



9th Annual

ACADEMIC AND RESEARCH SYMPOSIUM

April 24, 2019

2:00–6:00 pm	Registration & Folder Pickup	THOM Main Street
2:30–3:30 pm	Session A: Oral Advanced Art Session B: Oral Empirical Session C: Oral Technology	THOM Auditorium THOM 111 THOM 113
3:40–4:40 pm	Session D: Oral Advanced Art Session E: Oral Non-empirical Session F: Oral Technology	THOM Auditorium THOM 111 THOM 113
4:50–5:50 pm	Session G: Oral Advanced Art Session H: Oral Non-empirical Session I: Oral Experiential & Non-empirical Poster Session: Literature Review	THOM Auditorium THOM 111 THOM 113 THOM Main Street
6:00–7:00 pm	Session J: Oral Advanced Art Session K: Oral Technology Session L: Oral Empirical & Technology Poster Session: Empirical & Technology	THOM Auditorium THOM 111 THOM 113 THOM Main Street

ACADEMIC AND RESEARCH SYMPOSIUM - PRESENTER SCHEDULE

	THOM Main	THOM Aud	THOM 111	THOM 113	
2:30 PM - 3:30 PM		<i>Oral Advanced Session A</i> 1. Fuchser (3:10p)	<i>Oral Empirical Session B</i> 1. Wetzel (2:30p) 2. Abramo (2:45p) 3. Matters (3:00p) 4. Engdahl (3:15p)	<i>Oral Technology Session C</i> 1. Otte (2:30p) 2. Hofmeister (2:45p) 3. Hammes (3:00p) 4. Carey (3:15p).	2:30 PM - 3:30 PM
3:40 PM - 4:40 PM		<i>Oral Advanced Session D</i> 1. Snader (3:40p) 2. Embray (4:00p) 3. Kuehn (4:20p)	<i>Oral Non-empirical Session E</i> 1. Cain (3:40p) 2. Bayer (3:55p) 3. Huhn (4:10p)	<i>Oral Technology Session F</i> 1. DeForest (3:40p) 2. Abramo (3:55p) 3. Hendrickson (4:10p) 4. Doremus (4:25p)	3:40 PM - 4:40 PM
4:50 PM - 5:50 PM	<i>Poster Literature Review Session</i> 1. Lange 2. Liermann 3. Hicks 4. Vieselmeyer 5. Schipper 6. Wauhob 7. Fisher 8. Chery	<i>Oral Advanced Session G</i> 1. Stamm (4:50p) 2. Dannehl (5:10p) 3. Boye (5:30p)	<i>Oral Non-empirical Session H</i> 1. Jeppesen & Hammes (4:50p) 2. Easter & Lefebure (5:05p) 3. Rensner & Neihardt (5:20p) 4. Engdahl (5:35p)	<i>Oral Experiential & Non-empirical Session I</i> 1. Ambrecht (4:50p) 2. Hoelz (5:05p) 3. Rathke, Blomenberg, Himmelberg, Price, Scott, Smith, Wood, & Woodburn (5:20p)	4:50 PM - 5:50 PM
6:00 PM - 7:00 PM	<i>Poster Empirical & Technology Session</i> 1. Bridgeford 2. Doremus 3. Hammes 4. Eitzmann 5. Dieckhoff 6. Bi 7. Engdahl 8. Brady	<i>Oral Advanced Session J</i> 1. Comstock (6:00p) 2. Asche (6:20p) 3. Moll (6:40p)	<i>Oral Technology Session K</i> 1. Wetzel (6:00p) 2. Keeler (6:15p) 3. Wragge (6:30p) 4. Rose (6:45p)	<i>Oral Empirical & Technology Session L</i> 1. Engdahl (6:00p) 2. Buhler (6:15p) 3. Beasley (6:30p) 4. Krome (6:45p)	6:00 PM - 7:00 PM

Oral Session A – Oral Art – THOM Auditorium

Marissa Fuchser; Faculty Sponsor: Don Robson **3:10-3:30p**

Frame of Reference

Sculpture and painting are often seen as different or even opposing approaches to making art. In my study, I worked to create both sculptures and paintings that work together to express ideas of harmony, motion, and refinement. The subject matter is based in nature but remains abstract to avoid associations that accompany recognizable subjects such as trees, water. I aimed to emphasize the individual qualities that paintings and sculptures have in the way they can uniquely express things like space, motion, and balance. Even so, they remain connected through shapes, forms, and colors.

Oral Empirical – Session B – THOM 111

Emily Wetzel; Faculty Sponsor: Sara Brady **2:30-2:45p**

The Effect of Music on Negative Language in an Individual with ASD: A Case Study

Autism Spectrum Disorder (ASD) symptoms include impairments to social, communication, cognitive, or behavioral functioning. Applied behavioral analysis is the most common intervention for individuals with ASD, however prior research has also found success reducing problematic behaviors by providing noncontingent access to stimuli (Piazza et al., 2000). The purpose of this case study is to determine whether implementing music will have an impact on the subject's display of negative language. It is predicted that when the subject is exposed to music, they will display less negative language.

Jackson Abramo; Faculty Sponsor: Sara Brady **2:45-3:00p**

A Study of the Influence of Income on Life Satisfaction

Past research has shown income inequality to be negatively related to well-being (Cheung & Lucas, 2016). Deci and Ryan (2000) established a model for needs which achieve life satisfaction when met, specifically in a workplace setting. Few studies have examined income along with the basic needs in a workplace together. This study measures life satisfaction (Denier et al., 1985) and income, as well as autonomy, competence, and relatedness in workplace. It is hypothesized that income will be positively related to life satisfaction when controlling for the basic needs.

Nathan Matters; Faculty Sponsor: Sara Brady **3:00-3:15p**

Impact of Social Media and American Government Knowledge on Attitudes

Past research shows a relationship between perceived procedural injustice and negative levels of satisfaction with police (Salvarore et al., 2013). Also, personal experience strongly influences information about the justice system (American Bar Association, 1999). This study determines whether contextual information of police use of force and knowledge of the American justice system are related to perceptions of law enforcement. It is expected that greater knowledge of the American Justice System and higher contextual information will lead to more positive views of law enforcement.

Heather Engdahl; Faculty Sponsor: Sara Brady **3:15-3:30p**

Support Factors & Substance Use Among Adolescents in Flint, MI

Previous work has found low substance use among adolescents positively related to familial and neighborhood support (Wen, 2017; Wallace et al., 2017). However, other work has found varied relationships between substance use and neighborhood factors (Snedker et al., 2009). Using data from the Flint Adolescent Study (Zimmerman, 2018), this study hypothesized that low substance use would be correlated with perceptions of positive parental relationships and neighborhood safety. Logistic

regression models were non-significant, but further analyses revealed extraneous relationships worth discussing.

Oral Technology – Session C – THOM 113

Samuel Otte; Faculty Sponsor: Brian Albright **2:30-2:45p**

Simulation of a Familiar Board Game

Chutes and Ladders, a very common board game in the homes of many, can be played and last a long time. Through the use of Microsoft Excel, we can create a model that is a simulation of the board game itself. With the click of a mouse, we can simulate 1, 5, or even 100 games and mark how many turns one single game of Chutes and Ladders would take to reach the end. We can figure out the expected number of turns that it would take for a player to win a game and remain victorious over all.

Makenzie Hofmeister; Faculty Sponsor: Sara Brady **2:45-3:00p**

BIOPAC: Electrooculogram

The purpose of this study was to examine an individual's eye movements using an electrooculogram (EOG). The participant was asked to look at a simple drawing, a complex drawing, text, and text with a photograph. It was hypothesized that there would be more eye movements when there was more varied visual stimuli (i.e., the complex drawing and text with photograph) compared to less varied visual stimuli (i.e., the simple drawing and text). Results and applications will be discussed.

Paul Hammes; Faculty Sponsor: Brian Albright **3:00-3:15p**

Geometric Similarity of Foods

Often times foods can be modeled with geometric similarity. These include potatoes and grapes. By doing this different aspects can be looked at relatively easily, such as the surface area to volume and the volume to density. Two different sized potatoes are looked at to see which will provide the highest surface area. Two different sized grapes were also looked at, 10 of the larger and 20 of the smaller, to see which would yield the highest volume given three different densities.

Kyle Carey; Faculty Sponsor: Sara Brady **3:15-3:30p**

BIOPAC ECG and cardiovascular health

Electrocardiogram (ECG) is a very useful tool that can measure the activity of the heart. Exercise that increases heart rate is good for building up cardiac muscle endurance and long term heart health. Some people, however, cannot participate in many of the typical cardio movements other can (e.g., age or injury). Using ECG, I measured the heart activity of a male subject doing both jogging in place and doing pushups to compare how these physical activities affected the heart. Future applications will be discussed.

Oral Session D – Oral Art – THOM Auditorium

Kelly Snader; Faculty Sponsor: Justin Groth **3:40-4:00p**

Landscape: Physical and Conceptual

By pushing material limits, my body of work explores my artistic practice through a visual language that examines the boundaries of physical and conceptual landscapes. This project emerged as I tried to find a way of working with materials that mimicked the ways in which the choices we make affect our daily lives. Different options lead to different outcomes, but ultimately, there is beauty that comes from living this journey we call life.

Jacy Embray; Faculty Sponsor: Seth Boggs **4:00-4:20p**
Time Perception: 1997 - Unknown

My work explores the idea of time - specifically my experience and acknowledgement of the past, present, and future. I am using light as a medium, due to its truthful yet fleeting quality and its connection with time. I have constructed an LED installation, using coding to control the brightness, color, and pacing of the lights. The installation is paired with a typography book, consisting of words that I have sourced from my writing. These words are a connection to the past and a personal reminder of change and growth. Both pieces are invitations into my story and my experience of time.

Courtney Kuehn; Faculty Sponsor: Don Robson **4:20-4:40p**
Interaction Series

The drawings of the hands are to portray how I am dealing with issues of anxiety in relationships. In the drawings, the hands refer to me, as they are explicitly my hands. I think of them as a self-portrait that expresses how I'm feeling or how my anxiety restrains me. Historically, self-portraits typically use the face. I want the drawings to be more relatable and applicable to the viewer; therefore, I draw my hands instead of my face. I have learned that by making art about the obstacles I encounter, I am quite literally facing them.

Oral Non-empirical - Session E - THOM 111

Corianne Cain; Faculty Sponsor: Lorinda Sankey **3:40-3:55p**

Teaching, Modeling, Integrating, and Developing the Faith of the Next Generation

Children and adolescents experience distinct stages of physical, emotional, social, moral, spiritual, and intellectual development. Effective Lutheran schools, and the teachers within, must specifically reach and minister to students in a holistic manner, nurturing the body, heart, and mind of students. An effective approach to spiritual development involves intentional modeling, connections, integration, and attention to the various realms of students' development as they grow in faith and understanding of their Lord and Savior Jesus Christ.

April Bayer; Faculty Sponsor: Lisa Ashby **3:55-4:10p**
Willa Cather and the New Woman: Examining Modern Gender Ideology in "The Professor's House" and "Alexander's Bridge"

At the turn of the twentieth century, social attitudes regarding women's role in society were rapidly changing. This presentation offers a close reading and analysis of how Willa Cather portrays the complexity of gender through *True Woman* and *New Woman* ideology in her works "Alexander's Bridge" and "The Professor's House" through social, psychological, and economic lenses. Furthermore, the presentation considers the concept of male victimhood by examining the ways the male protagonists respond to their female counterparts' varying degrees of independence.

Sarah Huhn; Faculty Sponsor: Vicki Anderson **4:10-4:25p**
Learning Together: An Examination of Community ESL Classes and the Goals of Students

There is an increasing number of adults who require and benefit from community ESL services; however, a lack of resources and teacher training can often lead to classes that fall short of helping students reach their goals. This presentation contains research on several adult community ESL classes. The focus involved the goals of students and the ways in which teachers adapt their classes to fit the needs of students.

Oral Technology - Session F - THOM 113

Brennan DeForest; Faculty Sponsor: Brian Albright **3:40-3:55p**

A New Look at the Birthday Problem

The birthday problem is a famous problem in elementary probability which uses a uniform distribution and ignores the leap day. Using Excel, I reexamined the birthday problem using a new distribution and included the leap day to see if this would change the solution.

Jackson Abramo; Faculty Sponsor: Sara Brady **3:55-4:10p**
A Case Study of the Influence of Music on Heart Rate

Past research has shown that relaxation music does not reduce heart rate (Ng et al., 2016). However, heavy-metal music has been shown to reduce the parasympathetic modulation of heart rate variability (Vanderlei et al., 2016). Using an electrocardiogram (ECG), this case study measures the heart rates of one participant exposed to two versions of the same song. Two electrodes will be placed directly on the participant's wrist and ankle. It is hypothesized that the dubstep version will evoke a more rapid heart rate.

Joshua Hendrickson; Faculty Sponsor: Brian Albright **4:10-4:25p**

Tidal Locking - Modeling with Proportionality

This presentation explores the relationship between planetary mass and tidal locking time of a moon-sized satellite orbiting each of the known planets in the solar system. The author provides a simplified form of the complicated orbital mathematics equation describing tidal locking time, which simplifies to a proportionality equation. Using Microsoft Excel, tidal locking times are calculated for a moon around each planet. The author then discusses changes to parameters to accommodate any size orbit, satellite mass, or satellite rigidity.

Delaney Doremus; Faculty Sponsor: Sara Brady **4:25-4:40p**

Effects of Reading Media on Eye Movements using Electrooculography

The purpose of this project was to examine any difference between eye movements when reading on a screen or reading on paper. I used electrooculography (EOG) technology to precisely measure eye movements to analyze differences in eye movements when reading in those two conditions. EOG technology measures the electrical signal generated by movements of the muscles surrounding the eyes, so it allows for precise tracking of eye movements.

Oral Session G - Oral Art - THOM Auditorium

Miranda Stamm; Faculty Sponsor: Jim Bockelman **4:50-5:10p**

BFA Thesis

My work involves me interviewing people. Some are strangers and others I know well. I take the information I gather about each person's personality and life and make a large scale watercolor portrait of them. I also do an abstracted embroidery of each person and embroider the painting as well. I make sure to relate each aspect of the pieces to make them coherent and work well together. I also struggle through my ability to relate to these people as I am painting them. My technique for each painting changes based upon what I am going through and how I am influenced by their personality.

Emma Dannehl; Faculty Sponsor: Justin Groth **5:10-5:30p**
Making in Held

As I make art, I am one to be very hands on. Ceramics has become a medium that I am very much attracted to. I enjoy the practice of coiling as it allows me to work through the

process. Often in my coiling sculptures I start by making gestural drawings to reference the shape of the form that I am going for. In the making of my art is where I do my thinking. It is a process of being flexible, learning, and allowing new ideas to come and go. In my work I like being able to communicate an idea or subject that is meaningful to me.

Megan Boye; Faculty Sponsor: Seth Boggs **5:30-5:50p**
The Red Thread: Fate, Faith, and Family

In Chinese mythology, the Red Thread of Fate was an invisible cord that the gods tied around the ankles of those that were destined to meet or help one another. My show, The Red Thread: Fate, Faith, and Family explores themes related to my adoption from China. For this show I created an art book that combines photography and typography with a series of spreads. Using the screen-printing technique, I then created three large-scale prints based off spreads in the book that I think best represent the themes: fate, faith, and family.

Oral Non-empirical - Session H - THOM 111

Lydia Jeppesen & Paul Hammes; Faculty Sponsor: Kyle Johnson **4:50-5:05p**
The Effects of Caffeine on the Cold Resistance of C. elegans

C. elegans are nematodes with short life spans, allowing them to be easily studied. The purpose of this study is to look at how caffeine affects C. elegans' cold resistance. We predict that the worms will be more cold resistant after caffeine exposure. This resistance will be tested by freezing NGM media gels, placing worms that have been exposed to caffeine and those that have not on separate gels. A current will be placed over the worms, motivating their movement in a linear direction. The distances that both sets of worms moved will be compared by a t-test to see caffeine's effect.

Melody Easter & Jamie Lefebure; Faculty Sponsor: Kyle Johnson **5:05-5:20p**
Caenorhabditis elegans Behavioral Movements Corresponding to Food Quality

C. elegans contain their own unique behaviors related to locomotion and food quality. Exploring how these worms seek out their prey is knowledge that can be used for studies related to chemotaxis. C. elegans are quite selective with the bacteria that they choose to consume, and we propose that the quality of the bacteria given as a food source will influence whether the worms will search out the bacteria. We predict that C. elegans pre-exposed to high quality food will enhance the behaviors relating to searching for food.

Josiah Rensner & Scott Neihardt; Faculty Sponsor: Kyle Johnson **5:20-5:35p**
Proposed Study on the Effect of a Competing Signal on Caenorhabditis elegans Electrotaxis

Caenorhabditis elegans is a nematode that has been extensively studied. When C. elegans is placed in an electric field it always moves toward the cathode, a behavior known as electrotaxis. This electrotaxis has not been tested in the presence of a competing signal. NGM gels will be prepared with a food source on one end. The gels will be placed in an electric field so that the worms would have to leave the food source to electrotax. We expect that the worms will move significantly faster in the absence of a food source. These results would indicate that a competing signal affects electrotaxis.

Heather Engdahl; Faculty Sponsor: Sara Brady **5:35-5:50p**
Eye Movements & Deception

Surveys have shown that, both globally & in police officers in the US, gaze aversion is widely assumed to be related to lying (Global Team, 2006; White et al., 2016). However, an experiment

found no differences among liars' & truth tellers' eye movements (Wiseman et al., 2012). The study will utilize an EOG to collect electrical response potentials associated with the eyes' activity while conducting a game to collect both truthful and deceitful statements. It's hypothesized that EOG data collected while lying will exhibit a spike of ERP compared to a lack thereof during truthful statements.

Oral Experiential & Non-empirical - Session I - THOM 113

Isaiah Armbrecht; Faculty Sponsor: David Coe **4:50-5:05p**
Evaluating Ethics: Aristotle, Aquinas, Kant

For a Christian, ethics can seem a difficult task in light of the Scriptures and this present world. Lutherans have even been accused of not pursuing ethics because of their focus on justification. How can Christians (and Lutherans in particular) address the ethics of today? An analysis of the ethics of Aristotle, Aquinas, and Kant provides a helpful understanding of ethics for the Christian's everyday life.

Sophia Hoelz; Faculty Sponsor: Kathy Miller **5:05-5:20p**
The Importance of Social Relationships in the Aging Process

Social relationships are an integral part of the human experience. As we age, these relationships become harder to maintain yet can have substantial benefits to quality of life. Volunteering at a Senior Center for four months I was able to gain firsthand experience about the benefits of social relationships throughout the aging process. This experience, along with separate research, exhibits the qualities of life that may be enhanced, and how these instances are particularly beneficial to the elderly population.

Arianna Rathke, Luke Blomenberg, Harlie Himmelberg, Kourtney Price, Cyrus Scott, Emma Smith, Katelyn Wood, & Victoria Woodburn; Faculty Sponsor: Jen Janousek **5:20-5:35p**
Experiences in Guatemala

We will explore the experiences of our mission trip to Guatemala and how it relates to the Sustainable Development Goals (SDGs). Four specific SDGs will be discussed: zero hunger, good health and wellbeing, quality education and clean water and sanitation. An examination of the depravity of these SDGs in Guatemala, and the standards hoped to be achieved by the WHO will be made. We had the opportunity to help advance these SDGs by conducting health fairs at several Guatemalan schools in an effort to provide education on hygiene, nutrition and topics of health awareness.

Oral Session J - Oral Art - THOM Auditorium

Luke Comstock; Faculty Sponsor: Seth Boggs **6:00-6:20p**
Lcomstock_selfportrait_01.pdf

Lcomstock_selfportrait_01.pdf is the artist solution to the problem of how audiences participate in viewing art, quickly forgetting things that take explanation. It seeks to develop thirty distinct posters to make the work approachable on a surface level. The work also causes the artist tension, forcing him to strive for new styles for the same general idea. Finally, the work is an abstract portrait of the artist displayed in visual space, literary concepts, and design approach. The result causes the viewer and artist to look at a subject in a way not traditionally displayed in a gallery space.

Evan Asche; Faculty Sponsor: Jim Bockelman **6:20-6:40p**
A Fascination With Fabrication

The works I have created over the past year use all fabricated wood that has been bought from general stores such as Lowe's. My reasoning for this was to convey the human fascination with how things are fabricated and made available to us today, specifically with the material of wood. It can serve as a sculptural foundation, a frame, a surface, a tool, a drawing. Illustrating the aggressive playfulness that takes place in my work is something I hope to put on display. It is the fascination between the manmade and nature that drives this work that I have created.

Zachary Moll; Faculty Sponsor: Jim Bockelman **6:40-7:00p**
Material Elevation

A presentation discussing my final body of artwork made for Concordia University Nebraska. Included in this presentation is an overview of the influences I have discovered in my artwork as a student as well as how they tie into my current work. The four characteristics that influence my work are agency, material, theology, and community.

Oral Technology - Session K - THOM 111

Emily Wetzel; Faculty Sponsor: Sara Brady **6:00-6:15p**
EOG Investigating Ambiguous Visual Stimuli

Electrooculogram (EOG) procedures measure horizontal and vertical movements in eye muscles by placing electrodes on the temporal side of each orbit as well as above and below the eye. A single subject demonstration was performed using BIOPAC software to examine whether or not eye muscle movements change when processing frightening or unsettling visuals opposed to ambiguous images.

Bret Keeler; Faculty Sponsor: Brian Albright **6:15-6:30p**
Winning Probabilities in Blackjack

The presentation is about a simulated game of Blackjack and the winning percentage of the player based on their actions

Quinn Wragge; Faculty Sponsor: Brian Albright **6:30-6:45p**
Predicting Teacher Salary in the U.S. by State

This math modeling project uses multiple regression to see what is the best indicator of a teaching salary in a small sample of U.S. States. To do this I chose a handful of predictor variables I thought would be interesting to look at, and then used a forward selection process to see what variable was the best predictor.

Samuel Rose; Faculty Sponsor: Brian Albright **6:45-7:00p**
Optimal Blackjack Stopping Points

In this presentation, I will discuss the ideas and strategies behind utilizing different stopping points in hands in the game of blackjack. This game uses optimization techniques discussed in Mathematical Modeling.

Oral Empirical & Technology - Session L - THOM 113

Heather Engdahl; Faculty Sponsor: Nancy Elwell **6:00-6:15p**
Empathy, Resource Accessibility, & Generosity

Previous research has exhibited conflicting relationships among helpful behaviors in low socioeconomic status (SES) individuals, in comparison to their counterparts. For purposes of the study, SES was manipulated via reminders of resource accessibility. Procedures included a survey, writing prompt, and a raffle ticket method to assess the variables of empathy, resource accessibility, and generosity. It was hypothesized that empathetic individuals reminded of resource abundance would exhibit higher levels of generosity than counterparts. Results and implications will be discussed.

Melinda Buhler; Faculty Sponsor: Sara Brady **6:15-6:30p**
Impacts of Parental Management and Timing of Adolescent Romantic Relationships on Self-Esteem

Past research has found that self-esteem is highly influenced by the parent-child relationship (Akhouri et al., 2018). Madsen (2008) qualitatively examined how parental management (i.e., rules) of dating influences the parent-child relationship. This study aims to fill the quantitative research gap on the relationship between parental management of adolescent relationships, timing of adolescent relationships, and self-esteem. I hypothesized that there will be a negative correlation between self-esteem and parental management of adolescents' romantic relationship. Results will be discussed.

Vincent Beasley; Faculty Sponsor: Sara Brady **6:30-6:45p**
Heart rate and emotion related to satisfaction with life using electrocardiogram (ECG).

This small scale study reports the effect of emotions on human electrocardiogram (ECG). The purpose of this was to study measure heart rate using ECG during a cognitive task related to satisfaction with life and while listening to a motivational video. A male subject was asked to recall a time when they experienced a negative event and explain how they responded and overcame that event. Then, the subject listened to a motivational video. The results showed that heart rate did not differ between conditions. Implications and limitations will be discussed.

Rachel Krome; Faculty Sponsor: Sara Brady **6:45-7:00p**
Performing an EEG using the Biopac Student Lab System

Electroencephalogram (EEG) is a test used to study the electrical activity of the brain or the abnormality of a subject's brain waves. This project used the Biopac Student Lab System EEG to record the electrical signals of a participant's brain. A student was given a memory task in which they had to recreate a familiar location. Multiple trials were run with the participant under varying levels of visual stimulation.

Poster Session - THOM Main Street - 4:50-5:50pm

Elizabeth Lange; Faculty Sponsor: Nolan Harms
The Effect of Concurrent Electrical Stimulation and Mirror Therapy on Upper Extremity Stroke Rehabilitation

Stroke rehabilitation for upper limb impairment is extremely difficult, as patients often struggle with the fact that they cannot do the same tasks as before. A faster recovery means the patient can return to his/her normal activities sooner. Numerous studies have explored how certain therapies for upper limb stroke rehabilitation can work together to provide faster and more effective recovery. Specifically, research has shown that electrical stimulation therapy and mirror visual therapy given simultaneously can result in significantly improved function as compared to either therapy alone.

Samantha Liermann; Faculty Sponsor: Nolan Harms
Effects of Early Sport Specialization

Today's society puts immense pressure on winning and being elite. I also looked at how young was too young to specialize, and when should parents and coaches shift the focus on sampling to specialization. The purpose of collecting and reviewing the research was to look at the effects of early specialization on youth participants not only physically, but also psychologically. The information shows that sport sampling until after the age of puberty at least helps reduce the chance of overuse injuries, prevents burnout, and creates more physically, mentally, and emotionally well-rounded youth.

John-Robert Hicks; Faculty Sponsor: Nolan Harms
Effects of Intermittent Fasting on Weight Restricted Athletes

Evidence suggests that intermittent fasting (IF) is effective in the general population for weight control, but there are concerns about its efficacy for weight-restricted athletes (WRA). This review of literature focused on three aspects of WRAs and performance. Studies show that IF is not beneficial to endurance when done to exhaustion. Research of IF on resistance training showed detriments in performance at high volumes. Lastly, IF did not affect athletic performance. These findings lead to a comprehensive recommendation that IF can be used as long as training workload is not high.

Megan Vieselmeier; Faculty Sponsor: Nolan Harms
ACL Reconstruction - Bridging the Gap from Rehabilitation to Performance

The goal for all forms of post-operative ACL rehabilitation: to return the patient to a normal and complete level of function in as short of a time as possible without compromising the integrity of the surgically reconstructed knee. The stats are alarming: there is a 45% risk of tearing the new ACL if the rehabilitation process is not followed properly. That risk can be decreased to 18-20% with proper training, however, there is always a risk of a re-tear. Bottom line, do not rush a return to sport. Get the knee mechanics and stability as close to normal as possible before returning to sport.

Jared Schipper; Faculty Sponsor: Nolan Harms
Effectiveness of Tommy John Surgery in Baseball Pitching

Tommy John Surgery is one of the most prevalent surgeries for a pitcher in the MLB. Tommy John is a surgery in which a torn ulnar collateral ligament on the medial side of the elbow is replaced with a tendon from another part of the pitcher's body. Effectiveness of this surgery is determined by the rate of return by the pitcher to the sport and pre-surgical vs post-surgical stats. With how common this surgery is, it is important to look at how effective it is. A UCL tear can be career ending, however with this surgery and proper recovery a pitcher can return healthier and perform better.

Tanner Wauhob; Faculty Sponsor: Nolan Harms
Effects of Caffeine on Athletic Performance

Caffeine can have a bad reputation, but in the eyes of an athlete it is a potential way to get an advantage on opposing competition. Athletes are among the few groups of people who are interested in the effects of caffeine and what it does to their body. Caffeine is extremely prevalent in the diets of many athletes, but not heavily monitored. Caffeine acts as a central nervous system stimulant where it makes the body more alert. Researchers have found that caffeine is a major enhancer in athletic performance. Some have even said it is the most legal sports performance booster there is.

Walker Fisher; Faculty Sponsor: Nolan Harms
The Effects of Sleep on Athletic Performance

Athletes of all levels are always looking for ways to get an edge on their opponents. One factor that potentially enhances sports performance is sleep. Sleep has a significant effect on many different components of athletic performance such as reaction time, injury prevention, stress, and exertion. When an athlete suffers from sleep deprivation or poor sleep, he or she is at a much greater risk of performing poorly. Research has shown that obtaining an optimal sleep pattern can be beneficial in achieving peak athletic performance.

Deandre Chery; Faculty Sponsor: Sara Brady
Exploring differences in heart rate with ECG

Electrocardiogram (ECG) uses an electrical signal that measures heart rate through the placement of electrodes on the body. In this small scale study, participant's change in heart rate was measured using ECG while listening to music to prepare to exercise versus performing a physical exercise known as planking. This experiment can be helpful when exploring possibilities of music therapy or other possible applications to cardiovascular research.

Poster Session - THOM Main Street - 6:00-7:00pm

JayCee Bridgeford; Faculty Sponsor: Sara Brady
Effect of Reading Media on Comprehension

Previous research has found similarities and differences in reading outcomes based on media (digital vs. paper formats; Margolin, Micheal & Kegler 2013). This current study aimed to determine if different reading media has an influence on the degree of comprehension. I hypothesize that students who read a hard copy of an article will have higher comprehension scores compared to students who read the same article digitally. Results and implications will be discussed.

Delaney Doremus; Faculty Sponsor: Sara Brady
To what extent is social media use associated with relational aggression?

Previous research suggests that social media has widespread influences on adolescent life, especially in relationships (Cyr et al., 2015). This study aimed to measure the relationship between social media usage and relational aggression among adolescents. In this study, students were asked to take a survey of relational aggressive behaviors as well as how much time they spend daily on various social media apps. I hypothesized that there would be a positive correlation between time spent on social media and levels of relational aggression.

Paul Hammes; Faculty Sponsor: Robert Hermann
Remote Mapping Using Arduino Ultrasonic Sensors

Robotic mapping provides a safe way to locate objects and determine the layout of a remote space. Using an Arduino Uno-based robot and two ultrasonic sensors a room can be mapped out. The robot determines its path around the room, taking distance measurements to the perimeter wall and measuring its speed as it moves. This allows the room's dimensions to be found. The speed and distances collected are then transferred to Excel and graphed. The map produced this way is compared to the room's actual dimensions to test the robot's accuracy.

Derek Eitzmann; Faculty Sponsor: Robert Hermann
Arduino-Based Ag/AgCl Electrode Chloride Sensor

Quantitative chemical measurements are essential to fields such as medicine and quality assurance. The Ag/AgCl electrode is the industry standard in these fields. This project develops a system to perform real-time measurements of chloride concentration in situ. The system is composed of an Arduino, voltage amplification circuit, and two Ag/AgCl electrochemical cells. The sensor functions by measuring the potential between two cells to calculate the [Cl]. The system can measure the log of the concentration within 10%. The system can be modified to serve as the basis of other chemical sensors.

David Dieckhoff; Faculty Sponsor: Robert Hermann

Active Noise Cancellation Using an Arduino

Microprocessor

Active noise cancellation has many commercial and industrial applications. Using an Arduino microprocessor, a speaker, and a combination microphone and amplifier, the apparatus can be used to record and reproduce a sound wave. The board uses a fast Fourier transform to find individual frequencies that, when combined, make the complete incoming waveform. Shifting the most prominent frequency by half a wavelength produces a wave that can interfere destructively with the incoming frequency. The shifted wave is compared to the incoming wave and the resulting reduced waveform is analyzed.

Deandre Chery; Faculty Sponsor: Sara Brady

Exploring differences in heart rate with ECG

Electrocardiogram (ECG) uses an electrical signal that measures heart rate through the placement of electrodes on the body. In this small scale study, participant's change in heart rate was measured using ECG while listening to music to prepare to exercise versus performing a physical exercise known as planking. This experiment can be helpful when exploring possibilities of music therapy or other possible applications to cardiovascular research.

Magboula Bi; Faculty Sponsor: Sara Brady

Measuring emotional difference using electroencephalogram

In this experiment, electroencephalogram (EEG) was used to measure the brain waves of an individual during two different emotion tasks. The first task involved thinking happy thoughts with the eyes closed and then opened. The second task involved thinking of something that may have angered them so they were expected to think of angry thoughts with their eyes open and then closed. The results suggested that there is a distinction between the two tasks.

Heather Engdahl & Sara Brady

Presented at the annual meeting for the Society for Personality and Social Psychology in Portland, Oregon February 2019

Do Empathy and Narcissism Predict Ethical Decision-Making Regarding Monetary and Social Dilemmas?

In a correlational study, participants (N=97) completed an online questionnaire which measured the Big Five personality traits, empathetic behavior, selfism, and ethical decision-making via ethical dilemmas. One dilemma was derived from previous work and nine dilemmas were created and included in the measure. Multiple linear regression models were conducted. High levels of empathy predicted ethical decision-making, whereas high levels of narcissism predicted unethical decision-making. These results suggest that empathy and narcissism may predict ethical decision-making in monetary and social dilemmas.

Sara Brady

Presented at the annual meeting for the Society for Personality and Social Psychology in Portland, Oregon February 2019

When a lie becomes the truth: How opportunity to lie and motivation to impress induce attitude change

In an experiment, participants either lied or did not lie about their previous survey responses to impress an attractive, opposite-sex person who was known to have responded differently from them. Later, only those who lied to impress their partner changed their current attitudes. The results have relevance for theories of attitude change, source monitoring, false memories, and self-deception.

Thank you to all participants, faculty sponsors, staff, judges, administrators, and attendees for supporting the symposium!

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