



CSURF

19TH ANNUAL COLORADO SPRINGS UNDERGRADUATE RESEARCH FORUM

WHEN:

Saturday, April 22, 2003
8 a.m - 5 p.m.

WHERE:

Colorado College
14 E Cache La Poudre
Colorado Springs, Colorado
Cornerstone Arts Building and
Armstrong Hall

WHAT:

This collaborative venture is designed to highlight the research and creative works of undergraduates from Pikes Peak State College, Colorado College, the United States Air Force Academy, and the University of Colorado Colorado Springs.

FOR MORE INFO: CSURF.UCCS.EDU/
REGISTRATION OPENS IN JANUARY

For more information on a specific event, directions, or disability accommodation, email Lisa Schwartz at lschwartz@coloradocollege.edu.





Armstrong Hall, Colorado College



Cornerstone Arts Center
Colorado College

Keynote Address

Juan Miguel Arias, PhD

Visiting Assistant Professor, Environmental Education, Colorado College

Title: Axe Sharpening: Undergraduate research in a constantly changing world

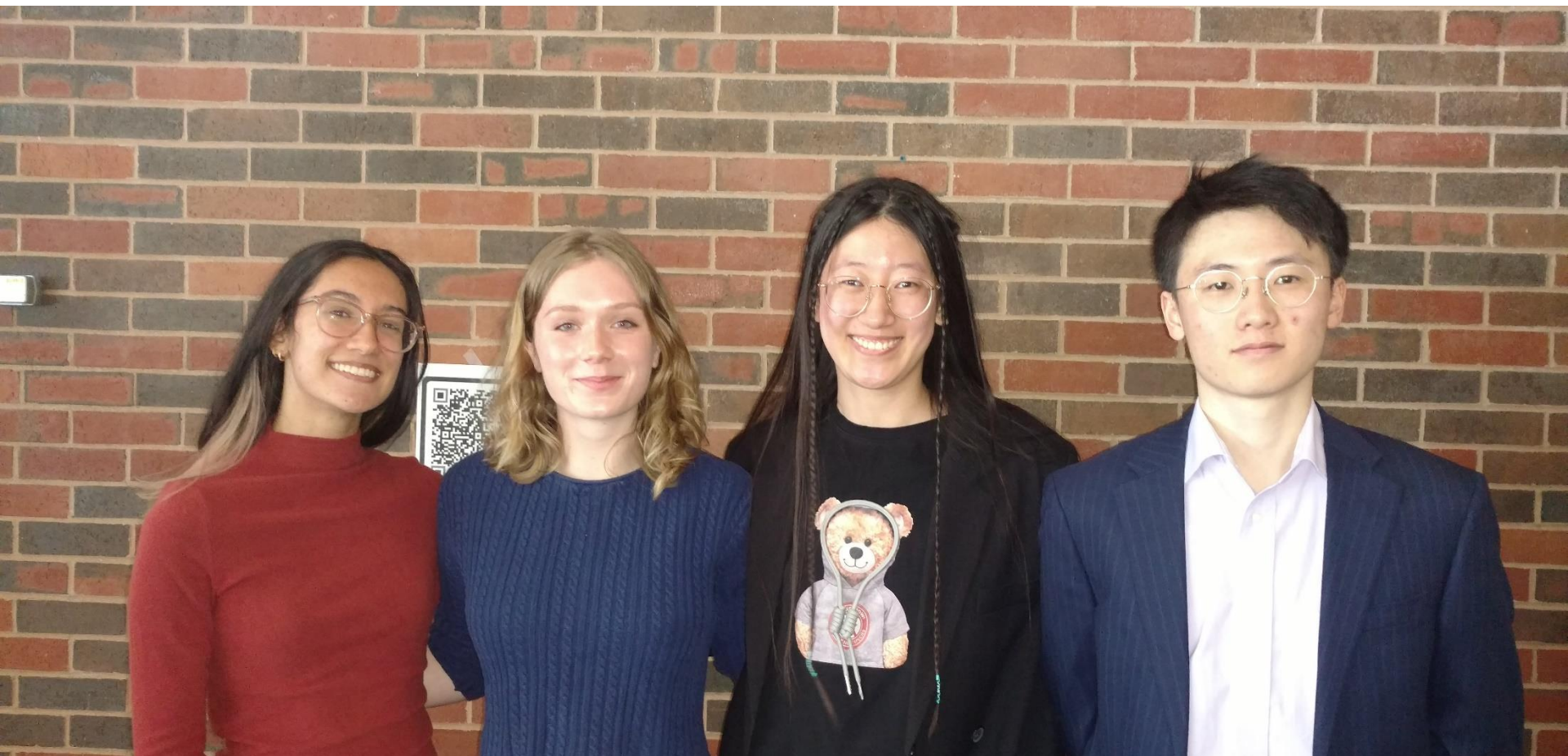


Abraham Lincoln (allegedly) once said, “If I only had an hour to chop down a tree, I would spend the first 45 minutes sharpening my axe.” Taking this and any Lincoln quote with a historical grain of salt, the lesson nevertheless holds true. This is especially so in our world today, when we realize that the figurative trees we face in our work are not ones we will face for an hour but rather years and lifetimes, and that these trees are changing with every new technology and cultural pattern we create. In the face of this magnitude, undergraduate research—often the first opportunity to “add a tiny bit of knowledge to a field”—can feel at once

overwhelming and superficial. In this talk, however, I draw from psychology, education, history, environmentalism, and critical social theory to propose that the divergence of thought made possible by the undergraduates themselves doing such research is necessary for our resilience and adaptability in this constantly changing world.

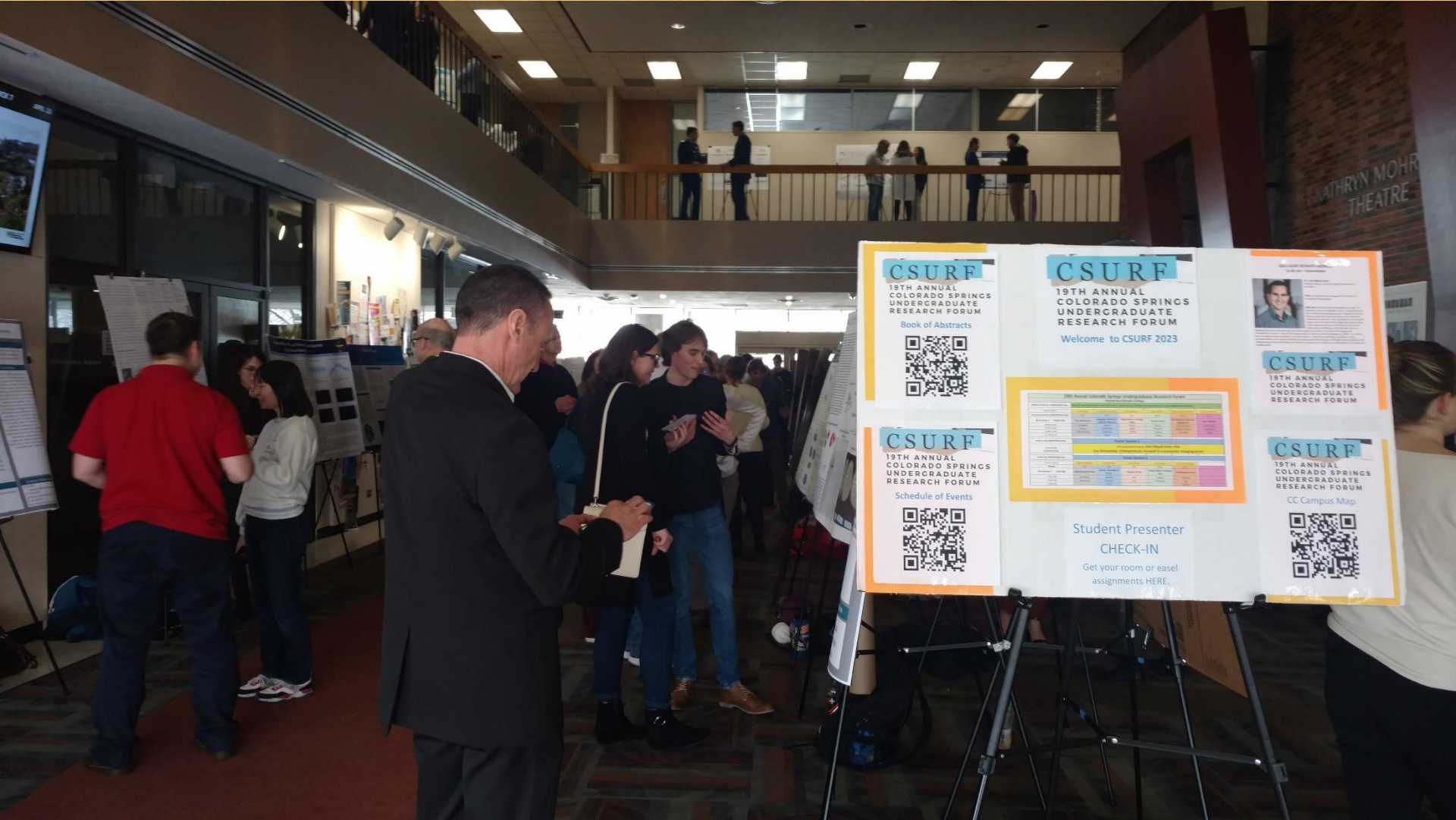


**COLORADO
COLLEGE**




Lena Saunders Rhetta Power Zimin Guo

Rocky Sui




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Book of Abstracts




CSURF
19TH ANNUAL COLORADO SPRINGS UNDERGRADUATE RESEARCH FORUM
Welcome to CSURF 2023

19th Annual Colorado Springs Undergraduate Research Forum	
Day	Time
Friday, April 14	8:00 AM - 5:00 PM
Saturday, April 15	8:00 AM - 5:00 PM
Sunday, April 16	8:00 AM - 5:00 PM


CSURF
19TH ANNUAL COLORADO SPRINGS UNDERGRADUATE RESEARCH FORUM
Schedule of Events



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CC Campus Map



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Student Presenter
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KATHRYN MOHR THEATRE





The Dematerialized Self: Smartphone Mediated Being-In-The-World

Rheta Power and Tomi-Ann Roberts
Colorado College, Colorado Springs, CO



Introduction

Smartphones are no longer used primarily as "phones" but as portals to a virtual world. This virtual world is not just a place where we can connect with others, but a place where we can live. This virtual world is not just a place where we can connect with others, but a place where we can live. This virtual world is not just a place where we can connect with others, but a place where we can live.

Method

Study 1: Scale Development
248 MTurk participants: 161 to 50, 137 women 140 men
Self-Dematerialization example items:
- Sometimes, I feel as though I can disappear into my mobile device and escape the world around me.
- When I get my mobile device ready after spending time on it, I often have time to relax to feel like I can start my day.
- There is a lot on my mobile device that no one in my real life knows.
- When using my mobile device while walking, it sometimes feels like I can touch the virtual world.

Study 2: Construct Validity
218 MTurk participants: 16 to 50, 137 women 181 men
Measures:
- Smartphone Usage Items
- Self-Dematerialization Questionnaire (SDM)
- Expected Telefun Absorption Scale (ETAS)
- Smartphone Addiction Scale - Short Version (SAS-Sv)
- Satisfaction with Life Scale (SWLS)
- Loneliness Scale-Short Form (LLS-6)

Results

Study 1
Self-Dematerialization Questionnaire (SDM) created
- 12 items formed via Factor Analysis, with high scale reliability. Cronbach's alpha = .96
- Higher scores on the SDM predicted by:
- Age (higher SDM the younger the user)
- Gender (higher SDM in women than men)
- Greater average hours per day on device
- Greater enjoyment of using device
- Having device as integral to life
- Walking at device within 10 minutes of walking
- Having device as primary mode of communication

Study 2
- SDM showed high scale reliability: alpha = .979
- SDM and Smartphone Absorption positively correlated
- SDM and Age negatively correlated
- SDM, but not Smartphone addiction, predicted higher satisfaction with life (M=392, p<.001) (R²= .525, F(3,283)=485.45, p<.001)
- Smartphone addiction, but not SDM, predicted Loneliness (R² = .188, F(3,283)=110.6, p<.001) (M=392, p<.003)
- Higher correlation between loneliness and SDM in men (r = .37) than women (r = .18)

Discussion

Summary of Findings:

- SDM is a reliable measure of trait Self-Dematerialization
- Trait SDM correlates with the construct of trait absorption, suggesting the dematerialization functions much as story-world absorption does, engendering a sense of being inside the digital world.
- Women, younger people, heavier device users, and those who enjoy device use all higher on SDM
- Although Self-Dematerialization is correlated with Smartphone addiction, it does not carry the negative consequences of loneliness that Smartphone addiction does.
- Unlike Smartphone addiction, SDM positively predicts satisfaction with life.

Self-Dematerialization may...

- Give women and others whose bodies are publicly surveilled/objectified more access and freedom to move through the world as a digital body
- Feelings of privacy and access engendered by dematerializing into one's smartphone are an illusion, due to widespread data sharing
- Explain why GenZ (iGen) are less likely to drink, get a driver's license, get a job, have sex, go out on dates or socialize with their friends (Twenge, 2017). Perhaps they invest in their dematerialized, over-material, bodies.

Toward Dematerialization Theory

- Smartphones offer us an alternative way of being in the world
- Communication, navigation, entertainment, dating, work, etc.
- We Self-Dematerialize while on our devices and...
 - Detach from our surroundings and physical world
 - Invest in our digital selves and physical body
- Mobility of smartphones and worlds over physical/material ones. any location at any time.
- Smallness of smartphone, always in-hand, and an arm's length away increases the sensation of its embodied, and private, self.

Selected References

Byrne, J.B., Dai, Ch. H., Cameron, L.L., & ...

Alienation on campus: The unique impact of cultural identity and belongingness on college students



Helena Saunders and Tricia Waters
Psychology Department, Colorado College, Colorado Springs, CO

Introduction

Alienation

- The experience of feeling socially isolated from communities or groups is an important aspect of college student well-being (Burbach, 1972).

Cultural Identity

- Loneliness experienced by an individual can be mitigated by group belongingness especially when that group membership is part of their cultural identity (Hansen et al., 2020).

Campus belongingness

- Students who feel as though they belong to their campus community often experience an increased sense of well-being, mentally, socially, and academically (Meehan et al., 2020).

Social model of identity change (SMIC)

Hypothesis that the negative effect of the transition to higher education can be mitigated by the social identity continuity pathway (retaining or personal group membership, or cultural identity) or the social identity gain pathway (forming new relationships in the new environment, or campus belongingness) (Ortega et al., 2021).

Hypotheses

- Students with international backgrounds have a strong sense of cultural identity, then they will experience lower levels of alienation.
- If students with international backgrounds have high levels of campus belongingness, then they will experience less alienation.

Selected Readings

Burbach, H. J. (1972). The measurement of a contextual measure of alienation. *The British Journal of Psychology*, 63(2), 209-214.

Doan, T., Ng, M. H. A., Hassan, A. S., & Hassan, S. (2021). Identity continuity predicts academic performance, retention, and the satisfaction among international students. *Applied Psychology: An International Review*, 70(3), 881-894.

Hansen, S. J., Crivello, T., Allen, J., Bunting, B. V., Frang, P., & Saunders, H. A. (2022). Social identity makes group-level social connection interventions for loneliness and mental health. *Current Issues in Psychology*, 42, 181-190.

Ng, M. H., Sefick, M., & Frisco, V. (2022). Emotional belonging, belongingness, and mental health in college students. *Frontiers in Psychology*, 13(8), 1-8.

Method

Participants

- 88 undergraduate students between 18-24 years of age.
- 81% identified as female.
- 54% were in their fourth year of college.
- 22 participants had international experience.
- Students were recruited through a campus message with a focus on recruiting individuals who have attended school outside the U.S. prior to beginning their undergraduate education.

Materials

- Alienation - University Alienation Scale (UAS; Burbach, 1972).
 - Example item: "I don't have as many friends as I would like at [institution]"
 - $\alpha = .82$
- Cultural Identity - modified Swetlow's & Corneliusen Scale (Swa et al., 2018).
 - Example item: "I have spent time trying to learn about my home country and culture"
 - $\alpha = .88$
- Campus Belongingness - Cultural and Academic Experience Questionnaire (CAEQ; Latt et al., 2020).
 - Example item: "I feel that my peers respect my academic views."
 - Subscales: campus membership, campus integration ($n = 77$).

Procedure

- Participants completed a 10-minute survey.
- The survey began with questions on demographic information.
- Participants then completed the three scales measuring alienation, cultural identity, and campus belongingness.
- All participants were instructed to respond to items regard how they currently felt as an undergraduate student to encourage respondents to think about their present-day identity.

Results

Cultural Identity

- A linear multiple regression was used to test hypothesis 1 (effect of cultural identity on alienation).
- Higher cultural identity trended towards predicting lower alienation for the full sample.
- A second exploratory hierarchical linear regression showed that when the interaction of international status and cultural identity were added, the model was strengthened.
- Additionally, the exploratory model showed that a stronger sense of cultural identity resulted in higher reported alienation in the international group.
- The hypothesis that strong cultural identity predicts lower alienation was not supported in the international group.

Campus belongingness

- Linear multiple regression was used to test hypothesis 2 (effect of campus belongingness on alienation).
- Higher campus belongingness trended towards predicting lower alienation for the full sample.
- This result was reported in the international and domestic groups.
- Campus belongingness did not negatively correlate with alienation in the second exploratory model.
- These findings support hypothesis 2, which posits that increased campus belongingness decreases alienation.

Cultural Identity

- Correlation coefficient
- Strength of relationship
- The higher the cultural identity, the lower the alienation
- Higher cultural identity trended towards predicting lower alienation for the full sample
- A second exploratory hierarchical linear regression showed that when the interaction of international status and cultural identity were added, the model was strengthened
- Additionally, the exploratory model showed that a stronger sense of cultural identity resulted in higher reported alienation in the international group
- The hypothesis that strong cultural identity predicts lower alienation was not supported in the international group

Campus belongingness

- Linear multiple regression was used to test hypothesis 2 (effect of campus belongingness on alienation)
- Higher campus belongingness trended towards predicting lower alienation for the full sample
- This result was reported in the international and domestic groups
- Campus belongingness did not negatively correlate with alienation in the second exploratory model
- These findings support hypothesis 2, which posits that increased campus belongingness decreases alienation

PLEASE NO FOOD OR DRINKS IN THE HALLWAY

The Dematerialized Self: Smartphone Mediated Being-In-The-World

Rhett Power and Tomi-Ann Roberts
Colorado College, Colorado Springs, CO



Discussion



Abstract

Introduction

Conclusion

Impact of Prenatal and Postnatal Inulin Supplementation on Memory and Gut Microbiota in Maternally Separated Rats

Rocky Sui*, Jack Beattie, Peyton Classon, Nick Firestone, Lori L. Driscoll
Colorado College, Colorado Springs, CO



Background

Early Life Adversity (ELA)

- ELA encompasses a range of adverse experiences, including physical or emotional neglect, physical, emotional, or sexual abuse, and traumatic experiences.
- ELA in the form of maternal neglect is correlated with a greater incidence of negative health outcomes, such as health conditions (depression, anxiety, and cancer), health-related behaviors (smoking, alcohol drinking, and sedentary lifestyle), and psychological challenges (depression, traumatic stress, and loss of access to healthcare coverage).
- ELA can induce responses to psychosocial and physiological stressors, exacerbating the negative impact of psychopathology.
- The maternal separation model is considered an animal model of ELA, inducing behavioral and neuroendocrine signs of elevated stress reactivity during development.

Microbiome Gut-Brain Axis (MGBA)

- Microbiota is a diverse microbial community that resides in the gut, and the brain that influences neurological responses and behaviors.
- Environmental factors, including stress and childhood neglect, can have a significant impact on the gut microbiota, which in turn can influence brain function and behavior via the MGBA.
- The gut microbiome requires fiber (as a food source for beneficial bacterial) bacteria, and thus the MGBA may be a potential target for the modulation of short-chain fatty acids that are produced by gut microorganisms of the host organism.

Method

Animals

N = 108 Long-Evans rats (ACUC approved protocol 2019-007). Rats were kept in a temperature and humidity-controlled colony and maintained on a 12-hour light/dark cycle, with lights on during the day.

Maternal Separation (MS)

MS pups were separated from their dams and littermates for 18 hours per day to simulate early life adversity. Control pups remained in their maternal cages and were picked up and handled 15 minutes per day.

Inulin-Enriched Diet

All MS and control rats (Dams, etc., Baseline), P4 or ANOVA, in which 50% of weight constant was replaced with inulin. The water was available *ad libitum* throughout the experiment.

Gut Microbiome Analysis

Fresh fecal samples were taken on PNDs 14, 21, and 28. Rats were anesthetized using CO₂ and humane extraction was performed immediately after euthanasia. Samples (*n* = 24) were stored in microcentrifuge tubes at -80 °C and subjected to 16S rRNA gene sequencing (Microbiome Insights, Inc, Vancouver, BC).

Behavioral Testing

New Object Recognition (NOR)

Rats were pre-tested with two similar objects during the first session, and then one of the two objects was replaced by a new object during a second session after a delay of 1 or 24 hours. The number of times of recognition memory.

Reference Memory Task (Hidden Platforms)

Rats were trained to swim in a circular pool. The number of times of recognition memory.

Probe Trial

Rats were trained to swim in a circular pool. The number of times of recognition memory.

Statistical Analysis

Data for the novel object recognition and water intake tasks were analyzed using a two-way ANOVA. Data for the other tasks were analyzed using a two-way ANOVA.

Results cont'd.

Reference Memory Task (Hidden Platforms)

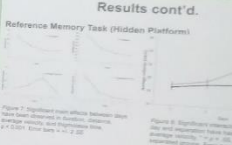


Figure 7: Significant main effects between dams that have been exposed to maternal neglect and maternal care on the number of platform crossings. Error bars = *n* = 20.

Figure 8: Significant interaction effect of maternal care and inulin on the number of platform crossings. Error bars = *n* = 20.

Probe Trial

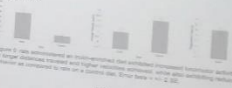


Figure 9: Significant interaction effect of maternal care and inulin on the number of platform crossings. Error bars = *n* = 20.

Discussion

The current study did not find evidence that prenatal and postnatal inulin supplementation ameliorated microbial and behavioral changes induced by early life adversity, potentially due to limitations in the model and purified diet used. However, the gut microbiome and behavioral changes remain, and the gut microbiome and behavioral changes remain, and the gut microbiome and behavioral changes remain.



Alienation on campus: The unique impact of cultural identity and campus belongingness on college students



Helena Saunders and Tricia Waters
Psychology Department, Colorado College, Colorado

Introduction Method Results

Alienation
The experience of feeling socially isolated from communities or groups is an important aspect of college student well-being. (Burbach, 1972)

Cultural identity
Confidence experienced by an individual can be triggered by group belongingness especially when that group membership is part of their cultural identity (Heaman et al., 2022).

Campus belongingness
Students who feel as though they belong to their campus community often experience an increased sense of well-being, socially, academically (Wester et al., 2022).

Social model of identity change (SMIC)
Demonstrates that the negative effect of the transition to higher education can be alleviated by the social identity continuity pathway: retaining or the social identity gain pathway: forming new memberships in the new environment, or campus belongingness (Chen et al., 2021)

Hypotheses

- If students with international backgrounds have a strong sense of cultural identity, then they will experience lower levels of alienation.
- If students with international backgrounds have high levels of campus belongingness, then they will experience less alienation.

Selected Readings

Burbach, N. J. (1972). The development of a measure of alienation. *Journal of Personality Assessment*, 36(2), 226-234.

Chen, Y., Ho, N. H., Heaman, A. J., & Heaman, C. (2022). Identity continuity, identity acquisition, assimilation, and the acculturation anxiety-integration account. *Asian Journal of Psychology*, 16(1), 971-984.

Heaman, A. J., Heaman, C., Chikara, T., Jahan, L., Bentley, J. L., Prigg, T., & Walters, N. K. (2022). Social identity regulation for loneliness and mental health: A meta-analysis. *Journal of Personality and Social Psychology*, 123(1), 1-15.

Wester, S. B., Saunders, H., & Waters, T. (2022). Directional ambiguity, belongingness, and mental health in college students. *Journal of Personality and Psychology*, 123(1), 1-15.

Participants

- 50 undergraduate students between 18-24 years of age
- 61% identified as female
- 54% were in their fourth year of college
- 22 participants had international experience.
- Students were recruited through Groupville
- Students were recruited through Groupville message with a focus on recruiting individuals who have attended school outside the U.S. prior to beginning their undergraduate education.

Materials

- Alienation – University Alienation Scale (UAS; Burbach, 1972)
 - Example item: "I don't have as many friends as I would like at [university]."
 - $\alpha = .83$
- Cultural identity – modified Showstov's Connectedness Scale (Shen et al., 2019)
 - Example item: "I have spent time trying to learn about my home country and culture."
 - $\alpha = .88$
- Campus belongingness – Cultural and Academic Experience Questionnaire (CAEQ; LaR et al., 2021)
 - Example item: "I feel that my peers respect my academic views."
 - Bidirectional: campus membership, campus integration ($\alpha = .77$)

Procedure

- Participants completed a ~10-minute survey
- The survey began with questions on demographic information
- Participants then completed the three scales measuring alienation, cultural identity, and campus belongingness
- All participants were instructed to respond to items regarding how they currently felt as an undergraduate student to encourage independent responses to think about their own identity.

Cultural identity

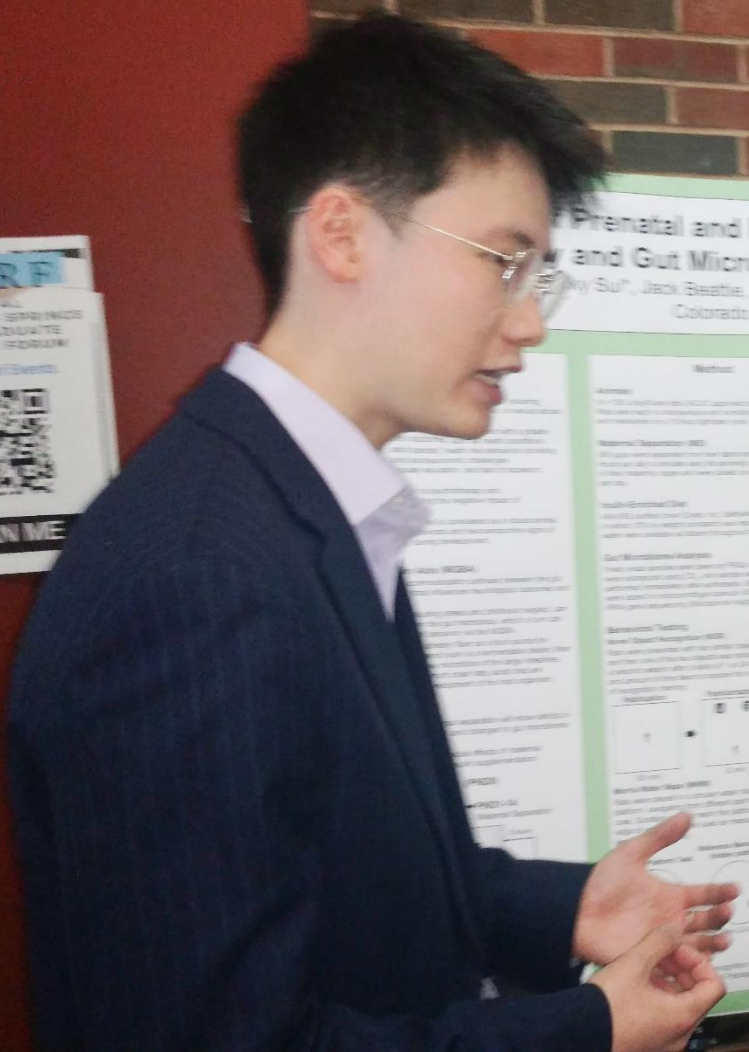
- A linear multiple regression analysis showed that cultural identity significantly predicted alienation with a stronger sense of membership resulting in lower alienation.
- The hypothesis was supported in the international group.

Campus belongingness

- Linear multiple regression analysis showed that campus membership significantly predicted alienation with a stronger sense of membership resulting in lower alienation.
- This result was reported in both the international and domestic groups.
- Campus belongingness continued to be negatively correlated with alienation in the second exploratory model.
- These findings support hypothesis 2, which posits that increased campus belongingness decreases alienation.



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Prenatal and Postnatal Inulin Supplementation on Gut Microbiota in Maternally Separated Rats

Yanyu Su*, Jack Beattie, Peyton Clesson, Nick Firestone, Lorrin L. Driscoll
Colorado College, Colorado Springs, CO

Method

Abstract

Maternal Separation (MS)

Inulin-Enriched Diet

Gut Microbiota Analysis

Behavioral Testing

Maternal Milk Water (MW)

Statistical Analysis

Results

Gut Microbiota Analysis

Behavioral Testing

Discussion



Poster titled "Prenatal and Postnatal Inulin Supplementation on Gut Microbiota in Maternally Separated Rats" by Yanyu Su, Jack Beattie, Peyton Clesson, Nick Firestone, and Lorrin L. Driscoll. It includes a photograph of a woman and several smaller images related to the research.

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PLEASE NO FOOD OR DRINKS IN THE THEATER

The Dematerialized Self: Smartphone Mediated Being-In-The-World



Rhettta Power and Tomi-Ann Roberts
Colorado College, Colorado Springs, CO



Introduction

Introduction text describing the research context and objectives.

Method

Study 1: Needs Development

Study 1 text describing the development of needs.

Study 2: Construct Validity

Study 2 text describing the validation of the construct.



Discussion

Discussion text summarizing findings and implications.

Study 3

Study 3 text describing the third study.

Additional text in the Discussion section.

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