UNDERGRADUATE STUDENT ABSTRACTS

Factors Associated with Farmers' Market Consumers' Perceptions

Jovita Avila

Farmers' markets have increased throughout the United States over the years. The markets provide a place for farmers and other vendors to sell directly to consumers. The current study investigated factors associated with consumers' perceived benefits and disadvantages of shopping at farmers' markets. Consumer perceptions of using CalFresh benefits at the market were also examined.

A cross-sectional study design was used for this study. A survey was distributed at the local Northern California farmers market and 24 participants completed the survey. Descriptive statistics and independent samples t-tests were used for data analysis.

Gender, ethnicity and income levels were significant factors associated with farmers' market perceptions. Males had a more positive attitude compared to females about product variety availability and preference of local over store products. Male participants also believed local fruits and vegetables taste better than store bought and that they could successfully purchase a week's worth of fruits and vegetables for themselves and their family. When comparing non-Hispanic white and other groups, non-Hispanic white participants believed they could purchase a week's worth of food at the farmers' market. Lower income participants had more positive attitudes about the farmers' market than higher income counterparts. Lower income participants enjoyed the farmers' market atmosphere better and felt more comfortable using their CalFresh benefits at the market compared to higher income participants. Participants highly valued the availability of fruits and vegetables at farmers' markets and noted that a greater variety would be desirable.

Farmers' markets should consider recruiting more farmers in order to provide more variety of products to participants. Further research is needed to develop strategies for making farmers' markets more accessible to consumers with diverse backgrounds.

Anthropogenic effects on foliar fungal endophyte communities

Nayellie Barragan-Mejia

Foliar fungal endophytes are fungi that live inside the leaves of healthy plants. These fungi are defined as nonpathogenic since collected leaves do not show symptoms or signs of disease. Similar to the human microbiome, some fungal endophytes have been shown to be important constituents of plant health playing significant roles in plant biochemistry, physiology, and defense. Since these fungi are recruited from the local environment and are susceptible to local environmental conditions, it is likely that areas with more anthropogenic activity will negatively impact fungal community composition compared to areas with little anthropogenic activity. To test this, we will collect leaves of co-occurring trees throughout the growing season along the Big Chico Creek representing an anthropogenic disturbance gradient from the Big Chico Creek Ecological Reserve (lowest disturbance), through Upper Bidwell Park (moderate disturbance), and down to the Chico State campus (highest disturbance). We will use both culture-dependent and independent techniques to characterize the fungal communities from leaf samples collected at each location from July through December to determine how disturbance influences these fungal communities. Additionally, fungal isolates obtained from culture-inde-

pendent techniques will be used to determine how various isolates interact with each other and ultimately influence fungal community composition. Interaction experiments can provide information on how fungal communities are assembled and provide insights on how to ensure restoration efforts incorporate the use of beneficial fungi.

Monitoring the Presence of Chytridiomycosis in Amphibians by Quantitative Real-Time Polymerase Chain Reaction

Maredith Berdeja

The emerging disease, Chytridiomycosis, has been known to impact the decline of amphibian populations around the world greatly. The skin disease is caused by water-borne spores of the Chytrid fungus *Batrachochytrium dendrobatidis* (Bd). Amphibians affected with the disease show intense skin sloughing and often perish. The area of study is the Big Chico Creek Ecological Reserve (BCCER) in Butte County. Sampling will occur within these 7,835 acres of land, and 4.5 miles of Big Chico Creek, where numerous tributaries, springs, and riparian areas can be found. Although the fungus has not yet been detected in BCCER, it is important to establish early monitoring and protocols to prevent its introduction. This fungus infects several types of amphibians found through BCCER, including the Sierra newt (*Taricha sierrae*), Rough-skinned newt (*Taricha granulosa*), and Foothill Yellow-legged frog (*Rana boylii*), a California species of special concern due to its decimating numbers once infected. Another species that is crucial to our research is the Invasive North American bullfrog (*Lithobates catesbeianus*), as it is a carrier of the fungus but is not affected by sickness.

Quantitative PCR (qPCR) will be used in this research to amplify the Chytrid 5.8S ribosomal RNA (rRNA) gene to detect the presence of the Chytrid fungus. The DNA for the qPCR will be acquired by taking sterile cotton swabs and rubbing the top skin of the amphibians. Amphibians will be caught from particular sites and released once they have been swabbed. The samples will be returned to the lab and processed for DNA extraction and qPCR. As a control, the cytochrome b gene will be used to detect the presence of amphibian DNA. The relative amount of Chytrid DNA to amphibian DNA will be compared. Results will be shared with staff at BCCER to help with conservational efforts and management of the local amphibian species and overall watershed health.

'The Cult of Domesticity' in Gilded-Age California

Renee Brown

The "Cult of Domesticity" as an idea began to appear in the early nineteenth century to help lay out the role of American women. This ideal highlighted their role in the home and laid out expectations for righteous behavior around the ideal of "True Womanhood." Historians like Glenna Matthews have addressed the ideal woman. Her book, *Just a Housewife*, stresses the ways that contemporary literature and other forms of propaganda elevated this framework to women and men across the United States. Barbara Welter is another historian who wrote the article "The Cult of True Womanhood: 1820-1860," which highlights the actual core values of the ideal that would be used to judge a woman as she became a wife and a mother. Those core values were piety, purity, submissiveness, and domesticity. However, when beginning this research, it became clear that most historical research focuses on white women from the more established East Coast cities. This research looks more directly at women from California, looking into the question of whether these cultural norms that were prevalent on the East Coast would be the same elsewhere. This is critical because while the "Cult of Domesticity" was a real ideal pushed onto women during the 1800s, should

still have the full story of women. That means understanding if women across the country were given the same propaganda and if they went along with it or broke away. The project's research finds at least 276 divorce cases filed by women, correspondence about activities outside the home, and other life materials from the California State Library's archives that address the ways that some women—both white women and women of color—in California rebelled against prevalent gender norms and instead did engage in philanthropic activity. This research uses Annie Bidwell, Phoebe Hurst, Jane Stanford, and Mary Ellen Pleasant as case studies to demonstrate that women in California extended their lives far from inside that home and the domestic sphere. This project argues that women in California were given the ideal of "True Womanhood" and went against the ideal since they were in California during the late 1800s. California was a new state during the late 1800s, this was unlike the East Coast which had been established for more than over 100 years. Finally, it demonstrates the significance of moving outside traditional narratives that highlight the experiences of white women on the East Coast as a substitute for all women and stresses the compelling opportunities for studying women throughout American history who pushed back cultural norms during times when the landscape around them was uneasy.

Searching for Asbestiform Minerals in Little and Middle Butte Creek

Julianna Groteguth

Little and Middle Butte Creeks flow through Paradise and Magalia whose bedrock geology is made up of metamorphosed volcanic rock and serpentinized rock. Serpentine is a mineral that is known to grow in asbestiform habit, which is a needle-like shape with a length to width ratio of 3:1. Minerals that are formed in asbestiform habit can be weathered into microscopic particles which are called asbestos. Due to asbestos' microscopic size and needle-like shape, it is known to be harmful when ingested or inhaled by humans and animals alike. What is less proclaimed to the public is that metamorphosed volcanic rocks can also contain asbestiform amphibole minerals. Since the Paradise and Magalia area is largely made up of these rocks, there is potential for these minerals to be weathered, transported and airborne by the creeks. For this project, three 1-liter samples were collected from five spots along Little and Middle Butte Creeks in search of asbestos being transported in the water. The three sample types were pre-rain, muddied, and post-rain water. The water was then filtered with 10-micrometer filters to remove the debris collected that would not be in asbestiform habit and then 1-micrometer filters to gather minerals in asbestiform habit. The 1-micrometer filters were then dried out and mounted onto a Scanning Electron Microscope (SEM) stub to be analyzed in search of asbestos fibers. The third set of samples were not analyzed due to lack of time, but all the samples that were analyzed contained asbestos fibers of different compositions. The majority of the asbestiform minerals found in the samples were non-regulated amphibole asbestos, but there were also serpentine asbestiform minerals found in the samples as well. This project shows weathering of asbestiform minerals by water systems and how further studies on the impacts of waterborne asbestos is crucial to human and animal health.

Optimizing Deep Learning Tool for Segmentation of Hyperspectral FTIR Imaging Data and Developing a Clustering Tool for FTIR Data using Machine Learning Techniques

Josh Huskisson

This research applied supervised and unsupervised machine learning (ML) techniques

to classify materials such as polymers and plastics by utilizing their Fourier Transform Infrared (FTIR) spectroscopy data. FTIR data are challenging datasets that reveal the functional groups of materials and, therefore, their constituents. Machine Learning is the field that finds patterns in data to analyze and learn from it in a faster manner than a human does. By using Neural Networks (NN) as an ML model, we were able to identify the pixels of the FTIR imaging data that contained PHB in the PHB/PLA mixture. ML techniques were used in prior research for classification of FTIR data. This research identified several ML techniques that can improve and facilitate FTIR spectroscopic data analysis by evaluating the effect of hyperparameters on the precision of the classification and comparing the effectiveness of different techniques. The NN model was optimized for the best precision and accuracy. To achieve this goal, the hyperparameters were adjusted. This produced a precision of 89% and recall of 88% with detecting the pixels that contained PHB polymer. There was an overall accuracy of 96%. The Principal Component Analysis (PCA) was implemented. The first principals confirmed the functional groups of the PHB/PLA sample. Additionally, we evaluated the effectiveness of Classification by Random Forest Classifier technique on the same data which produced similar results to the NN technique. This classifier used the preprocessed data by PCA for the training and testing steps. The precision was 92%, the recall was 88%, and the overall accuracy was 96% with detecting the material.

In a dataset of 255 microplastic types, after baseline subtraction, K-Means Clustering, as an unsupervised technique, was used to identify and group the samples through their spectral data into 'clusters' of similar data. Data was determined as similar if absorption peaks were found at the same wavenumbers. The number of clusters was determined by computing the Sum of the Squared Error and using the elbow method. This technique can be utilized for clustering microplastic samples for applications such as finding the sources of water contamination by microplastics.

Aging and Skeletal Muscle Oxygen Utilization

Avery Lambrite, Sabrina Salvatore, Kyle Zelenski, and Ryan Perkins

Cardiovascular and skeletal muscle function are tightly interrelated due to their interface at the tissue level. Together, these systems form a complex oxygen transport and utilization cascade to facilitate energy production needed to perform aerobic work. Multiple recent reports have identified age-related alterations in muscle oxygen utilization that shed insight into the reduced exercise capacity classically observed with advancing age. Therefore, the purpose of this review is to synthesize and provide an update on the current state of the literature regarding the effects of aging on muscle oxygen utilization and underlying processes. Scientific literature will be sourced via databases archiving peer-reviewed work (e.g., PubMed, Google Scholar, etc.). Common themes and agreements amongst reports will be discussed when appropriate. In addition, clear gaps in knowledge will be highlighted as potential future work. Special attention will be given to publications addressing systems regulating oxygen delivery, extraction, and utilization in humans. Furthermore, the role of reactive oxygen species (ROS) as a regulatory mechanism of each these oxygen-related processes will be highlighted throughout. Non-invasive measurement of skeletal muscle oxygen saturation (SmO2) are used to assess local muscle oxygen utilization and have most recently been obtained via near-infrared resonance spectroscopy (NIRS). At rest, aging individuals (>65 yr.) exhibit ~38% lower SmO2 compared to their younger counter-

parts (<30 yr.). Additionally, aging results in reduced SmO2 during submaximal exercise. At maximal aerobic exercise, aging leads to a reduction in SmO2 of up to 59%. Post-exercise SmO2 has been shown to exceed double the amount of time to return to baseline levels in older individuals compared to young. Impaired oxygen utilization has been attributed to many of the individual hallmarks of aging, including lower muscle mass, reduced oxygen carrying capacity of hemoglobin, decreased capillarization, reduced blood flow, dysfunctional endothelium, mitochondrial dysfunction, and blunted nitric oxide production. Each of these critical steps in the oxygen cascade appear to be regulated by ROS as a byproduct of energy metabolism. Composition of these recent findings may prompt additional therapeutic interventions which may attenuate health consequences associated with aging.

Metal bioaccumulation in benthic macroinvertebrates from watersheds affected by the 2018 Camp Fire

Maurice Ledoyen, Daniel Pickard, and Sandrine Matiasek

Wildfire disturbances may be highly detrimental to adjacent aquatic systems as the mobilization of nutrients, metals, and polycyclic aromatic hydrocarbons pose significant risks to aquatic biota. Metals are of particular biological concern due to their carcinogenic potential, persistence in the environment, and potential for bioaccumulation. The 2018 Camp Fire in northern California was the deadliest and most destructive fire in California history. The quantity and spatial density of structures burned presented an opportunity to study the fate of metals mobilized after this unique wildland-urban interface fire. Benthic samples from burned watersheds were collected in 2019, 2020, and 2021 by the Aquatic Bioassessment Laboratory. Three watersheds were selected for this study as there were a significant number of structures burned in each catchment and documented declines in bioassessment indices. A fourth sample site from an unburned watershed was selected as a control. The objectives of this study were to; (1) quantify metal concentrations in benthic macroinvertebrates, comparing those from burned sample sites to the unburned control site, and (2) assess the variability of bioaccumulated metal concentrations over three years. Macroinvertebrate concentrations of chromium (Cr), cobalt (Co), copper (Cu), lead (Pb), nickel (Ni), and zinc (Zn) were significantly higher in the burned watersheds ($p < 0.05$) compared to the unburned control. Of the burned watersheds, Clear Creek (Co, Cr, Cu, Pb, Zn, $p < 0.05$) and Dry Creek (Co, Cr, Cu, Pb, $p < 0.05$) metal concentrations were the most elevated, with Butte Creek macroinvertebrates metal concentrations most similar to those of the unburned Big Chico Creek control. Elevated, yet non-linear temporal variability was observed and likely affected by the proportion of watershed burned above the sampling location, the spatial density and type of structures burned, as well as the land use surrounding the watershed. This study highlighted the immediate and lasting bioaccumulation of metals following a wildland-urban interface fire, posing potential health impacts for aquatic ecosystems. However, more research is needed to examine the magnitude and duration of metal bioaccumulation following destructive fires.

Psychological Benefits of Permaculture: Well-Being and Connectedness to Nature

Kimberlee Michl

It has been suggested that humans are experiencing a disconnection to nature (Curtin, 2014; Kahn et al., 2013). This disconnection underlies environmentally destructive actions that have created unprecedented changes in the biosphere. This devastation

must change as the health of the biosphere is directly linked to the well-being of its inhabitants, including humans (Aronson et al., 2016; Chatalos, 2018; Summers, 2018). Participation in agroecological systems, such as community gardening, has shown evidence of being beneficial for individuals and the environment (Suto et al., 2021). Permaculture is an agroecological system that has yet to be investigated. The purpose of this research study was to investigate the connection between practicing permaculture and participants' well-being, satisfaction with life, connectedness to nature, and inclusion of nature in self. This study compared two groups of participants; those who indicated having a permaculture practice and those who did not. In total there were 109 participants, 37 of which indicated currently practicing permaculture, while the other 72 did not. Participants voluntarily participated in an online survey distributed through various platforms. Well-being was assessed using two scales: the Hedonic Well-Being Scale, also referred to as Satisfaction of Life Scale (Ryff, 1989) and the Eudaimonic Well-Being Scale, also known as the Psychological Well-Being Scale (Pritchard et al., 2019). Connectedness to nature was also assessed using two scales: the Connectedness to Nature Scale (Mayer & Frantz, 2004) and the Inclusion of Nature in Self Scale (Kleespies et al., 2021). There were statistically significant differences in each of the constructs. Those who practice permaculture indicated greater: Well-Being $t(107) = 2.54$, $p = .013$, Satisfaction with Life $t(106) = 2.27$, $p = .025$, Connectedness to Nature $t(104) = 5.29$, $p = .000$, and Inclusion of Nature in Self $t(107) = 5.63$, $p = .000$. Overall, participants who practiced permaculture scored significantly higher in each of the scales compared to those who did not. The findings of this study offer empirical evidence to suggest there are psychological benefits of permaculture and expands our understanding of the benefits individuals can derive from participation in agroecological systems.

Understanding Barriers to Usage of Basic Needs Programs at Chico State

Dania M. Moreno Ruiz

This qualitative focus group project is the second phase of a mixed methods research project to better understand the barriers to accessing the Basic Needs Program resources at Chico State, such as The Hungry Wildcat Pantry, Emergency Grants, and Housing Assistance. In the first phase of the study, which started in January 2020, part of the research team surveyed 430 students who are low-income and do not currently utilize basic needs resources on the barriers they have faced using basic needs resources on Campus. To gain a deeper understanding of these obstacles in phase two of the study, the rest of the research team conducted eight focus groups between April 2022 and June 2022 with 22 students who had filled out the survey (1-6 participants in each group). Focus groups were auto transcribed using Otter.ai and then reviewed for accuracy by the student members of the research team. The focus group research team is currently coding the focus group transcripts using Dedoose qualitative software. Some preliminary findings suggest that the Basic Needs Program needs to better advertise its services to Chico State students to end the stigma of who is worthy of accessing these services and add resources not yet available that equally benefit students commuting to Chico State and distance learners. Once the data analysis is complete, the research team will combine the findings of the study's first phase with the second phase into a report for the Basic Needs Project.

The report aims to summarize barriers students face in accessing basic needs resources, share resources that students stated facilitate their access to resources that promote food and housing insecurity, and

offer suggestions on expanding access to the Basic Needs Program. Such findings can help increase graduation rates and positively affect the well-being and retention of students.

Optical characteristics of dissolved organic matter in streams affected by wildland-urban interface burning

Brooke Rosenow, Jackson P. Webster, and Sandrine Matiasek

Wildfire frequency, severity, and size have increased over the past few decades in the western United States. Increased fire frequency and growing urban development in the wildland-urban interface (WUI) raise concerns about water resources and quality. To better understand the impacts of burned anthropogenic materials in the WUI, this study observed the sources, dynamics, and fate of dissolved organic matter (DOM) in surface waters affected by the 2018 Camp Fire in Paradise, California. During the wet 2019 water year following the fire, water samples were collected from creeks draining watersheds affected by the Camp Fire during each major storm event to capture fire-generated DOM mobilized by stormwater runoff. Ash samples were collected in summer 2019 from burned structures and automobile tires. The objective of the study is to characterize the optical properties of combusted organic molecules transported in water after a WUI fire. This study asks the following question: Does DOM derived from specific burned sources of a WUI fire have distinguishable absorbance properties? Preliminary leaching experiments were conducted with three types of ash: white, black, and tire to establish their optical characteristics. Specific ultraviolet absor-bance (SUVA) was used to estimate the DOM aromatic content in WUI fire-affected waterways, and the spectral slope ratio of 275-295 nm and 350-400 nm was calculated to approximate DOM molecular weight as an indicator for DOM source and transformation. Preliminary tests indicated that $SUVA_{254}$ values in leached ash DOM (0.65-1.66 L mg^{-1} m^{-1}) were low compared to creek DOM (2.59-8.00 L mg^{-1} m^{-1}), while the spectral slope ratio was relatively higher in leached ash DOM (0.86-1.65) when compared to creek DOM (0.81-1.05). $SUVA_{254}$ is positively correlated to DOM aromatic content while the spectral slope ratio is inversely related to the molecular weight of DOM, suggesting that ash materials have a generally lower DOM aromaticity and molecular weight when compared to drainages most affected by urban burning. Ultimately, this study will provide a new understanding of the type of pollutants mobilized in waterways after WUI burning, with implications on aquatic ecosystems and public health.

Bioswale Plant Metal Accumulation and Seasonal Variability

Adil Syed, Gabrielle Wyatt, and Sandrine Matiasek

Urban surfaces contain many pollutants, such as grease, oil, pesticides, and trace metals from vehicles, construction, and industrial activities, which can be transported by urban stormwater runoff. Vegetated bioswales are known to increase the infiltration of these waters into the subsurface, as well as remove heavy metals through sorption, microbial decomposition, and phytoremediation. Trace metals are particularly concerning for flora and fauna within these bioswales, potentially resulting [SM1] in loss of biodiversity and soil degradation. This study investigates the mobility of metals within plant tissues, as well as the seasonal variability of metal uptake in plants at the Butte College bioswale in Oroville, California. Three native species were sampled in March 2020, *Muhlenbergia rigens*, *Juncus patens*, and *Carex barbarae*, and metal concentrations were analyzed within root and shoot tissues. These results were compared with data from the same plant individuals sampled in October 2018, May 2019, and October 2019. Higher concentra-

tions of trace metals were measured within root tissues compared to shoot tissues, with a 7.2-fold difference over the two years. Additionally, there was an increase in the overall bioaccumulation of metals over the two wet seasons analyzed (November-March), with an average 5.1-fold increase in the first year, and a 2.7-fold increase in the second. The 2019 dry season (April-October) resulted in an overall 54% decrease in trace metals in both root and shoot tissues. Between the five metals analyzed, those that are naturally part of the plant physiology (e.g., zinc) appeared to be the most mobile within plant tissues after uptake: the translocation factor (root:shoot ratio) for zinc was 1.67 in October 2020, while the chromium translocation factor was 0.14. Vegetated bioswales are an effective method for decreasing the impact of urbanization on water quality. However, given the harmful effects accumulating trace metals in vegetation can have on the surrounding ecosystem, these results have implications on the design and maintenance of these systems.

Tuscan Formation: Volcaniclastic Debris Flow Deposits from Ancient Mt. Yana: Using the MYana Explorer App to com-municate Geologic History to the Public

Erica Thompson, Henry Marine, Andrew Harp, and Rachel Teasdale

The Tuscan Formation is a series of volcaniclastic deposits consisting of breccia, conglomerate, sandstone, and mudstone beds emplaced by debris flows from Mt. Yana. Located 40 km south of the Lassen Volcanic Center, Mt. Yana is an eroded 3 Ma stratovolcano of the ancient Cascades (Clynne et al., 2010). Tuscan Formation deposits are in contact with and derived from Mt. Yana lavas (Clynne and Muffler, 2017). Geochemical and textural correlations of pyroxene-phyric andesites that are present in Mt. Yana lavas and Tuscan Formation clasts (Lindberg et al., 2006 Cortino et al., 2007) are used to correlate source lavas with debris flow deposits. MYana Explorer, a newly developed educational app-based guide for the public, presents observations and geologic analyses that explain relationships between the Tuscan Formation and eroded Mt. Yana. MYana Explorer includes 12 different stops exploring the geology of the Tuscan Formation and Mt. Yana (in Chico CA and within a 2-hour drive from Chico, respectively). Three stops explore the Tuscan Formation and focus on the concept of geologic time. In two locations, users observe the base of the Tuscan Formation, which is a nonconformity where debris flows were deposited on the Lovejoy Basalt Formation (15-16 Ma; Coe et al., 2005) and on Carboniferous metabasement (Clynne et al., 2010). This expression of geologic time is important to geologists and is a valuable educational opportunity to explain natural history to the public. MYana Explorer app users will learn how Mt. Yana was built through dike emplacement and eruptions of lava, how it eroded to a now nearly unrecognizable volcano, and how this resulted in the emplacement of the Tuscan Formation. The app will help users understand their local geology including, volcanic erosional processes, volcaniclastic deposits, geologic time, and the geology of proximal and distal volcanic facies associated with eroded stratovolcanoes in the Cascade Range. The MYana Explorer app will be available free online in the spring of 2022.

Uruguay as a Destination for Migration

Victoria Villaseñor

This study was created to investigate the political history of Uruguay and its modern-day implications, specifically within the context of migration. This study involved the collection of qualitative data through interviews with people from Cuba, Brazil, and Venezuela, who had recently migrated to Uruguay.

The participants shared about their firsthand experiences and offered insight into migration in Uruguay. The participants discussed the reasons why they felt compelled to leave their country of origin, what specifically drew them to Uruguay, and how their experience has been so far. While their personal experiences and background vary greatly, some of the commonalities include praise for Uruguay's simple migration process (especially for people who come from countries that are part of the Mercosur agreement), the country's economic stability, high quality of life, laid back culture, LGBTQ+ inclusion on a political and social level, as well as free public universities and universal healthcare. A Uruguayan professor was also interviewed to create space for them to share their perspective on how the recent influx of migrants has impacted their country and Uruguay's politics and sociocultural norms. The Uruguayan perspective on migration was also explored through the information presented in Montevideo's *Museo de las Migraciones* (Migrations Museum). In addition to the theme of migration, this intersectional study focuses on Uruguay's history as a welfare state, feminism in Uruguay, the implications of the country's colonial past, and its reputation as being LGBTQ+ friendly. The results of the oral history interviews challenge some of the stereotypes and assumptions US citizens may have toward Latin American countries. The study also highlights ways in which we could look to Uruguay as an example of migration policies that are more humane than the system we have in place in the United States.

Evaluating the Best Instrument for Geochemical Analysis of Tonalite from the Bald Rock Pluton Near Oroville, CA

Matthew Wagoner, Elisabeth Kennedy, and Hannah Aird

Accuracy versus convenience is an important decision when choosing a geochemical analysis method. Two instruments may serve similar purposes in their analytical output but cater to different needs depending on the level of accuracy needed. An inductively coupled plasma mass spectrometer (ICP-MS) is regarded as the best way to run trace element analysis in geological materials, but preparation takes longer as samples must be digested in acid before being ionized with a plasma torch and run through a detector that measures mass and concentration. While also intended to analyze the bulk composition of a sample, the portable x-ray fluorescence spectrometer (pXRF) is portable and handheld making it optimal for field use. An x-ray is emitted at a specific wavelength hitting the sample, causing a secondary x-ray to be emitted characteristic to each element with the concentration of each element calculated from the intensity. The pXRF is more time efficient, taking only minutes to obtain data, and is a non-invasive, low environmental footprint option, but has significantly higher detection limits than the ICP-MS, with ICP-MS detecting elements in the parts per trillion, and a pXRF detecting on the parts per million scale. A tonalite sample taken from the Bald Rock Pluton was run through both instruments and sent to an outside research-grade XRF analysis laboratory. Magnesium and chromium are accurate for both ICP-MS and pXRF, showing a percent difference of less than 5% when compared to data from the outside facility. The ICP-MS was more accurate for nickel, 7% compared to 15% for the pXRF, and the pXRF was more accurate for aluminum, silicon, and iron. If the wanted results are in low concentrations or are trace elements besides aluminum, the ICP-MS is more precise with results having low relative standard deviations. If the intent is major element oxides, then the pXRF is the better choice, since it can process both silicon and iron which the on-campus ICP-MS currently cannot accurately measure due to the lack of an available standard for Si and signal inter-

ference for Fe. Both instruments are good options if expected concentrations are taken into consideration.

Future Temporal Perspective and Acculturation as Predictors of Eating Behavior, Exercise, and Body Image Among Latinx Undergraduates

Maria Zepeda

Temporal Perspective is a concept that helps in understanding the psychological theories of time, including the individual's importance of the past present, and future. Future time perspective includes a person's view of the limitations regarding their future and the opportunities they have. A key feature of the positive time perspective, which is a more optimistic and motivated point of view of the opportunities they can face in the future, is the assumption that the person's time is extended. On the other hand, a negative time perspective is a pessimistic view of what the future holds for their health, academic, and personal lives, as well as the time frame they have left. This research study was designed to understand Latinx undergraduates' perspective of their future, and how acculturation to western culture affects their eating habits, exercise, and body image. The research included understanding the perspective of the future, people's timing and order of future events and goals, their behavior with regard to culture, acculturation, multiculturalism, and its relationship with the dominant American culture. Additionally, eating, exercise frequency, and body image issues in psychology were looked into as was the time perspective of White Americans. The results were that people with positive future time perspectives were physically healthier with a higher likelihood of healthy eating, exercise more, and higher body self-esteem. However, there are no studies that involve the behavior of the individual or that investigate different cultures and how culture affects them. Acculturation does correlate with unhealthy choices due to increasing body dissatisfaction, leading to unhealthy eating habits and infrequent exercising. It is recommended that future researchers attempt to understand the correlation between future time perspective and acculturations, as there is overall a lack of research regarding the two connections.

Perseverance to a Point: "Does Grit Interfere with Help-Seeking in First Generation College Students"

Sara Isabel Zuniga

The psychological construct of grit has generated significant enthusiasm for its predictiveness of achievement of long-term academic goals. Despite grit being viewed almost exclusively as a positive trait, there may arise situations in which being too "gritty" is suboptimal and likely to interfere with more efficient behaviors such as help-seeking. One group within higher education that may be vulnerable to interference from grit is first-generation college students (FGCS), who tend to exhibit high levels of grit and perseverance (O'Neil et al., 2016) compared to non-first-generation college students (NFGCS; Midkiff, Langer, Demetriou, & Panter, 2016). Compared to NFGCS, FGCS may feel obligated to persist in challenging situations and avoid asking for help for fear of burdening others or being judged (Chang et al., 2020). If grit is more likely to interfere with help-seeking in FGCS than NFGCS, then institutions may wish to allocate resources to train FGCS to identify when and how to ask for help from support staff. With this background, the present experiment examined whether FGCS (n = 21), when compared to NFGCS (n = 21), would (1) score higher on grit (Short Grit Scale; Duckworth & Quinn, 2009), (2) score lower on help-seeking (Karabenick, 2003), and (3) persist for longer in a novel unsolvable spot-the-difference task before asking

for help. Surprisingly, FGCS and NFGCS did not differ significantly on any questionnaire-based (grit, help-seeking) or behavioral measures (time spent searching or asking for help in the unsolvable spot-the-difference task). Our results should be viewed in light of limitations such as our small and homogenous sample, as well as the online medium through which sessions were conducted. Additional research is needed to characterize the predictive validity of measures of grit in academic settings. If grit, and specifically perseverance, allowsresearchers to identify students who are vulnerable to suboptimal academic behaviors, then interventions can be implemented as they prepare to transition to their higher education institution. To this end, future researchers may wish to develop educationally relevant tasks requiring perseverance to clarify whether excessive grit is associated with negative consequences for college students who encounter challenging academic situations.