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Elise Cunanan

Sociology at California State University, Fullerton

Mentored by Dr. Nolan Cabrera (Educational Policy Studies and Practice)

Student Financial Aid and Family Structure's Impact on the College Experience

ABSTRACT: The majority of college students and their families cannot pay for higher education with savings alone. They often heavily rely on financial aid to assist them in affording college. Literature suggests that financial aid packages make college more accessible for students but also helps them engage and persist in college. The purpose of this study was to analyze students from diverse financial backgrounds and their financial needs while in college. This research examined how students feel about borrowing for higher education, why students who receive significant financial aid packages borrow, and how families support their children while they are enrolled in college. Using secondary data from in-depth interviews with undergraduates that were a part of the Arizona Assurance program, the study examined how financial aid, family structure, and student loans have a significant impact on how students experience college. Findings suggest that students in the sample did not initially intend to take out loans when they received a significant amount of financial aid. They did, however, take out loans to cover living and personal expenses. Additional findings reveal that students' parents supported their pursuit of higher education, but how they express this support varies. Future research can support the development of new financial aid policies that can better assist students with different financial needs and obligations.

Sean Driskill

Physics at University of Arizona

Mentored by Dr. Tai Kong (Physics)

Chemical Doping of Tin Phosphorus Trisulfide (Sn2P2S6) and

Tin Phosphorus Triselenide (Sn2P2Se6)

ABSTRACT: Sn2P2S6 and Sn2P2Se6 are wide band-gap semiconducting crystals. Mechanical pressure can be emulated through the process of chemical doping (Kimber et al., 2009) to expand or contract the inter-atomic spacing of a crystal structure. The alteration of interatomic spacing changes the gap between valence and conduction bands and may cause phase transitions in the solid matter (Israel et al., 1998). This study investigates potential dopants for the Sn2P2S6 and Sn2P2Se6 crystals and reports the observed effects of chemical doping on the parent compound. Sn2P2S6 and Sn2P2Se6 are subject to chemical doping with substitutions made to the Tin ions of both crystal structures. Crystals in this study are formed through vapor transport techniques using Iodine as the transport agent, and all chemical doping occurs during the vapor phase. X-ray powder diffraction is used to qualitatively determine the success of each attempted doping and any potential changes to the crystalline structure size. Four Probe Measurements are utilized to determine the resistivity of crystal samples produced by this study. Upon completion of the resistivity measurements, any correlation between chemical doping and the resistivity of Sn2P2S6 and Sn2P2Se6 will be analyzed.

Annika Gonzales

Psychological Sciences at University of Arizona

Mentored by Dr. Michele Walsh and Dr. Rachel Gildersleeve (Family and Consumer Sciences)

Social Determinants of Health in a Rural Arizona County

ABSTRACT: Social determinants of health (SDOH) are social and economic conditions that shape the environment in which people are born and live; these conditions are influenced by the distribution of wealth and resources and by local leaders (Viner et al., 2012). Social factors such as food security, education, and socioeconomic status influence the health of individuals and families in rural areas (Holben et al., 2006). Being able to address these social factors is vital to prevent chronic diseases and to increase an individual's overall lifespan. This paper examines how three SDOH-- socioeconomic status, educational attainment and accessibility-- affect healthy eating and active living in rural Cochise County, Arizona.

American Community Survey data was used to compute a SDOH index to broadly describe how community conditions vary across the county. A healthy living index was also created for the same geographies by summing responses from select items from a Behavioral Health Community Survey. The average score for the county was 21 (of 28) and ranged from 17 to 22 for the healthy living index; the average county score was 16 (of 25) and ranged from 13 to 22 for the SDOH index. A correlation test showed that there was a moderate correlation of .555 between the two indices. This shows a relationship between healthy living and SDOH. The research and results are with the intention to not only create more awareness among residents in the county but increase funding for programs and resources on healthy eating and active living.

Chenna Hu

Psychology at California State Polytechnic University,

Pomona

Mentored by Dr. Vicky Lai (Psychology)

## How do Mandarin and English speakers represent time and events?
A study on linguistic factors and cultural patterns of rhetoric

ABSTRACT: Does one's language(s) and culture(s) influence their thought processes? Research on contrastive rhetoric that contrasts cross-cultural characteristics of linguistic and rhetorical forms argues that discourse patterns are influenced by cultural contexts (Kaplan, 1966; Tzung-yu, 1993), while cross-linguistic studies on the nature of spatiotemporal representations have empirically demonstrated cross-linguistic differences influence mental representations (Boroditsky, 2001; Lai & Boroditsky, 2013). In the domain of time, studies on the spatiotemporal conceptualizations showed that Mandarin speakers tend to characterize time using both horizontal and vertical axes, while English users primarily conceptualize time along horizontal axes (Lakoff & Johnson, 1980; Boroditsky, 2001). However, new research suggests the vertical spatiotemporal references used by Mandarin speakers could indicate a cyclical concept of time rather than a vertical one (Sun & Zhang, 2021). Moreover, studies in contrastive rhetoric suggest Mandarin speakers tend to engage in circular thought patterns in discourse, while English speakers use linear thought patterns to express their opinions. The present study proposes to investigate differences in spatiotemporal judgements and the cultural thought patterns between Mandarin and English speakers at the discourse level. Participants will be asked to watch seven video segments depicting a baseball game and to describe the events in a paragraph afterwards. It is predicted Mandarin speakers will follow a circular thought pattern with emphasis on vertical spatiotemporal representations, whereas English speakers will follow a linear thought pattern with emphasis on horizontal spatiotemporal representations.

Camille Korbut

Applied Mathematics at University of California, Riverside

Mentored by Dr. David Glickenstein, Dr. Kevin Lin, and Dr. Avinash Karamchandani (Mathematics)
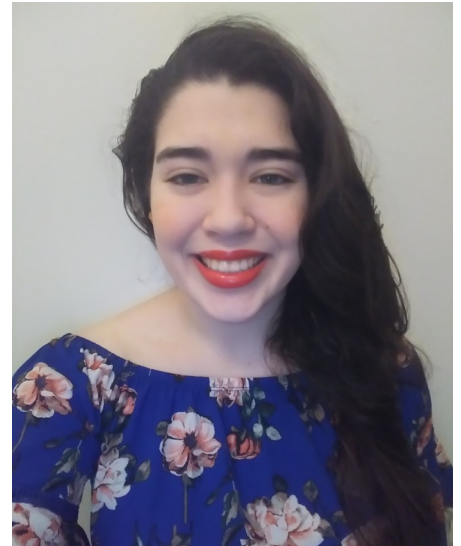
Comparison of Cosinor Analysis and Singular Spectrum Analysis (SSA) in Quantifying Circadian Rhythms of Unemployed Arizonans

ABSTRACT: Desynchrony of one's circadian rhythm can lead to the onset of health concerns such as a higher risk of cancers and cardiovascular disease (Kuhlman, Craig, & Duffy, 2017). Despite this and the clear impact of unemployment on one's daily rhythms, there are few studies exploring how the human body reacts to light fluctuations and sleeping patterns on a 24-hour cycle in unemployed individuals; only one paper to our knowledge has examined employment status and its effect on biological rhythms that do not conform to 24 hours (Ockenfels et al., 1995). In most of the literature, regression-based cosinor analysis is commonly used to quantify circadian rhythms (Halberg, Visscher, Flink, Berge, & Bock, 1951). In recent years, singular spectrum analysis (SSA) has gained popularity. SSA, which applies linear algebra techniques to time series data, may increase the accuracy of modeling circadian rhythms (Golyandina, 2021). In this work, data on activity count and light exposure were extracted from a study by Haynes et al. (2017) for 124 unemployed Arizonans via watches that recorded data every 30 seconds over a two-week period. Participants were observed in a natural environment where no schedules were enforced: the data reflects their natural circadian rhythms. This study compared the SSA method to different cosinor models by calculating the coefficients to determine the goodness of fit for each model. The nonparametric SSA method outperformed nonlinear cosinor analysis and single-component cosinor model. By creating more accurate models, one can further explore desynchrony and diagnosis in chronomedicine.

Chloe Mattila

Mathematics; International Studies at College of Charleston

Mentored by Dr. David Glickenstein, Dr. Kevin Lin, and Dr. Avinash Karamchandani (Mathematics)

Actigraphy and Population-Mean Cosinor Analysis
of Acrophase, Gender, and Depression

ABSTRACT: Mental health is a human right, and unemployment is a public health issue because it can lead to poorer health and a lower quality of life (Blanchflower & Bryson, 2020; Von Domelen et al., 2011), often causing longer term effects on one's mental health, such as depression (Wilson & Finch, 2021). This research investigates how activity can vary in different unemployed subgroups. The de-identified actigraphy data, continuously monitored activity count taken by wearable devices, of 114 involuntarily unemployed Arizonans were analyzed using the population-mean cosinor analysis and population comparison tests from the Cosinor2 package in R. This analysis was performed on subgroups of the dataset according to their depression severity (minimal to mild and moderate to severe) based on the Beck Depression Inventory-II (BDI-II). Further subdivisions were made using gender binary classification, female and male. We found that the acrophase, time of highest activity, of those with a depression severity of minimal to mild and moderate to severe were significantly different (p-value < 0.05). Those classified as having minimal to mild depression had earlier acrophases than those with moderate to severe depression. This was still the case when further separating the subgroups by gender. Further investigations into the causes of these acrophase differences would be beneficial for understanding the effects of depression and unemployment on one's activity. The results suggest the importance of studying unemployment and depression regarding the timing of activity levels throughout the day since physical activity may promote health and improve quality of life.

Fernando Mendez

History at California State University, Long Beach

Mentored by Dr. Bill Beezley (History)

Preservation of Heritage and Spanish Language for Latinx Immigrants in Los Angeles

ABSTRACT: Los Angeles is home to one of the largest Latinx populations in the nation, with the largest influxes of Mexican, Central American, and South Americans immigrants spanning from the 1960s to the late 1980s. The sudden influx in Latinx population required these immigrants to adopt methods of cultural and language preservation, as well as decide to what extent they wish to assimilate into United States culture. This led to strong displays of Latin American culture and Spanish language all throughout Los Angeles, including public schools. Seeing as the Los Angeles Unified School District boasts the second largest public school district by enrollment, the education provided within the district holds strong potential to influence future generations Latinx Angelenos. In 1998, California Proposition 227 was passed, effectively eliminating state funding for bilingual education in California public schools, changing the landscape of public bilingual education for nearly two decades. This study observes the ways in which Latinxs in Los Angeles have preserved their language and heritage through the years of California Proposition 227 (1998-2016), as well as to what degree these preservation methods were altered. This is done with the purpose of determining whether external motive of public policy such as California Proposition 227 plays a stronger role in limiting cultural and language preservation than the internal Latinx immigrant family and community motives for encouraging such preservation.

Faith Metlock

Nursing at Ohio State University

Mentored by Dr. Jennifer Hatcher and Dr. Tiesha Glover
(Public Health, Cancer Center)

Improving Health Literacy in Minority Populations

ABSTRACT: Health literacy, the degree to which individuals have the capacity to obtain, process, and understand basic health information and services, has proven to be an important factor linked to health outcomes, health insurance coverage, and health behaviors, yet there is a paucity of research concerning this topic (Levy & Janke, 2016; Hersh et al., 2015). In the 2003 National Assessment on Adult Literacy, it was found that nearly 36% of adults have low health literacy (Davis et al., 2020). Of this percentage, lower socioeconomic status individuals, elderly, and non-native English speakers are disproportionately represented. Following the assumption that leveraging people's existing visual analysis skills minimizes cognitive load, evidence from studies show that tailored infographics may be a promising approach for making health-related information easily comprehensible among adults. Using a community-based team approach, the present study will explore factors that influence health literacy levels in minority populations and assess the feasibility of designing and creating health-related infographics targeted towards minority viewers on social media to increase understanding and engagement. On a weekly basis, the community-based research team met to strategize and devise a plan for creating and promoting infographics covering information on health disparity topics previously discussed in recorded zoom-discussions led by the University of Arizona's Cancer Center. Three sets of infographics were successfully created. Further examination into the efficacy of the designed infographics is required.

Desiree Romero

Psychology at University of Arizona

Mentored by Dr. Stephen Cowen (Psychology)

Effects of Ketamine on the Neural Physiological Behaviors on Levodopa Induced Dyskinesia Using a Rodent Model of Parkinson's Disease

ABSTRACT: According to the Parkinson's Foundation, approximately 60,000 Americans are diagnosed with Parkinson's Disease each year. Parkinson's Disease is a neurodegenerative disorder that is caused by the loss of dopamine producing neurons that in-turn causes cognitive and motor deficits. In the treatment of Parkinson's Disease, the use of Levodopa (L-DOPA), a precursor to dopamine production, has been shown to reduce symptoms of Parkinson's Disease; however, after long-term administration, L-DOPA induced dyskinesia (LID) occurs. LID is a debilitating movement disorder, which includes symptoms of involuntary, erratic movements of the face, arms and/or legs. The purpose of the present study was to observe the effects of ketamine on neural activity in the motor cortex and striatum during LID using a rodent model of the disease. Animal models of LID were implanted with multi-electrode 'hyperdrives' that allowed for the measurement of single-unit and local-field activity in the motor cortex and dorsal striatum. Ketamine (20 mg/kg, i.p.) and L-DOPA (12 mg/kg i.p.) were injected into 7 male Sprague-Dawley rats during the experiment to determine how these drugs affected the neural signatures of LID. We hypothesized that ketamine would reduce 80-Hz oscillatory activity in the motor cortex as such activity is a signature of LID in human patients and animal models. Final results for the research study are pending at this time.

Jonah Vega-Reid

Psychological Sciences at University of Arizona

Mentored by Dr. David Sbarra (Psychology)

S.H.A.R.P.: Satisfaction, Health, and Reciprocal Physiology

ABSTRACT: Interpersonal relationships and social connectivity have been clearly identified as important factors in health and health outcomes (Holt-Lunstad et al., 2017). Physiological linkage or the phenomenon of two people's physiology becoming synchronized during interactions has been shown to predict relationship satisfaction which is a measure of relationship quality, though past studies show mixed results (Timmons et al., 2015). The current study analyzed interactions between romantic couples during both a disagreement task and a positive reinforcement task. We hypothesized that when physiology is more highly linked during the disagreement task there will be a negative correlation with relationship satisfaction and when physiology is more highly linked during the positive reinforcement task there will be a positive correlation with relationship satisfaction. Unfortunately, the results did not yield any statistically significant correlations between measures of relationship satisfaction and physiological linkage. The most robust finding was a positive correlation between heart rate linkage and partner level difference in relationship satisfaction, $r(20)$ = .39, p= .07, but even this finding did not meet the threshold for statistical significance. The lack of predictive power in the results probably has to do with the small sample size and future studies should include larger samples.

Morgann West

Psychology at University of Arizona

Mentored by Dr. Mary-Frances O'Connor (Psychology)

Bereavement in the COVID-19 Pandemic:
The Grief Experience of African American & Latino Communities

ABSTRACT: The experience of bereavement and losing a loved one during the COVID-19 pandemic has been increasingly difficult for African American and Latino communities. With already existing challenges, the COVID-19 pandemic has emphasized the need to understand the disproportionate struggles of people of color. To study the impact, we conducted the Survey of Bereavement After Covid-Related Death and focused on minority communities who are underrepresented in research. In the current study, 252 participants answered online surveys, measuring loss characteristics, demographics, depression, grief, and an option for open-ended comments. The purpose of the study was to recruit a representative sample of individuals, including people of color. The results showed that the sample was not representative of the current population, which indicated that there were fewer participants of African Americans and Hispanic or Latino/a individuals than hypothesized. The current study explored grief severity and depression among people of color, as well as the importance of the location of death which continues to be analyzed. Lastly, the study revealed that there are still significant challenges among recruiting underrepresented populations in academic research, indicating that further research is necessary and recommended.