



Undergraduate Research Conference 2023

Lightning Talk Abstracts

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Tranace Alexander, Ashton Ortego, Ava Allam

Mentor: Dr. Brooke Breaux

University of Louisiana at Lafayette

Perceptions of Statements, Stories, and Images

A popular assumption in cognitive linguistics is that metaphors are extremely common in both language and thought (Lakoff & Johnson, 1980). Historically, the evidence provided for this assumption has been primarily linguistic in nature. For example, a conceptual metaphor such as LOVE IS A CONTAINER is proposed to exist in the minds of speakers because it is natural to talk about people being in love or people falling out of love regardless of the fact that containment is a spatial concept and love is an abstract concept. One question, which arises from this assumption, is the nature of the connection. In other words, how might the spatial and abstract concepts that are activated by a conceptual metaphor be connected? In 2000, Boroditsky investigated the abstract concept of time and found evidence of a connection flowing from space to time but not one flowing from time to space. Boroditsky's findings suggest that even though thinking about time does not require thinking about space, abstract concepts are structured, at least in part, by the spatial concepts with which they are connected (i.e., evidence of an influence from space to time). The reverse effect was not supported: The structure of abstract concepts does not appear to have an influence on the structure of spatial concepts.

The purpose of the current study is to use Boroditsky's methods to extend these results to the meanings of prepositions. The current question is whether the same pattern of results will hold when the concrete and abstract concepts being investigated are lexical in nature: the concrete meanings of in and on (e.g., a flower in a vase; a lamp on a table) and the abstract meanings of in and on (e.g., the woman is in love; the man is on vacation), respectively.

We are in the process of collecting data from a convenience sample of native English-speaking adults in the United States. We are aiming for a minimum of 300 participants, similar to the number of participants recruited by Boroditsky (2000).

Using a fully crossed between-groups design, we created four different conditions: space-to-space, space-to-abstract, time-to-time, and abstract-to-space. Each participant is presented with five prime stimuli of one type: in photographs, on photographs, in stories, and on stories. Each participant is presented with one target stimulus: an ambiguous in/on image or an ambiguous in/on statement. Participants were asked to choose between the words in and on to describe the

target or complete the image.

Our very preliminary data suggests that we might not end up finding results similar to Boroditsky's (2000). In fact, of the eight participants who have completed the study every one of them has responded in a way that is opposite to the lexical primes they received.

If this pattern of results is maintained in our final data set, it will not support Boroditsky's (2000) conclusion of metaphoric structuring and the idea that spatial concepts serve as the basis for abstract concepts. It might suggest that participants are experiencing a contrast effect where after one lexical concept is presented repeatedly, they prefer a novel lexical concept. Alternatively, it might suggest that repeating one concept results in a build up of criteria about a specific lexical item and that the ambiguous target stimulus that they are presented with does not meet these criteria. We are interested to see what happens in our final data set.

Gabrielle Boutte, Caitlyn Rogers and Dr. Ed Bush

Mentor: Dr. David Spivak

Louisiana State University

Synthesis of a Fentanyl Derivative for use as a Template for Molecularly Imprinted Polymers

Fentanyl is a deadly synthetic opioid, with a lethal dose of two milligrams. It is commonly polluted into other illicit substances. As a result, the United States is currently facing an overdose epidemic. Current methods for the detection of fentanyl don't allow for mobilization required for point of contact detection. Developing a method for point of contact detection of fentanyl is crucial for ensuring the safety of first responders as well as those who face the effects of fentanyl polluted in illicit substances. Molecularly imprinted polymers are synthetic polymers which have previously been utilized for the detection of small molecules and have applications for point of contact detection. This work utilized benzyl fentanyl, a less toxic fentanyl derivative, as a template for molecularly imprinted polymers. Benzyl fentanyl derivatives as well as common illicit substances, were used as analytes for cross binding studies showing benzyl fentanyl molecularly imprinted polymers successfully detect fentanyl in the presence of other illicit substances.

Emily DeGruise, Valanne L. MacGyvers, Ph. D.; Andrea L. B. Eggenberger, MS; Taylor Gage, MS; Ella Garlington

Mentor: Dr. Valanne MacGyvers

University of Louisiana at Lafayette

Experienced Corporal Punishment and Empathy, Leadership, and Achievement in College

Corporal punishment has been recognized in prior research as having

adverse effects on children, specifically on cognitive development (Gershoff, 2010).

Lopez et. al (2001) reported that corporal punishment use by parents predicted lower levels of empathy in a sample of undergraduate college students, but other studies have provided mixed results, indicating the need for further research. Gershoff et al. (2019) also found that school corporal punishment is linked to lower high school GPA. Building on previous findings, the purpose of this study was to examine the relationship between experiences of corporal punishment as a child with characteristics seen in the early college years including empathy, leadership, followership, and academic achievement.

This study also analyzed context of use as well as opinions regarding the use of corporal punishment.

Gabrielle Mellor, Colette Mouton, & Don Zhang, Ph. D.

Mentor: Dr. Don Zhang

Louisiana State University

Taking Risks, Chasing Smiles

Despite recent research supporting the notion that risk propensity is correlated with both happy (e.g., high extraversion) and unhappy (e.g., low conscientiousness) personality traits, the role of risk propensity as a personality predictor of happiness has been often overlooked in psychological research (Angrim et al., 2020; Joseph & Zhang, 2020). Relatedly, risk propensity has been found to individually predict both adaptive and maladaptive real-world outcomes separate from the Big Five personality traits (Highhouse et al., 2022). Extending this research, the present study examines the relationship between scores on multiple measures of wellbeing (e.g., Subjective Wellbeing, Psychological Wellbeing, Life Satisfaction) and measures of risk propensity (e.g., DOSPERT, GRiPS). The study sample comprised approximately 500 participants from the LSU SONA participant pool who were tasked with completing a 20-minute Qualtrics survey. To extend upon this research, a meta-analytic investigation is currently underway. This research intends to generate crucial insights into the ways risk propensity is uniquely related to the happiness and wellbeing of individuals and uncover whether risk takers are happier than their non-risk-taking peers.

Ashton Ortego, Dr. Breaux, Tranace Alexander, Ava Allam

Mentor: Dr. Breaux

University of Louisiana

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Brennan Robertson

Mentor: Vince Wilson

Louisiana State University

Studies on Measuring Impulse Noises

Impulse noise, a workplace hazard, is often overlooked by prevailing industrial hygiene monitoring methods. This study investigates whether the conventional personnel noise dosimeter exaggerates impulse noise exposure. Building on prior qualitative research, which suggested substantial disparities between standard personnel noise dosimeters and impulse level meters, this study aims to continue the previous findings. The data pool is formed by field measurements of impulse noise created by a firearm. Dosimeters are affixed to both shoulders, and impulse level meters are strategically placed near each ear using tripods, all within a one foot proximity. By comparing data from these instruments, we aim to identify noteworthy individual differences. If disparities emerge, they will substantiate the overemphasis or underemphasis of impulse noise by the standard personnel noise dosimeter. The earlier phase of this project indicated qualitative discrepancies between impulse measurements captured by the standard personnel noise dosimeter and the impulse level meter. Should the continuation of this study be able to quantitatively discern a significant difference between these instruments, a clear susceptibility within the standard personnel noise dosimeter will be confirmed.

Caitlyn Rogers, Dr. Ed Bush

Mentor: Ed Bush

University of Louisiana

Using *Tillandsia recurvata* as a Biological Indicator to Monitor Air Pollution and Oil Retention

Air pollution is defined as the presence of a substance in the atmosphere that is harmful to human health, living things, and/or has a negative impact on the environment. A plant such as *Tillandsia recurvata*, ball moss, could be used as an inexpensive biological indicator for urban pollution. The purpose of this research was to determine if ball moss could be used as a biological indicator of urban pollution and retain oil pollution. Multiple sites were identified and grouped by vehicular traffic frequency (counts) using the Louisiana State Department of Transportation and Development (LaDOTD) traffic data to randomly select five low (0.0 - 7000), and five medium/high frequency (7001 to >14,000) traffic counts in locations within Baton Rouge, La. city limits. Differential analysis determined that harvested ball moss tissue levels from areas with low traffic (<0.05 level) contained lower S concentrations than plants tested from high traffic counts. In a second study, dried *Tillandsia recurvata* plant tissue accumulated greater oil weight than absorbent paper towels. *Tillandsia recurvata* absorbed and/or retained oil at a greater ratio of oil than its own mass. Therefore, the results of each experiment indicated that *Tillandsia recurvata* may successfully function as a biological indicator and serve as an oil retentionist on a small-scale test. Further research is needed on a larger-scale area to confirm the efficacy of ball mosses for controlling water pollution *in-situ*.

Wyatt Stoute, Anthony Melkomukov , John Landry, Paul Darby

Mentor: Paul Darby

University of Louisiana

CAPE 4- Picosatellites

During the 9-minute launch of this picosatellite, the structure will experience extreme static and vibrational loads. These loads will be applied to our metal structure which can then transfer them to the inner electronic components, which are less flexible and more rigid. Natural frequencies of our structure can cause these vibrations to amplify, which may then pose a threat to the inner components. To ensure that our structure will survive this launch period, we have simulated the conditions it will be subject to. The goal of this research is to determine any problematic natural frequencies that may cause our structure to be damaged, fail, or threaten the payloads contained within it. The structure will be subject to a uniform base excitation, which was applied through all the outer faces of the structure. This was examined using SolidWorks Simulation, specifically a Linear Dynamic- Random Vibration study. The study found that the outer structure experienced the most response with relevant frequencies below 50Hz.

Treasure Wells, Dr. Jennifer Baumgartner

Mentor: Jennifer Baumgartner

Louisiana State University

Louisiana Early Childhood Education Oral History Project

Oral history is a field of study and method of gathering, preserving and interpreting the voices and memories of people, communities, and people in past events. It is our oldest tool used for learning and passing on stories from generation to generation. However, as a means for preserving information, oral history is more often than not a forgotten medium in the wake of written word and other technological advancements. The stories of our elders and experts still deserve to be preserved in their primary form: word of mouth. Equally important to preserve are the stories our educators have to tell, whose livelihoods are also often taken for granted. Teachers are integral members of our society. They set children up as citizens of the world, and guide them towards success. The children of today are the leaders of tomorrow, and teachers play a key developmental role that makes a child ready for their future. The stories and livelihoods of teachers are often left untold. Word of mouth is easily lost over time and taken for granted. Therefore, the The Louisiana Early Childhood Teachers Oral History Project is taking initiative to preserve the voices of this population directly from the teachers themselves. We are working to interview career early childhood educators for their stories and experiences as teachers. We are also centering teachers from the coastal region to highlight the unique perspectives they have to share. The aim is to keep the art of oral history and the stories of our educators alive to preserve them for the next generations to come.