance.

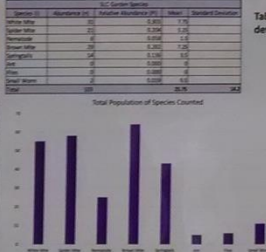


Figure 2. Species populations counted through all samples.

Index of Diversity	
Location	Probability
Garvin	0.692
West	0.827
Somsen	0.867
SLC Garden	0.774
IWC	0.832

Table 3. Simpson's Indices of Diversity from all sampled locations.

Results and Discussion

The total number of species found each time samples were taken were fairly similar to each other (Table 1). Total populations were highest when samples were taken in fall 2013, which could be explained by the change in seasons. During spring, samples were taken in late March and Early April. The ground was thawing from the cold winter. During the winter months, the organisms would be found further down in the soil (Brower et al., 1998). This situation can affect the populations found in the soil sample, since soil was only sampled from the upper 10-15cm of the top soil.

Based on the calculation of the Simpson's Index of Diversity (Brower et al., 1998), Winona State University Main Campus locations sampled near Somsen Hall had the greatest species diversity (Table 3). While this was the highest value, the IWC Garden and West Campus also had a high diversity. On the other hand, the soil samples from the SLC Garden had the highest mean value of invertebrates (abundance), averaging about 26 organisms per sample. This result is much higher than those of many other locations, with the next highest being the West Campus (15 organisms followed by 10 at the new IWC Garden) (Table 2).

A comparison of the data suggested that the Index of Diversity does not seem to have a strong correlation with species abundance (Brower et al., 1998). For example, the samples from Somsen Hall had the highest Index of Diversity (.827). However, they also had the second lowest mean of species abundance (.72). Samples from Garvin Heights also had a low mean species abundance (5.33) and differed from the samples from Somsen Hall by having the lowest Index of Diversity (.692) (Table 2 and 3).

When looking at the overall data of species abundance for every taxon described in this study (Figure 2), the soil samples from all Winona area locations had highest population abundance of Brown and/or Red Mite (Orbital Mite), followed by Spider Mites and White Mites (Nardi, 2003). Five of the eight species of soil invertebrates found in all soil samples were commonly found in all samples (Figure 2). Diverse species of mites are ubiquitous in soil as they play a major role in the decomposition processes of soil organic matter (Nardi, 2003).

Conclusion and Recommendations

The species abundance on the Winona State Main Campus was lower than the abundance on West Campus and the Gardens (SLC and IWC). Results showed that the SLC garden had a higher abundance than the garden at the IWC. Because the IWC Garden was constructed in 2013, the young plant community established there may not have had sufficient time to generate stable organic matter that in every topsoil becomes the focal component for attracting soil invertebrates. Therefore, with good soil care and management over time, also the IWC may likely reach a higher abundance and diversity of organisms as the native plant community becomes better established. Because pesticides have been used on Main Campus in the past (B. Borsari, personal communication), it may take much longer for the population near Somsen Hall to increase in numbers and diversity. The use of any chemicals should be avoided to maintain Somsen Hall to increase in numbers and diversity. The use of any chemicals should be encouraged to avoid soil disturbance and compaction. However, both the effects of chemicals on the soil as well as compaction by pedestrians could provide viable research questions for further studies to be conducted about this topic.

Acknowledgements

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Abstract

This study investigated the ethical tension of denying services to those in need often experienced within non-profit organizations. Data was collected from 5 questionnaire responses (n=5) through use of an edited version of two established ethical questionnaires. The responses revealed themes of honesty, respect and confidentiality in ethical decision making. Research into the philosophical standpoints of deontology and utilitarianism are used to evaluate narrative responses to ethical questions.

Introduction

In my prior experience within non-profit organizations, I witnessed an ethical duality consisting of deontology and utilitarianism. Deontology is an ethical theory that places "emphasis on the relationship between duty and the morality of human actions" (deontological, n.d.). Deontology in non-profit organizations is present in the duties of the employees and volunteers to the people that the organization is set up to help. There are clear right and wrong guidelines for the employees and volunteers to follow in the forms of rules, regulations and policies set in place by the non-profit organization. Utilitarianism is an ethical theory that "seeks the greatest good for the greatest number of people (Ferrell, Fraedrich, & Ferrell, 2013). In a non-profit organization utilitarianism can be seen most clearly in how the organization will try to get the most use out of the limited resources that they possess. For example food shelves often ask for monetary donations because they have deals in place with food distribution centers that get them more food than if the individual donated food. These two ethical theories often contradict each other, for example with deontology one would not be able to go against the code of conduct but with utilitarianism if not following the code of conduct created more "good" for more people than it would be alright to break the code of conduct.

Method

With permission I gave a questionnaire to eight ORC employees. The questionnaire was an edited version of two previously established ethical questionnaires. The employees given the questionnaire were chosen because they have the authority to make decisions about clients and whether or not services will be provided for them. Data for this study was collected from five questionnaire responses (n=5).

Questionnaire

Please answer all questions to the best of your ability and with as much detail as you can.

1. Describe your own personal code of ethics?
2. What is your organizations code of ethics? Written? Unwritten? Is there a difference?
3. Are there any conflicts between your personal code of ethics and the organizations code of ethics?
4. What major ethical issues or dilemmas do you have to deal with?
5. Your organization was created to help adults with disabilities. Are there any instances in which YOU had to be the person to make the decision not to help?
6. What factors guided your decision to not offer/terminate services?
7. Are there any of these factors that you have no control over?
8. Were you equipped to make the decision to not offer/terminate services?
9. Did your decision follow organization code of ethics?
10. How does this align with the mission, your code of ethics and the organizations code of ethics?

Findings

Themes

In a review of the data I collected I found themes of respect, service and duty present in the employees' personal codes of ethics. The theme of respect for the purposes of this study is based on conducting business and interactions with honesty, integrity and respect. I found that this respect within interactions with clientele and coworkers to be present in 80 percent of the respondents. One respondent stated that "an employee needs to be honest to others and themselves". A definite trend in the data is that every respondent had some form of service or need to help other people as a part of their personal code of ethics.

The theme of duty was also in the data collected from the questionnaire. The importance of the work or some work related task was mentioned by every respondent. Confidentiality and professionalism in conduct being the two most referenced. In speaking with the executive director of the ORC I learned that confidentiality is mandatory under the "Health Insurance Portability and Accountability Act of 1996 (HIPAA)" (Summary, n.d.). As such confidentiality is emphasized within the organization. I believe that further research should be done to see if such emphasis could be the reason that confidentiality is present in the personal ethical code of several of the respondents.

Alignment of corporate and personal values

In conducting this study the thing that I found to be most interesting is that 80 percent of the employees that responded to the questionnaire believed that their personal code of ethics and the code of ethics of the non-profit organization were in alignment. Only one respondent stated that there was potential for conflict due to the fact that their own personal code of ethics is subject to alteration. That outside factors and personal experiences can influence their code of ethics; whereas, the codes of ethics of the non-profit organization were set by government and management. This high percentage of alignment suggests that either the non-profit organization is attractive to or attracts people with a similar ethical code.

Deontology vs. Utilitarianism

The original purpose I had for this study was to find how the ethical theories of deontology and utilitarianism present in this non-profit organization could coexist and whether or not they created conflict when it came to situations in which the employees had to make the decision either discontinue or deny services to individuals in need. Through the responses collected I found that the organization had solid guidelines in regards to such situations and that as an employee it was their duty to follow these guidelines. In this organization utilitarianism is mainly used in situations in which the employees have to decide if helping one client is worth the potential safety risk that client poses to themselves and others. However, it seems even this utilitarian decision not to help for the greater good of the rest of their clientele is made with a deontological bent as it is based on set guidelines that the employees have a "duty" to follow.

Limitations

The two main limitations of this study consisted of the scope and the size of the study. If I were to attempt this study again I expand the scope of the study to include more types of non-profit organizations. I would try to include food shelves and homeless shelters at the very least. I would also include as many non-profit organizations as I could to increase the size of the study in hopes of getting more responses. To this end I would also consider expanding the study to include non-profit organizations from states beyond Minnesota. Another limitation this study had been the inability to get the respondent to expand beyond yes, no or N/A responses for some of the questions.

Suggestions for Further Research

It is hoped that this study will be further investigated and will generate further interest in this and other related topics. In the future I hope that this study will be continued and expanded to include non-profit organizations beyond occupational rehabilitation. I believe that it would be beneficial to see if similar results are obtained in other social justice based organizations. I also hope that further research will be done in regards to the alignment seen in this study between the individual's personal code of ethics and the organization's code of ethics. Is it that individuals with particular moral and ethical standards are drawn to non-profit and social justice organizations or is it the organizations of this type seek to attract people with similar moral and ethical standards of the organization?

Conclusion

After analysis of the data the conclusion that I have come to is that for any truly definitive answers in regards to how non-profit organizations are able to function with the apparent ethical duality of deontology and utilitarianism further and more expansive study is required. While I am now more convinced than ever that the duality is present in non-profit organizations the study as it stands has only raised more questions for me.

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Background

- Nursing students enrolled in a gerontological nursing course completed a supplemental practicum experience.
- Older adult residents of independent living and assisted living facilities took part in numerous student guided conversations.
- Students and older adults discussed various topics including end-of-life (EOL) care and loss.
- Following the discussions, students were asked to write reflective journals on their experience.

To facilitate conversation between residents and student nurses, students were given discussion questions regarding EOL care and loss. These questions included:

- How has your older adult dealt with loss in his or her life?
- Does your older adult have any specific spiritual beliefs that have helped him or her cope with loss (think broadly about this)?
- Does your older adult have an advance directive and/or living will?
- Overall, what do you think you and your older adult have learned during your discussions?



Method

The researchers analyzed students' reflective journals to establish common themes among student nurses regarding attitudes towards loss and EOL care. Secondary analysis of student reflective journals identified themes regarding EOL. The researchers analyzed the student reflective journals through framework analysis and illuminative evaluation (Partlett & Hamilton, 1972).

The following research questions were identified to evaluate the students' personal journal reflections:

- Following conversations with older adults, what can students' personal reflections tell us about the students' attitudes regarding EOL care, loss, and death?
- Can analysis of students' personal reflections add anything to the body of knowledge regarding older adults' experiences with EOL care, loss, and death?
- Does personal reflective journaling by students provide an effective tool to enhance student learning regarding their attitudes and knowledge about EOL care, loss, and death?

Review of Literature

Perspectives surrounding EOL

- In the United States, many individuals consider death an uncomfortable topic of discussion. Researchers found that individuals who had more anxiety toward aging had higher levels of death anxiety (DePaola, Griffin, Young, & Neimeyer, 2003).
- Student nurses may have negative stereotypes and misconceptions of older adults, which can deter them from interacting with older adults (Rodgers & Gilmour, 2011).
- Licensed nurses and nursing students tend to have negative attitudes toward older adults, largely in part to global death anxiety (DePaola et al., 2003).

Nursing education surrounding EOL

- EOL content is important for basic nursing education, but within nursing schools, EOL education is inadequate (Ferrell, Virani, Grant, Coyne, & Uman, 2000).
- Student nurses develop their attitudes toward aging, older adults, death and dying throughout their student nursing experience, as well as within their life experiences (Rodgers & Gilmour, 2011).
- Student nurses who are educated on aging and have more experiences with older adults are more likely to have positive attitudes toward aging and older adults (Cozort, 2008).
- Nurses with more work experience had increasingly positive attitudes regarding death, along with increased flexibility and a greater ability to cope with death (Gama, Barbosa, & Vieira, 2012).

Results

Themes and Subthemes Discovered Within Students' Reflective Journals

Spirituality in Coping With Loss	Attitudes Regarding Death and Loss	EOL Planning	Older Adults' Hopes Regarding Death
<ul style="list-style-type: none"> • Spirituality and religion as a part of life • Spirituality and faith • Unspiritual 	<ul style="list-style-type: none"> • Acceptance of death as a part of life • Acceptance that death is certain • Difficulty in coping with death 	<ul style="list-style-type: none"> • Advanced directives • No advanced directives 	<ul style="list-style-type: none"> • Live a long, full life • Die peacefully • Be reunited with loved ones after death
Support in Grieving	Older Adults' Concerns Regarding Death	Students' Fears Regarding Conversing About Death	Students' Experiences Bring Them a New Perspective
<ul style="list-style-type: none"> • Support through spiritually and family • Support through family • Support through friends • Support through social activities 	<ul style="list-style-type: none"> • Fear of being forgetful • Fear of losing independence • Fear of debilitating illness • Fear of leaving loved ones behind • Unafraid of dying 	<ul style="list-style-type: none"> • An entirely difficult conversation • A difficult, but important conversation • A surprisingly effortless conversation 	<ul style="list-style-type: none"> • An experience that assisted the older adult in expressing their thoughts on EOL, loss, and death • An eye-opening experience • A rewarding experience • A confidence-boosting experience

Students' Fears Regarding Conversing About Death
"Discussing end of life care with my client was very difficult for me. I was not sure of how to phrase questions in a way that would be appropriate...I felt bad asking her questions about death because I could tell it made her sad."

"To be completely honest, I was quite taken aback, yet humbled that she felt comfortable enough to share such personal insight with me. Yet I was beyond pleasantly surprised at how smoothly our conversation flowed right from the start and her wholehearted willingness to share intimate details of her life. I anticipated the discussion of death, dying, religion, spirituality, and the afterlife to be one that was awkwardly brought up at then end of our series of visits; however, this was not the case in the slightest. [My older adult] relieved me of my worries without even knowing it, for tiptoeing around subjects was not her style."

Students' Experiences Bring Them a New Perspective
"In my opinion, I never thought death could be described as a good thing. I always thought that death was the most horrible thing to happen to individuals. However, after my experience with older adults, what I have learnt [sic] in school, and my beliefs and spirituality, I realize that death is part of the cycle of life and as we are born, we must one day die. Now, I look at the good aspects of leaving the world with dignity and peace, and creating last memories with my loved ones."

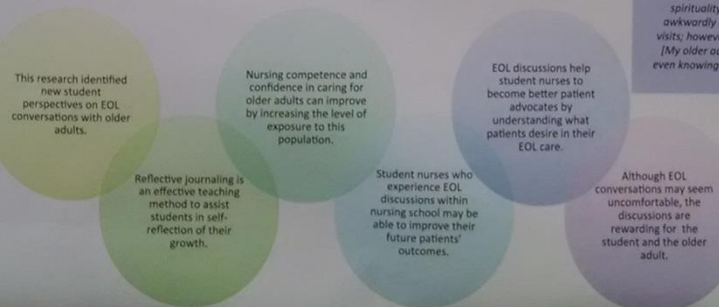
"This journal taught me that talking about death and dying is often the most important and useful conversation to have with a person or patient. It gives great insight into the care that patient needs and wants. Talking with my older adult about death and dying has shown that the hard conversations can sometimes not be as difficult as we thought."

Older Adults' Attitudes Regarding Death and Loss

My older adult "had told me many times throughout our conversation that she believed that when it was time for her to go, God would let her go peacefully, and she was extremely happy and content with that."

"My client realizes that everyone on Earth has a day of birth and a day of death. She consults herself in the faith she has and copes with life by praying a lot and ensuring that her family stays in harmony. Grieving will not bring back the dead, so it is good for one to pick up the pieces and move ahead. Being old, she also knows that her days are numbered and death is something that is unpredictable but certain."

Nursing Implications





Abstract

Ninety-seven percent of organizations in the United States are small businesses. Often ethical decision-making is only studied in large organizations. Since small businesses make up such a large percentage of the nation's workforce, it is therefore also important to understand the ethical decision-making within them. We gathered first hand data through administering an edited ethical culture questionnaire to employees of a small business in the restaurant supply industry. Data was collected from 8 questionnaire responses, (n=8), which revealed the ethical context of the small business. We found respondents said that they had a sound ethical conscience that guided their ethical decision-making within the business.

Introduction

Small businesses are a vital part of the United States economic system. So vital that 97% of businesses in the United States are classified as such. The United States Small Business Administration defines a small business as an enterprise having fewer than 500 employees. There are almost 28 million small businesses in the U.S. that provide jobs for over half of the working population. The importance of small businesses cannot be overstated, so why has the ethical decision-making within these organizations been often overlooked?

As students at Winona State University, our study of business ethics has mainly focused on the ethical decision-making within large corporations with more than 500 employees. These corporations often have a strict code of ethics along with established corporate values that guide their employee's ethical decision-making. We have found that a strong code of ethics coupled with a definite ethical tone at the top fosters an ethical corporate culture within these organizations. With so much of the research pertaining to large corporations our group was determined to shed some light on the ethical decision-making within small businesses. The 50% probability that we would be working within a small business environment encouraged us to obtain understanding on the subject so we would be prepared for the small business environment upon graduation. We set out to determine if employees within small business demonstrate ethical behavior without a formal code of ethics. This paper illustrates our experience using a questionnaire based research method and our reflection on the data generated from the questionnaire. This paper analyzes the ethical decision making of an employee in the context of a small business environment.

Method

Through family connections made by a member of our research group we came in contact with a small business in the restaurant supply industry located in the Midwest. Due to confidentiality reasons the business's name will not be revealed we will be referring to the business that we are researching as small business A. Small business A conducts many business-to-business transactions, but is also open to the general public. Its primary customers are local restaurants in the upper Midwest region, supplying them with everything from kitchen equipment to bar stools. Many of the employees of small business A conduct hundreds of dollars in sales each day. After multiple conversations with the owner we were granted the ability to access the ethical decision making within the small business A.

Once granted permission, we obtained an existing ethical decision making questionnaire and modified it to our specific needs. The questionnaire's purpose was to gather information on the ethical decision making within small business A. The questionnaire was composed of 57 questions with five options, strongly disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5). A copy of the questionnaire can be found in Appendix A. On March 10th, 2014 we traveled to small business A to administer the questionnaire. Prior to handing out the questionnaire the employees were notified that the questionnaire was completely anonymous and optional, and that the business's name would not be revealed in our research. Once we presented the questionnaire to 15 employees we left an envelope for the completed surveys and left the premises to allow for unbiased responses. Upon returning approximately two hours later we collected 8 completed questionnaires, a 53% response rate. With 8 fully completed questionnaires (n=8), we returned to Winona State University to compile and analyze the data. The purpose of the trip was not only to administer the questionnaire but also to get a first-hand perspective of the unique culture within the organization. Successful completion of WSU's Human Subjects Education Module is required of all WSU students, faculty, and staff who conduct research involving human participants on or off campus. All protocols required for our research were met. The following section will provide an analysis of the common themes found within the questionnaire responses along with a discussion of our findings.

Findings

While compiling the results and evaluating the data we wanted to determine if employees within a small business that did not have a formal code of ethics were able to make ethical decisions. We decided it was best to go through and pick out some of the trends we noticed with the responses and try to understand how this company can operate without a code of ethics. While gathering the data and compiling the results we noticed some similarities that presented themselves in the results from the questionnaire. The questionnaire we administered had 57 questions, 20 of these questions five or more respondents reported the same answers. The major trends we found included that company values, its profits, stakeholders and investors, and employee loyalty. This aligns with chapter one of our textbook, describing the benefits of business ethics (Ferrell, Fraedrich, & Ferrell, 2011). This company and its employees see that the ethical decisions they make impact every area of the business. Throughout this business the employees have a good understanding of their personal ethics along with their co-workers perceptions of ethics. They believe in following the golden rule, and they also feel that managers and workers must have a cooperative relationship and understanding of each other to foster success. Another trend we found is these employees are willing to learn more about ethics to help them navigate ethical decisions or ethical dilemmas encounter in the business environment. With strong relationships between workers and managers the employees strive to create the best possible image for the company.

Social Responsibility

Another trend that we found includes social responsibility. A majority of the employees believed the company has a social responsibility to its customers and that they should be held to a high standard. This company believes in maximizing profits and giving back to society. This represents two of the major levels of social responsibility located in chapter two (Ferrell, Fraedrich, & Ferrell, 2011). The employees we found were analyzing the data as almost all responses said bending the rules at times is okay. Within a firm this should be unacceptable because this can affect their image. A company can hurt themselves if they bend the rules too much. This could develop a bad reputation for the business. Yet all eight respondents said they strongly agree when the question was asked "The business has a responsibility to society and its stakeholders." We concluded that the employees within small business A attempts to do the right thing a majority of the time, but they might have minor situations where they bend the rules a little as long as it doesn't have a major effect on the company.

Ethical Boundaries

We believe that since this company operates as a small business there is not a strong sense of governance present within the company. This is because the business is so small that management does not monitor the decisions the employees make. The employees make sporadic decisions because there is no ethical guidelines established within the company. Another trend we found in the data is that the employees of small business A feel they make the right decisions, but with no formal ethical guidelines the employees do not know what to do in certain situations. Three questions they all responded similarly to were, ethics are complex, it is hard to approach ethical conduct, and ethics is relative to the person. We believe these responses indicate that there is no real guidelines for the employees to operate ethically. Certain employees act differently and have different ethical perspectives because there is no clear ethical code present within the company.

We think that this company should begin to start forming an ethical code for the business to follow. The easiest way they can start doing this is by establishing legal standards all employees need follow. We also believe they should create ethical training program to teach the employees to navigate ethical dilemmas/decisions. Furthermore, with no formal code of ethics there is no standards for the decision making.

All respondents said they were ethical, but yet went on to say that ethics is relative, so what one person perceives to be right another person's view could be opposite. Small business A needs to establish a strong culture that sets standards as to what the employees should perceive as right and wrong. The employee's responses indicated that they were willing to learn how to instill ethics within the company. From our knowledge and learnings about ethics our team believes that to best create a sound ethical culture, this company needs to establish an "ethical tone at the top" starting with the owner. If the owner establishes an ethical tone then follow employees have to abide by it. This ethical tone will then cascade down throughout the business creating an unwritten code of ethics. This will not only create a code of ethics for the company, but also continue to enforce and instill ethical decision making within the employees. A code is not good enough, they will just read over it and continue to do what they want. If the tone is set at the top, changes will be made and people will be held accountable for their decisions.

Opposing Views of Ethics

We found that there is opposing views of ethics within this company. The employee's realize that ethical issues are more complex than they thought. As the respondents reported, the greater the age the more ethical they have become. Research shows that the older you become and the more experience you have, the more likely you will be able to make the right ethical decision. According to Chapters 5-7 (Ferrell, Fraedrich, & Ferrell, 2011), the more experience you have on ethics, the more ethical person you will become. Also the respondents indicated that ethics is complex. This is where the company has a "Grey Area," we believe they showed signs of differing philosophies within the company. Some respondents showed that the company wants what's best for the greater good of the company. Which shows signs of utilitarianism. Yet, others said that ethics is relative to the person and that their needs to be a clear respected authority when reporting for work and duty. This was signs of deontology, therefore there are two clear differing views of how things work in the company. While both of these philosophies can work, it is hard to find a happy medium. As one manager's view may be deontology where they think that people need to be treated differently than others, yet another manager's view could be utilitarian by treating all employees equally. How do they find the area where these philosophies can coincide together to make the company function successfully.

Values

According to respondents all employees have a clear sense of the company values and ideas. These values are reported and communicate clearly with how they are running this business presently. Furthermore, all respondents expressed that their managers are aware of the ethical culture within the company and that there is a general understanding of the culture among the employees. This leads us to believe that there is an unwritten code within the company. The employees also responded that within the company there is a clear way of how things get done. This makes us able to conclude that there is an unwritten code within the company where you learn the culture when you receive the job. This is a culture that is not clearly defined, it is something you learn by being around and in the company. We do not believe that this is the ethical way to go along with their business because there can be too many faults and with there being no clear cut direction there is always going to be different views ideas and opinions on all aspects of the business. While dissecting the culture and reading the responses we found that this company tries to work as an integrative culture (Ferrell, Fraedrich, & Ferrell, 2011). This means the company has a high concern for its people and performance. We believe this because all respondents said they agree to the question "profit maximization is an appropriate goal." Yet, throughout the questionnaire they were consistent with saying that the needs of the people must be respected and met. We found that when learning about ethics that it is very difficult to accomplish this goal. We believe that this company is concerned more about the profit then its employees. We consistently saw profit being a more recurring theme than the care for people. Also they are a very compliance based company compared to value based. They focus on staying away from all legal aspects and don't teach employees to navigate the grey areas because the company doesn't even have a code of ethics so the whole company can be a grey area.

Discussion

From all of our findings we conclude that this company feels as if it has an unwritten code of ethics. This company that makes ethical decisions. All respondents indicated that they are active people and make ethical decisions. They also said they have sound personal ethics and believe their sound personal ethics can guide their business decisions. The group has learned from experience, with no formal code of ethics, the company feels they are acting off of sound principles, but with no formal code of ethics, the company policies it they are not devised from the ethical perspective of a strong foundation. We believe since in most small businesses there is no code of ethics that makes it difficult for small businesses to make the wrong decision and if ethics are not clearly stated things in the "grey area." Small business A appears to fit into the ethical "grey area," white, but with no guidance in place it is easy for employees to fall into the "grey area." Small businesses are unable to operate ethical programs and training because they do not have the finances to do so. Small businesses employees rely solely on experience and the defined culture around them. It is very hard to operate with no code of ethics but we think that it can be done if the company has individuals who were raised and understand the right from wrong in business decisions. With some ethical training we feel that the employees of small business A could improve their ethical decision making. It is possible for companies to operate without a code of ethics if there is a strictly defined ethical cultures. As one can see, the U.S. heavily relies on small business, with a business mind and the proper training and influences, we believe that it is possible to work under the conditions without a code of ethics. It is clear that companies have no problem working without a code of ethics while the U.S. is living in an environment with better educated and ethical business people.

Questionnaire

1. The business world has its own rules to follow?
2. Leaders firms have formal, consistent standards?
3. The business world operates ethically?
4. The type of employee-employer relationship within a firm is quickly tested by outside visitors?
5. I want to work for an ethical employer?
6. Fair wages and good products are all that a firm should be expected to provide to society?
7. The business community has a responsibility to society and its stakeholders?
8. There are situations where unethical acts are appropriate?
9. Unethical conduct by a firm is the exception to the rule?
10. I follow the golden rule and respect others?
11. I strive to understand business ethics issues?
12. Salary and benefit packages are dictated by market realities?
13. A manager must communicate with labor/employees?
14. Customer satisfaction is most important to your success?
15. Doing the right thing may not be the right thing to do?
16. It is not appropriate to learn society to make profits?
17. Ethics is mostly lip service?
18. My business conduct is guided by my personal ethics?
19. Managers must be respected?
20. There are many perceptions for defining ethical issues?
21. Ethical results do not require motivated workers?
22. Business is a function of society?
23. Ethical firm do things how they might be to do?
24. Stockholder needs are the primary concerns of a firm?
25. Legal requirements drive ethical behavior?
26. I bend the rules at times?
27. I want to know how to avoid ethics at work?
28. Politics has no place in business decisions?
29. Managers must be business?
30. Responsible firms balance all stakeholder needs?
31. Environmental issues are not a firm's concern?
32. Disinformation forces unethical behavior?
33. My opinion on ethics is changing?
34. Mutual understanding between management and labor is important?
35. Managers must be profit oriented?
36. Business should create standards that improve global conditions?
37. I see more unethical actions in the business world than I expected to encounter?
38. No one theory or approach explains ethical conduct?
39. I believe in the golden rule?
40. Managers cannot deviate on the procedures used to achieve organizational goals?
41. Profit is the purpose?
42. Workforce diversity does not help a business?
43. Managers give orders, workers follow them?
44. All employees are business oriented?
45. My managers are aware of the ethical climate in my organization?
46. My personal ethics has changed over the past several years?
47. Ethical conduct is profitable conduct?
48. Ethics is more complex than I thought?
49. It is not difficult to be a manager?
50. I am an ethical person?
51. I do not really think about the culture in my firm?
52. Managers need more approaches to get the job done?
53. Unethical conduct is a relative concept?
54. Profit maximization is an ethical goal?
55. A businessperson must separate business ethics from personal ethics?

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Objective

The objective of this study was to assess the relationship between primary production of phytoplankton and the complexity of fish and invertebrate trophic structure in slackwater habitats of a large floodplain river.

Methods

Study Area

The study area consisted of multiple backwater habitats off the main channel of the Upper Mississippi River between Brownsville, MN and Alma, WI. Samples were collected over a 36-d period from late July-August 2013. The sites were associated with varying types and abundances of riparian vegetation, including large trees, tall grasses, and patches of deep mud. Aquatic vegetation was present at each site and flourished.

Sample Methods

- Fish were caught in three 4 - 8 min runs using a timed boat electrofisher, with all fish identified and counted.
- Benthic invertebrates were sampled using dip nets and were sorted in the field and frozen until they could be identified to genus in the laboratory.
- Phytoplankton net primary production and respiration were measured using the light bottle/dark bottle method. Three pairs of 5-L cubitainers were left in the water for 5 - 8 hr. Initial and final dissolved oxygen concentration was used to calculate net primary production and respiration. Temperature measurements indicated there was no container effect. Net production and respiration were summed for gross primary production (GPP).
- The number of guilds present and the number of species per guild were determined for each site for both fish and invertebrates. The functional feeding guild of each taxon was determined based on published accounts of dietary preferences.
- Linear regression was used to examine the relationships between gross primary production and the number of guilds and the number of species per guild for both fish and invertebrates.

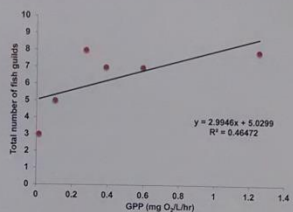


Figure 1: The total number of fish trophic guilds vs GPP (mg O₂/L/hr) in slackwaters of the Upper Mississippi River, July-August 2013. There was no significant relationship (p = 0.135).

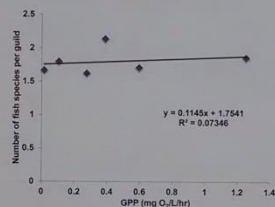


Figure 2: The total number of fish species per guild vs GPP (mg O₂/L/hr) in slackwaters of the Upper Mississippi River, July-August 2013. There was no significant relationship (p = 0.603).

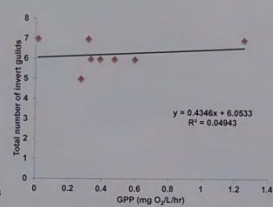


Figure 3: The total number of invertebrate guilds vs GPP (mg O₂/L/hr) in slackwaters of the Upper Mississippi River, July-August 2013. There was no significant relationship (p = 0.596).

Representative Study Sites

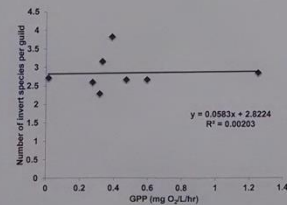


Figure 4: Total number of invertebrate species per guild vs GPP (mg O₂/L/hr) in slackwaters of the Upper Mississippi River, July-August 2013. There was no significant relationship (p = 0.915).

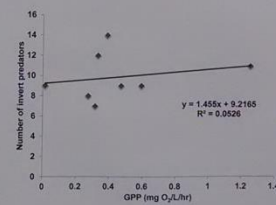


Figure 5: Total number of invertebrate predators vs GPP (mg O₂/L/hr) in slackwaters of the Upper Mississippi River, July-August 2013. There was no significant relationship (p = 0.585).

Results

- The total number of fish guilds was not significantly correlated to GPP (Figure 1).
- The number of fish species per guild was not significantly correlated to GPP (Figure 2).
- The total number of invertebrate guilds was not significantly correlated to GPP (Figure 3).
- The number of invertebrate species per guild was not significantly correlated to GPP (Figure 4).
- The total number of invertebrate predators was not significantly correlated to GPP (Figure 5).

Conclusions

- Gross primary production did not have a significant effect on the trophic complexity of fish and invertebrates at the selected sites.
- It was originally thought, according to the productive space hypothesis, that ecosystem complexity should increase along with increased levels of primary production, leading to greater food chain length (Post 2002).
- Our observations support many other studies that have suggested primary production is not a critical determinant of community organization in aquatic systems (Young et al. 2013). In comparison, terrestrial systems have been found to have increasing complexity in response to an increase in primary productivity (Post 2002; Takimoto et al. 2012). This could be because of feeding constraints in a size-limited aquatic environment (Young 2013).
- Other studies have compared ecosystem size, resource availability, and disturbance as possible sources of increased trophic complexity. In multiple studies ecosystem size has been found to play a larger role in community organization (Young et al. 2013; Post 2002). It is most likely a combination of multiple factors with differing levels of influence that cause variation in complexity (Post 2002).

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Abstract & Introduction

The southern red-backed vole (*Myodes gapperi*) inhabits the forests of the Hudsonian and Canadian life zones of central and southern Canada and the Rocky and Appalachian mountain ranges. The related northern red-backed vole (*Myodes rutilus*) inhabits northern Russia, Scandinavia, northern Canada, and Alaska. Previous phylogeographic analyses using mitochondrial and nuclear markers indicate the existence of repeated hybridization between these two species in limited zone of contact across Canada and Alaska. Notably, the hybrids appear to be self-sustaining and possibly displacing the parental lineages. Here, we further characterize the structural differences found in the mitochondrial cytochrome *b* protein among *M. gapperi*, *M. rutilus*, and their hybrids, using structural bioinformatics methods. We identified an amino acid substitution in the ubiquinone-binding region of the hybrid cytochrome *b* protein that is conserved across 119 other Arvicolinae rodents' sequences. Using this as the paradigm of our data analysis, we constructed homology models of these proteins and further characterized their structural differences on an evolutionary and atomic level. These results will help to guide further research in this area by suggesting functional amino acid substitutions due to these voles inhabiting different environmental conditions.



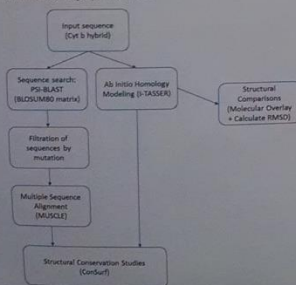
Methods

Sequence searches – Previous research has elucidated the presence of a cytochrome *b* mutation in the ubiquinone-binding region of the *Myodes* hybrid on residue 23 (Ala → Thr). A BLAST-related sequence search was performed with this protein sequence as input to determine if other Arvicolinae sequences contained this mutation. PSI-BLAST was used with a BLOSUM80 algorithm (1). Flexible multiple sequence alignments were performed using MUSCLE (2).

Molecular modeling – To gain insight on the structure and biochemical properties of these complexes in *M. gapperi*, *M. rutilus*, and their hybrid, we used molecular modeling approaches. Models were generated using I-TASSER, an ab initio modeling software, using the primary sequence as input (3, 4). Generated models of the cytochrome *b* were aligned individually using the Molecular Overlay function in Accelrys Discovery Studio Visualizer 4.0 (5).

Structural conservation studies – The multiple sequence alignment was submitted to ConSurf (6). Result of this prediction were mapped out onto the 3D model of the hybrid protein to visualize structural conservation of individual residues.

Data flow: Visualization of project methods.



Results

Sequence Searching & Species Distribution – The initial alignment of the cytochrome *b* protein from *M. gapperi*, *M. rutilus*, and their hybrid (Figure 1A) revealed a residue change (Ala23 → Thr23) in the ubiquinone-binding region (spanning from residue 15 – 40). Therefore we sought to investigate whether or not this mutation was conserved due to selective environmental and evolutionary pressures. This prompted us to search for other Arvicolinae sequences containing the same mutation. BLAST-related sequence searches returned 500 Arvicolinae sequences of which 119 contained the Ala23 → Thr23 mutation (Figure 1B). Using these sequences, we reported the species and geographic distribution (Table 1).

Figure 1. (A) Multiple sequence alignment of cytochrome *b* proteins in *M. gapperi*, *M. rutilus*, and their hybrid (B) Multiple sequence alignment of 500 Arvicolinae cytochrome *b* sequences. The WebLogo diagram (7) represents the alignment of the ubiquinone binding region of these proteins.

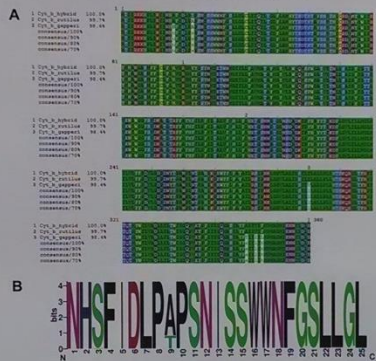


Table 1. Among the 500 sequences retrieved through the BLAST search, 119 sequences contained the mutation of interest. Table 1 lists the species and distributions of the filtered sequences.

Species	Common name	Distribution
<i>Myodes gapperi</i>	Southern red-backed vole	Canada, Northern United States
<i>Myodes rutilus</i>	Northern red-backed vole	Alaska, northern Canada, Scandinavia and northern Russia
<i>Myodes glareolus</i>	Bank vole	Europe, Asia Minor, Western Siberia
<i>Myodes urotaurus</i>	Japanese red-backed vole	Japan
<i>Balanophanes hochstetteri</i>	Bachman vole	Afghanistan, Tajikistan, and Uzbekistan
<i>Microtus middendorffi</i>	Middendorff's vole	Russia
<i>Microtus subgambelii</i>	Prairie vole	North America (Rocky Mountains, West Virginia, Canadian Prairies)
<i>Microtus arvalis</i>	Common vole	Eurasia
<i>Microtus thomasi</i>	Thomas's pine vole	Bosnia, Herzegovina, Greece, Macedonia, Serbia, Montenegro, Albania
<i>Microtus californicus</i>	California vole	California, Southern Oregon
<i>Microtus californicus atropurpureus</i>	Amargosa vole	California, Southern Oregon
<i>Microtus agrestis</i>	Field vole	Western Europe, Siberia, Northwest China
<i>Microtus savii</i>	Savii's pine vole	France, Northern Italy
<i>Microtus lusitanicus</i>	Lusitanian pine vole	France, Andorra, Portugal, and Spain
<i>Microtus doudeincostantini</i>	Mediterranean pine vole	France, Portugal, Spain
<i>Microtus doudeincostantini X laietanusus</i>	Mediterranean pine vole	France, Andorra, Portugal, and Spain
<i>Microtus hibernicus</i>	Irish pine vole	Europe: Austria, Italy, and Croatian Alps
<i>Microtus taricus</i>	Tatra pine vole	Slovakia, Poland, Ukraine and Romania: Carpathian mountain range
<i>Microtus multiplex</i>	Alpine pine vole	Austria, France, Italy, Serbia and Montenegro, and Switzerland
<i>Microtus longicaudus</i>	Long-tailed vole	Western North American
<i>Microtus subarcticus</i>	European pine vole	Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Estonia, France, Germany, Greece, Hungary, Italy, Liechtenstein, Luxembourg, Macedonia, Moldova, the Netherlands, Poland, Romania, Russia, Serbia and Montenegro, Slovakia, Slovenia, Switzerland, Turkey, and Ukraine
<i>Microtus pennsylvanicus</i>	Meadow vole	Canada, Alaska, and Northern United States
<i>Microtus mirus</i>	Slingshot vole	Northwestern North America
<i>Chionomys rutilus</i>	European snow vole	Southern Europe, Eastern Europe, and Southwestern Asia
<i>Chionomys ruberrimus</i>	Robert's snow vole	Azerbaijan, Georgia, the Russian Federation, and Turkey
<i>Atilax semicinctus</i>	Mongolian silver vole	Mongolia
<i>Eothenomys similis</i>	Savill's vole	Japan

Molecular Modeling and Structural Conservation – To gain insight into whether these mutations resulted in structural changes in the hybrid protein, homology models were generated. These models were optimally aligned in order to calculate the root mean square deviation (RMSD) between each residue (Figure 2A – B). Results of this analysis revealed that these structures deviated slightly in the area spanning the ubiquinone-binding region (> 0.5 Å). However, these mutations may contribute to areas of the protein containing higher structural deviations from the *M. gapperi* and *M. rutilus*, as much as 2.0 Å for some residues.

Structural Conservation Studies

Figure 2. (A) Visual representation of structural comparison methods. Generated models were optimally aligned and RMSD scores were calculated. (B) RMSD scores, which represent the difference in the two superimposed structures based on C α positions, were calculated for each residue to compare the distance in Å between the aligned structures. A structural alignment of the hybrid model was aligned with itself as a negative control.

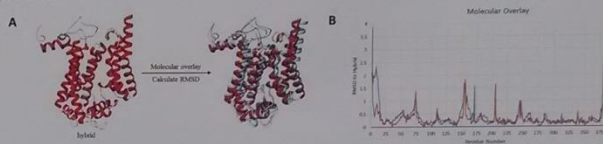
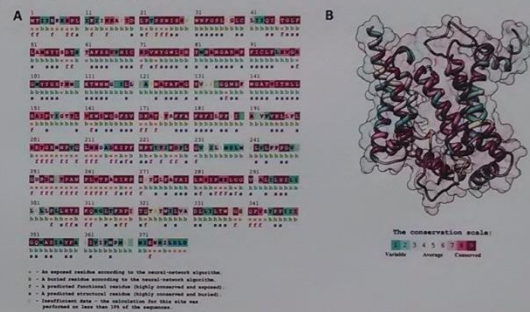


Figure 3. (A) Results of the ConSurf prediction reveal that the Thr23 residue substitution is potentially buried within the 3D structure of the cytochrome *b* subunit. (B) Results of the ConSurf prediction were mapped out onto the hybrid structural model in order to visualize the residue conservation within the context of its tertiary structure.



Structural conservation analysis suggests that the Ala23 → Thr23 mutation in the *Myodes* hybrid may in fact be a residue that is buried in the overall structure of the protein (Figure 3A). While this residue may not contribute to the overall function of the protein, the mutation may give rise to structural deviations in the protein that may alter its function as suggested by Figure 2B.

Summary

- Structural bioinformatics analysis and database searching reveal a structural mutation in the ubiquinone-binding region in the hybrid that is not present in the proteins of the parental species (*M. gapperi* and *M. rutilus*).
- This mutation is conserved across 119 other Arvicolinae sequences with a wide-ranging geographical distribution.
- Molecular modeling and structural comparisons suggest that the mutations seen in the *Myodes* hybrid may account for structural deviations, and possibly altered or improved function.
- These inferences may provide insight into evolutionary pressures that may contribute to functional amino acid substitutions in the cytochrome *b* subunits of these voles.

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INTRODUCTION

Stress is associated with sympathetic nervous system output and the appearance of catecholamines in the plasma. Sympathetic drive results in an increase in heart rate, blood flow to skeletal muscle and bronchodilation as part of the fight or flight response. Norepinephrine promotes gluconeogenesis to supply energy needed for the body's "fight or flight" response to stress.

Elevated blood glucose levels (BGL) are often associated with physical or psychological stressors in non-diabetic patients (Blair 1991). SNS stimulation could promote increased plasma glucose resulting from impaired insulin sensitivity or increased gluconeogenesis.

Sudden exposure to cold temperatures stimulates the sympathetic nervous system. The cold pressor (CP) test is used to stimulate the sympathetic nervous system and to examine physiological effects of SNS stimulation (Desborough 2000). Typical cold pressor tests use a single arm immersion for 4 minutes prior to cardiovascular changes (Moro 2011).

Oral glucose tolerance testing (OGTT) is central to the clinical diagnosis of type 1, type 2 and gestational diabetes. Positive testing for diabetes can carry important implications for patient glycemic health, patient medical history, future insurance costs and the patient's perception of wellbeing. Mental stress about these implications could result in increased SNS output and an artificially high blood glucose during OGTT.

Misdiagnosis of diabetes due simply to stress about testing could be a life-altering implication. This study examined physiological affects of a modified cold pressor test on the glycemic response and cardiovascular function in the healthy 17-26 year olds. Three shorter 30 second ice bath immersions were used in order to permit study approval by the university IRB.

METHODS

This study was approved by the Winona State University Institutional Review Board. After completing a 12 hour fast, subjects signed consent forms and were assigned to the control (CO=43) or cold pressor (CP = 40) treatment group. 0 minutes began when the individual drank a 50g OGTT. Blood glucose, blood pressure, and heart rate were obtained at -15, 0, 30, 60, and 120 minutes. Blood glucose was determined in duplicate using a finger stick and Reil On Ultima. Heart rate and blood pressure were determined using blood pressure cuffs and a finger heart rate monitor. Subjects in the CP group experienced a modified cold pressor test consisting of immersions of the left arm in an ice bath for 30 seconds at time -10 minutes prior to OGTT administration and 10, and 20 minutes post administration. Statistics were compiled using JMP Pro 10 with ANOVA (analysis of variance). Covariance was used to evaluate treatment, time, treatment x time, age, and weight. Differences were considered significant if $P > 0.05$. Data are expressed as mean \pm standard deviation.

RESULTS

Figure 1: OGTT with cold pressor stimulus did not alter blood glucose levels relative to control (P=0.79)

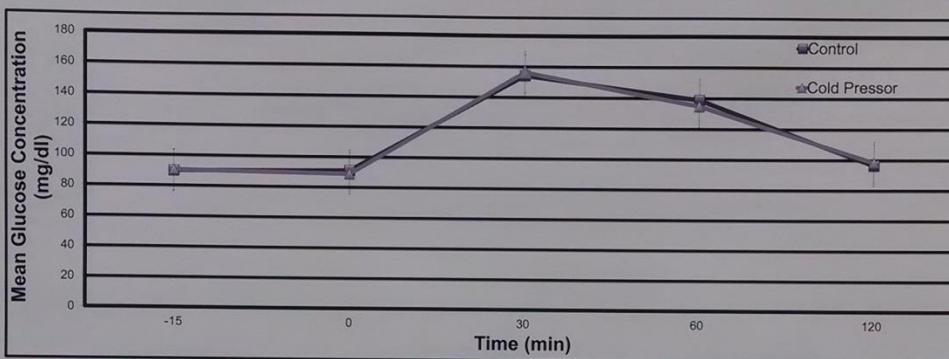


Figure 2: OGTT with cold pressor stimulus appeared to alter systolic blood pressure, but the difference was not statistically significant when compared with control (P=0.53)

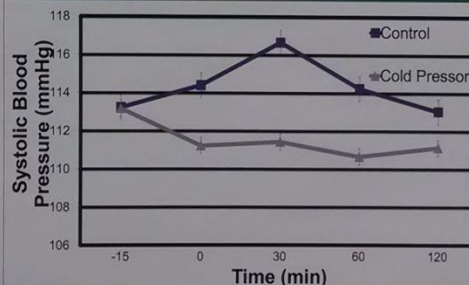


Figure 4: OGTT with cold pressor stimulus appeared to alter mean arterial pressure, but the difference was not statistically significant when compared with control (P=0.69)

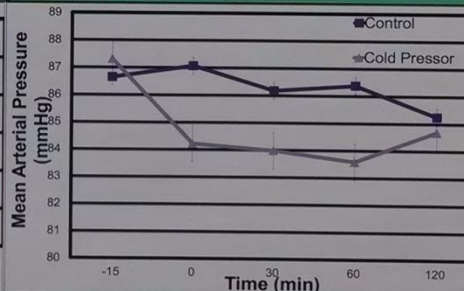


Figure 3: OGTT with cold pressor stimulus did not alter diastolic blood pressure relative to control (P=0.28)

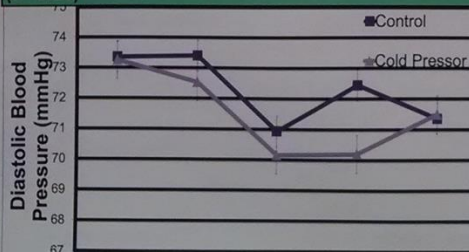
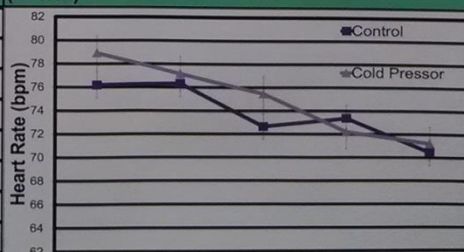


Figure 5: Heart rate decreased in the control and cold pressor groups with statistical significance (P=0.02)



SUMMARY

- 1.) OGTT with cold pressor stimulus did not alter blood glucose level relative to control. The cold pressor test did not have a statistically significant impact on glycemic response ($P = 0.79$).
- 2.) OGTT with a cold pressor stimulus did not alter systolic blood pressure, diastolic blood pressure or mean arterial pressure when compared to the control ($P = 0.53, 0.28,$ and 0.69 respectively).
- 3.) OGTT with a cold pressor stimulus appeared to alter heart rate when compared to time ($P=0.02$). However, when compared to the control group, no statistical significance was seen.

CONCLUSIONS

The cardiovascular and glycemic response to a cold pressor stimulus was evaluated in a cohort of 83 healthy college subjects. Cold pressor test had no statistically significant affect on blood glucose, systolic diastolic or mean arterial pressure. OGTT with a cold pressor stimulus appeared to alter mean arterial pressure and systolic pressure but was not statistically significant when compared to the control group. Surprisingly, the experimental group exhibited a decrease in heart rate when compared to time, but no statistical significance was determined when compared to the control group. It is possible that the three 30 second ice bath immersions were not adequately stimulate the SNS enough to significantly alter the glycemic response. Future implications of this study may include utilizing longer ice bath immersions to induce a more robust SNS response.

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Abstract

Endophytic fungi in plants are believed to serve some mutualistic functions: drought and salt tolerance, nutrient acquisition, seed germination, and plant establishment. Could desert plant fungi endophytes be transferred to local heat-sensitive plants, thereby conferring heat tolerance? The desert plants *Atriplex canescens* (four-wing saltbush) and *Larrea tridentata* (creosote bush) are normally colonized by dark septate endophytic fungi that cannot be eliminated by seed sterilization. Saltbush de-sterilized seeds from both species were germinated on MS + 1 mg/L 2,4-D media, and viable germinations (callus tissue formed on both root and hypocotyl sections). The presence of endophytic fungi in creosote callus was observed following staining of callus with 0.04% Trypan Blue. This was also verified by PCR using the fungal-specific primers Ured1 and Ured2. No fungal endophytes were detected in the four-wing saltbush callus by microscopy or PCR. The fungal endophyte-infected creosote callus was then transferred to roots of two micropropagated tomato cultivars (*Lycopersicon esculentum*) which were aseptically wounded, then transferred to soil after one week. There was no measurable difference between the growth rates of tomato plants infected with the callus inoculated with creosote plants and the uninfected tomato plants at 25°C, but continuing research will include monitoring the uninfected vs. fungal-infected tomato plants at elevated temperatures. "Endophyte-swapping" may be an alternative to genetically modifying plant tissues that are sensitive to environmental stresses, thereby circumventing the ethical baggage and health concerns that surround genetically modified plants.

Introduction

In 2008, scientists began swapping microorganisms between plants in attempts to alter a plant's response to high temperature stress (Rodriguez et al., 2008; Barrow et al., 2008). By applying microbes from weeds grown in high-temperature environments, to sensitive plants, the treated plants survived extremely high temperatures, and required significantly less moisture. Drought, soil salinity, and increasing temperature are currently the greatest threats to agricultural sustainability. It is not the plant alone, however, that adapts to plant stress. It is the plant's symbiotic relationship with fungi and bacteria that allow it to tolerate environmental extremes. In Wisconsin, the typical nursery plants sold for gardens and lawns are often not adapted to the high temperature stresses we've experienced in recent years. Many plants contain systemic fungal endophytes that are structurally integrated within the cells, tissues, and organs of these plants and contribute to heat tolerance. If the endophytes of southwestern plants could be used to infect temperate grasses and garden plants, we might expect to see an increase in temperature- and drought-tolerance in the infested plants. The goal of this study was to move fungal endophytes known to be present in two heat-tolerant desert plants (*Larrea tridentata* (creosote bush), and *Atriplex canescens* (four-wing saltbush)) into temperature-sensitive local tomato plants (*Lycopersicon esculentum*).

Methods

Callus Initiation: Seeds from the heat-tolerant species four-wing saltbush (*Atriplex canescens*) and creosote bush (*Larrea tridentata*) were obtained from Plants of the Southwest, Santa Fe, NM. Seeds were surface-sterilized (Barrow et al., 2008) and used to initiate undifferentiated callus cultures in MS + 2mg/ml 2,4-D media, which serves as a source of inoculum for *Aspergillus fumigatus*. Heat-sensitive tomato seed (*Lycopersicon esculentum*) var. Beefsteak was purchased locally (Figs. 1 and 3).

Endophyte Transfer: To transfer the fungus to heat-sensitive tomato plants, tomato seeds were surface-sterilized as for creosote and four-wing saltbush. The seeds, then placed on MS media minus 2,4-D at 25°C. After one week, the seeds (containing the fungal endophytes), were pushed below the surface of the media near the tomato roots. After three weeks, tomato plants were micropropagated from tissue culture into soil at 25°C (Figs. 4 and 5). Plants were covered with plastic bag to retain moisture for one week. They were then transplanted to garden.

Microscopy: Creosote and Saltbush callus were stained with 0.04% Trypan Blue and observed by light microscopy (Fig. 2).

DNA Extraction: DNA was extracted from 200 mg of callus tissue of each species according to Stewart et al. (1991). PCR was performed using Ured1 and Ured2 fungal-specific primers according to Barrow et al. (2008). PCR products were separated on 2% agarose gel with 100 bp ladder. Gels were run for 1.5 hours, stained with ethidium bromide and photographed (Fig. 6).

Results



Fig. 1. (A) Four-Wing Saltbush and (B) Creosote Bush two months after planting of seeds

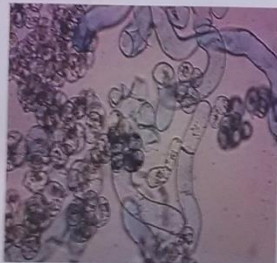


Fig. 2 (above) Creosote callus stained with 0.04% Trypan Blue. Endophytic fungi present.



Fig. 3 (above) Control and creosote-infected beefsteak tomatoes after infection and two week's growth in tissue culture.



Fig. 4 (to left) One-week-old beefsteak tomatoes prior to infection with creosote callus.



Fig. 5 (above) Creosote callus on MS + 2mg/L 2,4-D media

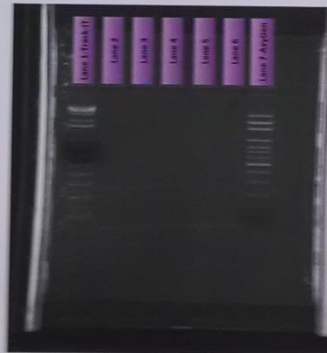


Fig. 6 (above) Electrophoresis gel of creosote and saltbush callus PCR using Ured1 and Ured2 fungal-specific primers. Rungel (Barrow) in row 1-4 (creosote), no fungal bands in row 5-6 (saltbush)

Summary of Results

- All creosote and saltbush seeds (on MS + 2,4-D media) germinated in one week. This contrasts with the uneven and low germination percentage that occurs in soil.
- The presence of endophytic fungi in creosote callus was detected in these heat tolerant plants (Fig. 2) and verified using PCR with Ured1 and Ured2 fungal-specific primers (Fig. 6). A single fungal DNA sequence of 225 bp was amplified from creosote callus by PCR. No fungal endophytes were detected in four-wing saltbush callus by either microscopy or PCR, but fungal endophytes have been reported for saltbush (Barrow et al. (2008)).
- Neither the creosote (nor 4-wing saltbush endophytes, if present) had a significant impact on the size of the tomato plants. Every plant had the same average diameter at the base, was the same shade of green, and had a similar number of branches. While the control tomato plants and those infected with four-wing saltbush callus had a similar average change in height (4.38 inches and 4.26 inches, respectively) the tomato plants inoculated with creosote bush callus had a smaller average change in height (3.5 inches). (Data not shown).

Conclusions

Climate models continue to predict that plants will face increased drought, soil salinization, increased CO₂ and temperature fluctuations in the future, yet little money has been invested into determining the adaptive potential of the organisms at risk. Microbiome swapping is an alternative to genetically modified seeds. It might circumvent the ethical baggage and health concerns that surround genetically modified organisms, and unlike conventional plant breeding or recombinant DNA gene transfers, the results are immediate (Barrow et al., 2008). Further research will be conducted to monitor the control vs. fungal infected tomato plants at elevated temperatures.

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Purpose

Due to a lack of literature by nursing professionals on reproductive environmental risks, the study was designed to evaluate the level of education provided to young adults by health care providers involved in prenatal care.

Design

Qualitative interviews were conducted with the student and faculty member in one rural county of the Midwest. The three providers were at three different settings.

The nutrition program and primary care providers served pregnant and pre-pregnant clients. The family planning served pre-pregnant client and rarely pregnant clients.

The interviews were recorded, typed and reviewed for themes. Internal Review Board approved processes and documents to assure privacy and protection of providers.

Literature Support

There is an increasing amount of evidence to support that certain environmental chemicals can cause harm to in utero development. Prenatal/preconception health professionals are in an ideal position to educate (Sutton et al., 2012).

Many women who are prenatal or pregnant are confused and unsure how to avoid heavy metals in food and are therefore at risk. Health care professionals should be aware of this when educating (Peters, Rhoades, Ezzell, Holland, & Weatherspoon, 2013).

Low level of confidence to teach about environmental risks among Public Health Nursing Directors (Polivka, Chaundry, & MacCrawford, 2012).

Research agenda for environmental health calls for new methods to translate information to health care providers and general public (Woodruff, Schwartz, & Giudice, 2010).

Qualitative Data

Themes	Educational Tools	Topics Covered	Patient Focus	Satisfaction with Current Educational Materials
Explanation	<ul style="list-style-type: none"> • Online Resources • Peer Mentoring • Handouts • One-on-one appointments 	Environmental topics covered while educating clients	Client's focus during visits and health care provider's other educational topics	The providers satisfaction with the current materials they use
	<p>CP1: "This is our manual that we give them. It coordinates with our childbirth education classes and our post partum (classes). They are all from the same series so they are able to go online and watch videos with this code and then it has this little section on environmental lifestyle factors."</p>	<p>CP1: "We just give a general overview... depends on their job descriptions. We always have them check their MSDS forms at work. We want to make sure if they are dealing with hazardous chemicals, what is it rated and then we discuss it with their provider... toxoplasmosis and listeria... chemicals in foods...mercury in fish.... Avoid anything that has harmful fumes like fuel, gasoline, cleaning fluids, paint, aerosol, pesticides, (and) insecticides"</p>	<p>CP1: "Their biggest concerns are mostly can they hear the heartbeat yet or physical discomforts like nausea or sleeplessness. More of the exciting baby things like ultrasounds...I definitely feel like we are trying to educate them more than they are enquiring us."</p>	<p>CP1: "It works really well...our patients like it... It is pretty comprehensive. It really varies per job so I don't know everyone's different living situation so I don't know if we would be able to cover everything in great detail. I think it gives a basic overview and then we get a feel when we are talking to them and can find resources"</p>
Quotes	<p>CP2: We have a couple of different smoking handouts we hand out... Minnesota does provide a really nice handout for fish.... We usually schedule half and hour per person approximately...very often for families we see them for the long appointment, give them their vouchers then they stop in for their quick 10 minutes, they get three more months and then by then it is time for their long appointment again"</p>	<p>CP2: "I would say the biggest one we talk about is smoking. We ask specific questions about tobacco exposure... We ask illegal drug use questions but that's the only chemicals that we ask about. We talk about kids under 15 and pregnant women being careful about pollutants, (and) the mercury level in fish."</p>	<p>CP2: "So even that little bit of time I'm given to do the nutrition assessment maybe they don't have a house right now and so that's where mom's focus is. I spend very little time on nutrition assessment and (instead) we are going over housing options for the family."</p>	<p>CP2: "I would say no, that I wasn't satisfied with the materials, they were a little bit older, but they had a nice booth there (at conference) and I just thought this (smoking pamphlet) was really catching... if you know of some good handouts that are appropriate for this population, absolutely (send them)."</p>
	<p>CP3: "many of our forms come to us from Planned Parenthood Federation of America which is then modified by Planned Parenthood of MN and then given to us and then changed...there isn't an environmental risk assessment... it's not something that is permanently engrained into our everyday business with patients... There are printed materials available"</p>	<p>CP3: "They do a health history form and there is very minimal information about environmental health. I know some of the social aspects are on there like smoke exposure things of that nature but things that are specifically environmental, we don't touch much on...If asthma is part of their health history, that's addressed but as far as things that may predispose them to... that's not on there... We are already focusing on seatbelt use, drinking, recreational drugs, (and) number of partners."</p>	<p>CP3: "Most of the time they are just like "What do I do to get on the pill?"...or "I'm on Depo, when should I stop if we are thinking of starting a family?"... a majority of our patients don't ask us"</p>	<p>CP3: "I think I would be interested to know more... environmental health and what specifically would our target population of 15-24...should we be focusing on. What for environmental health should we be considering as something we are completely missing and doing a disservice to our patients."</p>

Discussion

Health care providers in this Midwest rural area use various tools to educate women on prenatal health, but with very little focusing on reproductive environmental exposures. Topics covered generally included smoking with only one provider expanding on other exposure risks. Patient focus seemed to be a barrier to many of the care providers as most patients had other priorities during visits.

Conclusions

Providers valued learning more about reproductive environmental exposure risks and were open to being provided with more education to pass on to clients.

Due to limited time, providers tended to be focused on client immediate needs such as housing, food insecurity, contraception, pregnancy viability, and nutrition vouchers.

Clients rarely initiated concerns about lead, mercury, pesticides, plastics, personal care products, cleaning products, or hazardous materials in the home.

Clients occasionally expressed concerns related to work exposure to one provider. Generally client concerns are limited to immediate needs and not reproductive environmental risks.

Materials the providers consistently used included smoking risks and were inconsistent with lead, mercury, pesticides, plastics, personal care products, cleaning products, or hazardous materials in the home.

Next Steps

- ❖ Conduct future interviews in other counties to determine trends
- ❖ Initiate regional education on reproductive environmental risk for providers
- ❖ Consider new methods to reach pre-pregnant consumers about reproductive environmental risk
- ❖ Evaluate teaching materials for regional use on reproductive environmental risk
- ❖ Explore inter-professional collaboration