Research & Grants Expo
March 15, 2023
9:00-12:00

Research Participants

Researcher (School)	Researcher (School)
Ben Campbell (SEMS, Engineering)	Ping Wang (SIHSS, Computer and Information Systems)
Samantha Gibson (RSBUS, Marketing)	Sushma Mishra (SIHSS, Computer and Information Systems)
Jasmin Lin (RSBUS, Management)	Frank Hartle (SIHSS, Computer and Information Systems)
Ann Summerall-Jabro (SIHSS, Communication & Organizational Leadership)	Abdur Rahman Bin Shahid (SIHSS, Computer and Information Systems)
Anu Tripathi (SEMS, Engineering)	Peter Wu (SIHSS, Computer and Information Systems)
Rika Carlsen (SEMS, Engineering)	Diane Igoche (SIHSS, Computer and Information Systems)
Yaohui Wang (SEMS, Engineering)	Tauhidul Alam (SIHSS, Computer and Information Systems)
Rika Carlsen (SEMS, Engineering)	Ahmed Imteaj (Southern Illinois University, Carbondale)
Karen Paulett (SIHSS, Computer and Information Systems)	Stuart Allen (SIHSS, Communication & Organizational Leadership)
Natalya Bromall (SIHSS, Computer and Information Systems)	Whitney Moore (East Carolina University)
Abdur Shahid (SIHSS, Computer and Information Systems)	Timothy Jones (SIHSS, Academic Media Center, Arts & Humanities)
Vicki Donne (SNEHS, Education)	Kihyun Park (RSBUS, Management)
Mary Hansen (SNEHS, Education)	Shu Wang (Zhejiang University of Science & Technology)
Anna Abdulmanova (RSBUS, Finance)	Jing Liu (Zhejiang University of Science & Technology)
Aleksandra Rebeka (Georgia Institute of Technology)	Mingu Kang (Zhejiang University)
Ellyn Fritz (Franklin & Marshall College)	

Research Participants

| Researcher (School)	Researcher (School)
Artemisia Apostolopoulou (RSBUS, Marketing)	Gabriel Moreno (RSBUS, Marketing)
Dimitra Papadimitriou (University of Patras, Greece)	Christopher Plouffe (University Tennessee, Chattanooga)
Ioannis Lianopoulos (Aristotle University of Thessaloniki, Greece)	David Locander (University Tennessee, Chattanooga)
Nikolaos Theodorakis (Aristotle University of Thessaloniki, Greece)	Lisa Beeler (Clemson University)
Yun Chu (RSBUS, Marketing)	Barbara Burgess-Lefebvre (SIHSS, Arts & Humanities)
Jianyu Ma (RSBUS, Finance)	Cody Havard (University of Memphis)
Sun-A Park (SIHSS, Communication & Organizational Leadership)	Jessica Kamerer (SNEHS, Nursing)
Joe Shangguan (RSBUS, Accounting & Taxation)	Stephen Foreman (SNEHS, Nursing)
Judit Trunkos (SIHSS, Social Sciences)	Nancy Tamilia (SNEHS, Nursing)
Eliada Griffin-EL (RSBUS, Management)	Nadine Englert (SNEHS, Nursing)
Norma Juma (Washburn University)	Yao Zhang (RSBUS, Accounting)
Joy Olabisi (Rochester Institute of Technology)	Hongguo Wei (RSBUS, Management)
Zhou Yang (SIHSS, Social Sciences)	Jason Kanov (Western Washington University)
Gabriel Moreno (RSBUS, Marketing)	Gavin Buxton (SEMS, Science)
Christopher Plouffe (University Tennessee, Chattanooga)	Armand Buzzelli (RMU Director of Campus Recreation)
David Locander (University Tennessee, Chattanooga)	Hasan Celik (RSBUS, Management)
Lisa Beeler (Clemson University)	Audhesh Paswan (University of North Texas)

Research & Grants Expo 2023

Research & Grants Expo Plaque Award

Research & Grants Expo 2023
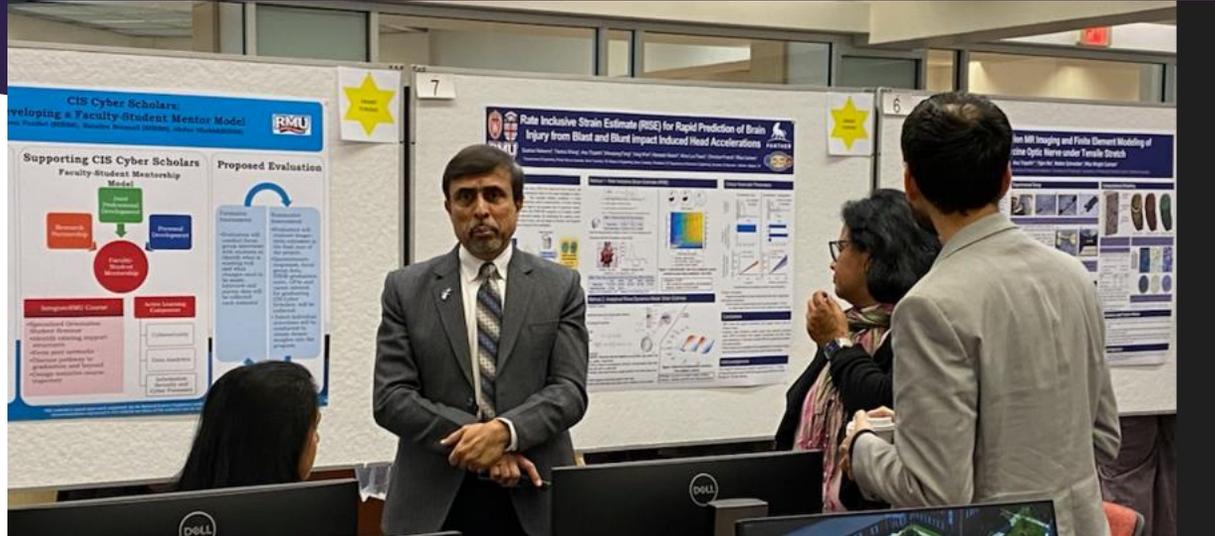
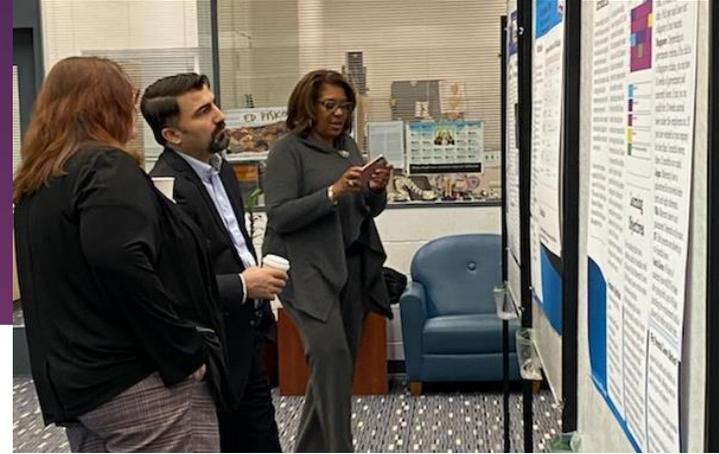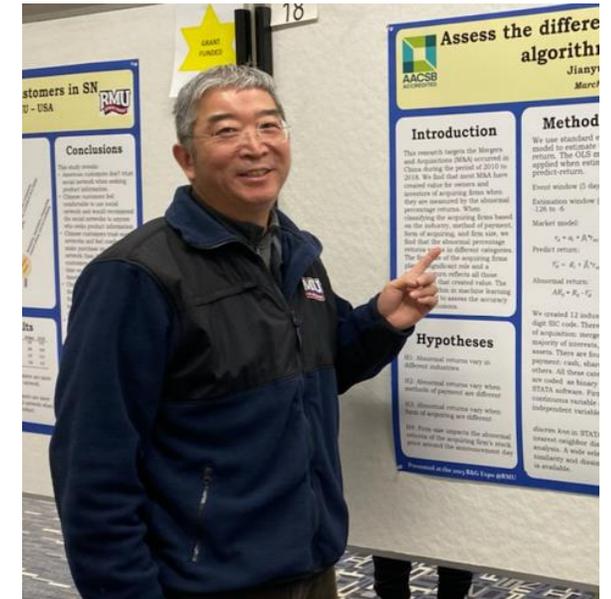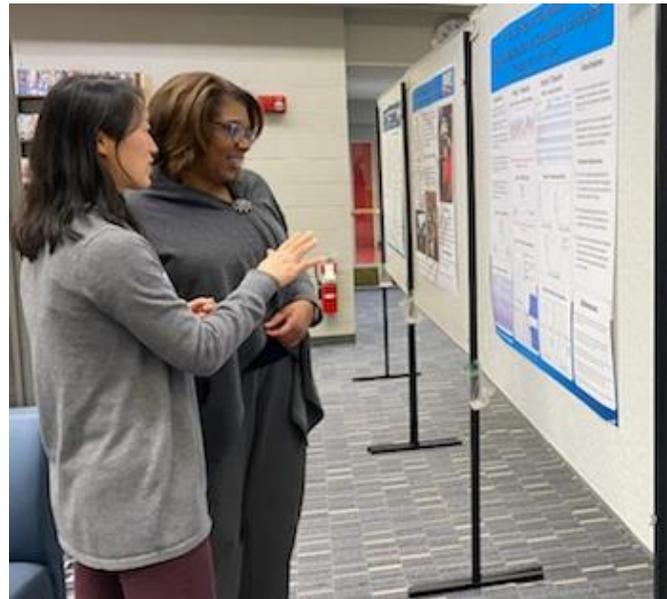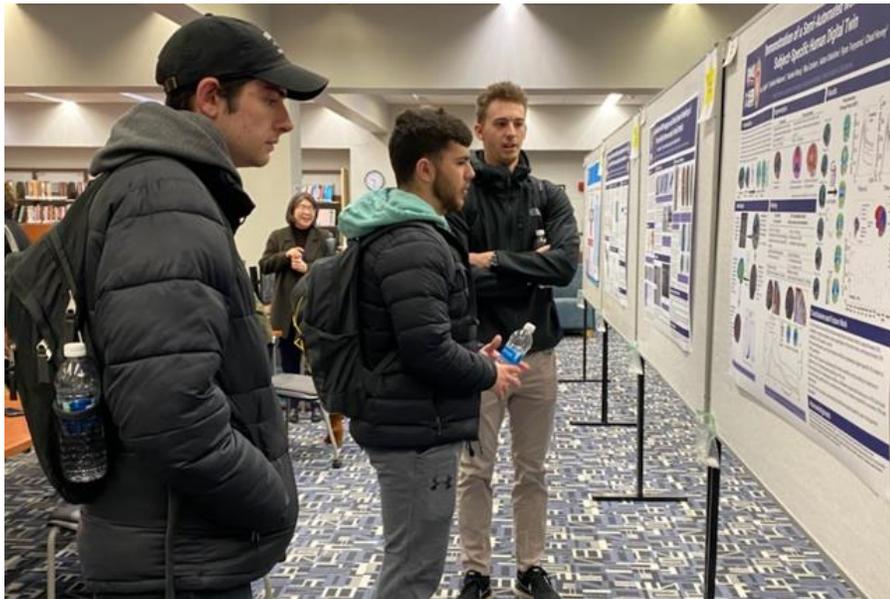# Research & Grants Expo 2023
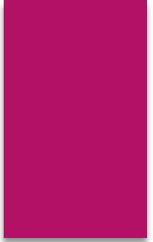
Research & Grants Expo 2023

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Research Posters from
RMU Schools & RMU Library

Laser Welding of Plastics

Ben Campbell, Ph.D.
Associate Professor, Department of Engineering
School of Engineering, Mathematics and Science
Robert Morris University

Introduction

The collaboration between RMU and MECCO began in 2017 to investigate the process of welding plastics with modified marking systems containing high power lasers. RMU is using MECCO facilities to conduct welding research to assist in the commercialization of this process and technology. This collaboration has involved 31 students, mostly as paid interns, resulting in 14 student internships for credit, 3 honors theses, 3 masters theses, and a PhD dissertation research topic for an RMU Lecturer. MECCO is a small company which has hired 7 RMU engineering alums during this time period as application engineers, sales engineers, service engineers, software engineers, and production supervisors.

Transmission Welding
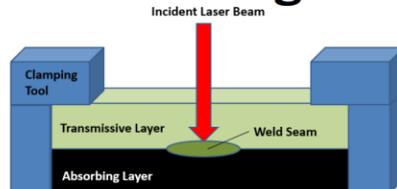
To weld, the parts are clamped under pressure while the laser is absorbed at the interface between an optically transparent and absorbing plastics to create the weld seam. The melted plastic expands and mixes to create the weld then cools to a solid in a few seconds after the laser exposure.

Portable Mini-Welding System

RMU students designed and built a portable mini welding system to take to trade shows, conferences, and customers. It will debut with live demos as part of a MECCO/RMU laser welding workshop at the Penn State Innovation and Emerging Plastics Technologies Conference in June 2023.

Thermal Monitoring

The surface temperature of the plastic can be monitored with a thermal camera during experiments to better understand the heat absorbed by the plastic. The goal is to stay below the threshold for melt on the top transmissive surface, but above the melt temperature and below the lowest threshold for decomposition on the absorbing surface.
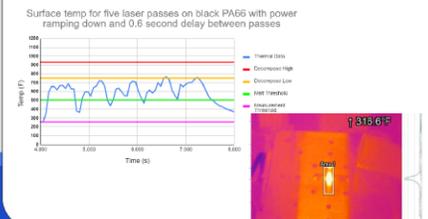
Taguchi Process Optimization

A Taguchi process can be performed to look at 3 processing factors with 4 levels using only 16 combination to reduce the number of tests for process optimization. Three samples of each combination were welded to get an average behavior. Upcoming shear testing will give weld strength and find the optimal parameters that produce the strongest welds. The selected parameters for the unfocused 1064nm laser are the laser power, speed of a single line pass and the frequency at which the beam is wobbled back and forth to increase weld width along the weld line. Samples will be sent to Penn State Behrend's plastics technology program for a more detailed material analysis.

Parameter	Level 1	Level 2	Level 3	Level 4
Laser Power	287W	276W	256W	235W
Laser Speed	12mm/s	14mm/s	16mm/s	18mm/s
Wobble Frequency	500Hz	750Hz	1000Hz	1250Hz

Conclusions

This partnership with MECCO has been supported by over $300,000 in direct funding from MECCO and grants from the State of Pennsylvania and with over $100,000 of in-kind donations. It has provided research and industry experience for numerous students and has been a pathway to employment for many RMU alumni. MECCO and RMU Engineering plan to continue to grow this partnership.

Carnegie Science Award

This project was recognized with the 2022 Carnegie Science Award for Exemplary Educational/ Corporate Collaboration. Current and former interns attended the ceremony.
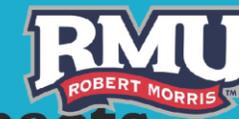

Scan the QR code to see the video produced by the Carnegie Science Awards

Presented at the 2023 R&G Expo @RMU

In the Eye of the Sufferer: Perceived Motivation of Compassion and Impacts

Hongguo Wei[1] Jason Kanov[2]

[1] RSBUS, Robert Morris University [2] Western Washington University

Introduction

The sufferer's (receiver) perception of the compassion giver's motives is absent (Dutton et al., 2014)

1) The appraisal process may determine the actual responses of the observer (Atkins & Parker, 2012).

2) Not only voluntarily personalized behavior is involved, but also forcible and impersonalized institutional behavior (Zucker, 1987).

Other-orientation (concern for others) and self-orientation (concerns for oneself) coexist in the person engaging in prosocial behavior (De Dreu & Nauta, 2009; Vaish et al., 2018).

Research question: How does a sufferer's perception of the compassion giver's motivation affect the sufferer's subsequent experience at work?
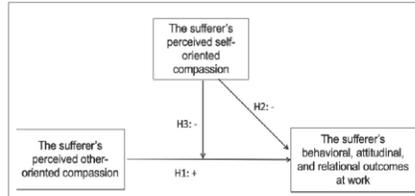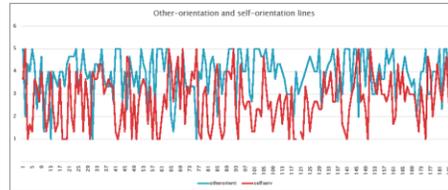
Figure 1 Theoretical Model

Table 1 Summary of Studies

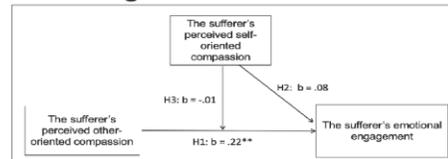|	
Pilot studies (1-2) Collected compassion stories (MTurk; business students)	Examine whether the motives in compassionate acts are more complicated than the pure other-orientation. How sufferers' perceptions of a compassion givers' motive related to their experiences of compassion.
Study 1 Recall design (employed workers; N=186)	Examine the role of the sufferer's perceived self-oriented vs. other-oriented motives and their impact on the sufferer's positive experience at work.
Study 2 Vignette-based experimental design (Prolific; N=229)	Validate the relationship between the sufferer's perceived self-orientation vs. other-orientation in compassion, and how the sufferer's expected compassion plays a role.

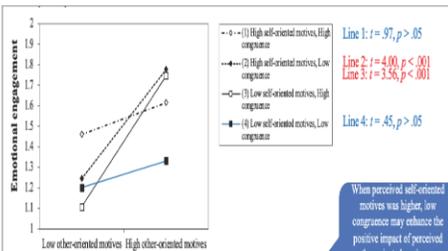## Study 1 Results

Figure 2 Other vs. Self-Orientation

Self-oriented and other-oriented compassion are independent and coexist.

Figure 3 Model Results

But the three-way interaction was significant (b = -.26, $p < .05$).

Figure 4 Three-way Interactions

Line 1: $t = .97, p > .05$
Line 2: $t = 4.00, p < .001$
Line 3: $t = 3.56, p < .001$
Line 4: $t = .45, p > .05$

Pair of slopes	Slope difference	t-value	p-value	95% Confidence Inter
(1) and (2)	-0.231	-2.125	0.035	(-0.444, -0.018)
(1) and (3)	-0.297	-2.335	0.021	(-0.546, -0.049)
(1) and (4)	0.015	0.076	0.940	(-0.371, 0.401)
(2) and (3)	-0.066	-0.543	0.588	(-0.304, 0.172)
(2) and (4)	0.246	1.363	0.175	(-0.108, 0.599)
(3) and (4)	0.312	1.383	0.168	(-0.130, 0.754)

When perceived self-oriented motives was higher, low congruence may enhance the positive impact of perceived other-oriented motives on emotional engagement.

When congruence was high, perceived self-oriented motives negatively moderated the relationship between perceived other-oriented motives and emotional engagement (H3).

Study 2 Results

Table 2 Analysis Results

Variables	Emotional engagement		Affect-based trust		Job satisfaction	
	b	SE	b	SE	b	SE
Frustration	.01	.08	.06	.07	.01	.07
Grief	-.18	.11	-.11	.10	-.20	.11
Perceived other-oriented motives (POO)	1.34***	.10	1.32***	.08	1.31***	.09
Perceived self-oriented motives (PSO)	-.62***	.09	-.61***	.08	-.62***	.09
Expected compassion (EC)	.11*	.05	.12**	.05	.09	.05
POO x PSO	.93***	.19	1.18***	.16	.98***	.19
POO x EC	.23*	.10	.21*	.08	.23*	.09
PSO x EC	-.20*	.10	-.21**	.08	-.28**	.10
POO x PSO x EC	.37	.19	.18	.17	.30	.19

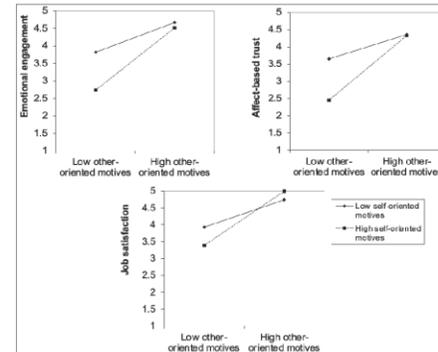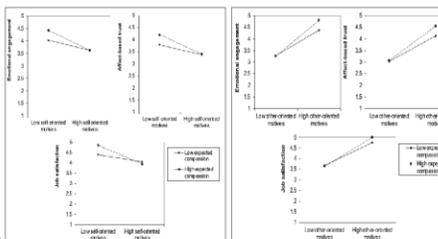### Figure 5 Interaction Plots

Figure 6 Additional Analyses

Conclusions

☐ Sufferers are not passive recipients of compassion. Understand compassion appraisal from the sufferers' perspective (Atkins & Parker, 2012).

☐ Self-oriented motives may comingle with other-oriented motives in any instance of compassion, which does not necessarily _compromise_ compassion's efficacy.

Practical Implications

☐ It is ok for employees/organizations to have self-oriented motives for engaging in compassion as long as they also have high other-oriented motives.

☐ For employees/organizations with too much emphasis on self-orientation, it is important to bring in other-orientation.

☐ Cultivate and convey feelings of empathic concern when displaying compassion interpersonally and when designing and implementing compassionate systems and structures.

References

Atkins PW and Parker SK (2012) Understanding individual compassion in organizations: The role of appraisals and psychological flexibility. _Academy of Management Review_, 37: 524–546.

De Dreu CK and Nauta A (2009) Self-interest and other-orientation in organizational behavior: Implications for job performance, prosocial behavior, and personal initiative. _Journal of Applied Psychology_, 94: 913–926.

Dutton JE, Workman KM and Hardin AE (2014) Compassion at work. _Annual Review of Organizational Psychology and Organizational Behavior, 1_: 277–30.

Vaish R, Liao QV and Bellotti V (2018) What's in it for me? Self-serving versus other-oriented framing in messages advocating use of prosocial peer-to-peer services. _International Journal of Human-Computer Studies_, 109: 1–12.

Zucker LG (1987) Institutional theories of organization. _Annual Review of Sociology_, 13: 443–464.

Demonstration of a Semi-Automated Workflow for Subject-Specific Human Digital Twin
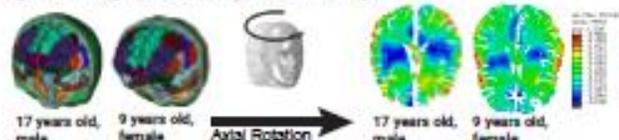
Anu Tripathi[1,2], Sushan Nakarmi[1], Yaohui Wang[1], Rika Carlsen[1], Adam Sokolow[3], Ryan Terpsma[3], Chad Hovey[3]
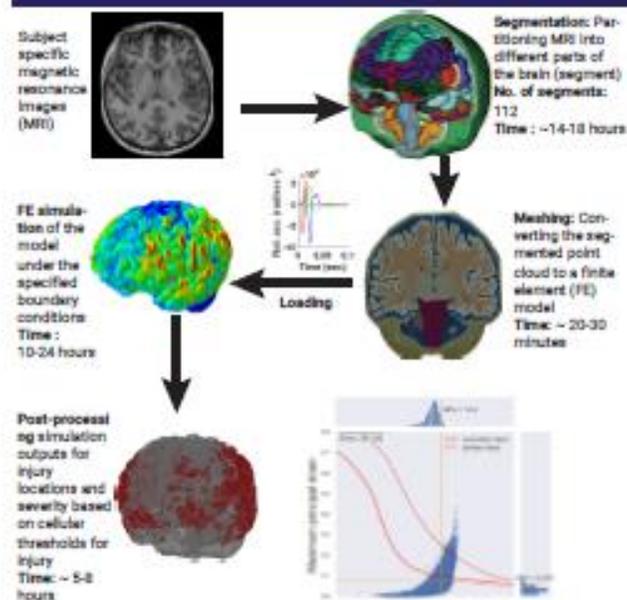
[1]Robert Morris University, [2]University of Wisconsin-Madison, [3]Sandia National Laboratories

Introduction

Computational head modeling is a powerful tool for understanding the mechanisms, risk assessment, and mitigation of traumatic brain injury (TBI). High anatomical variations among individuals hinder translating conclusions drawn from studies based on population average models. The goal of this study is to develop a nascent workflow for automated and personalized military TBI assessment which can provide more insight into the specific location of injuries within the brain by considering a person's unique brain anatomy.

17 years old, male; 9 years old, female — Axial Rotation — 17 years old, male; 9 years old, female

Methods

Subject specific magnetic resonance images (MRI)

Segmentation: Partitioning MRI into different parts of the brain (segment)
No. of segments: 112
Time : ~14-18 hours

Meshing: Converting the segmented point cloud to a finite element (FE) model
Time : ~ 20-30 minutes

Loading

FE simulation of the model under the specified boundary conditions
Time : 10-24 hours

Post-processing simulation outputs for injury locations and severity based on cellular thresholds for injury
Time : ~ 5-8 hours

Workflow for subject-specific 3D finite element model generation.

Segmentation

Automated	Semi-automated
• Atlas based brain and skull segmentation using machine learning	• Segmentation of dura, falx, tentorium, and sub-arachnoid cerebrospinal fluid (Glaser et al., 2017)
• No. of segments: 110	• Time: ~ 4-5 hours
• Time: ~ 10 -12 hours	

FreeSurfer brain segmentation. 3D Slicer dura, falx and tentorium segmentation. 3D Slicer sub-arachnoid CSF segmentation.

Glaser, Jeffrey, et al. PROC SPIE 2017, Vol. 10137, 380-386.

Meshing

Voxel Mesh (Fast, automated)	All- Hexahedral mesh (Most accurate, semi-automated)
• Time: ~ 20 – 30 minutes	• Time: ~ 4-5 hours
• Implemented in MATLAB with anisotropy assignment and region of interest (ROI) analysis	• Performed on CUBIT • Automation under progress
• Jagged edges between segments	• Smooth interfaces
• All elements perfect cube	• <1% distorted elements (0.1 < Jacobian < 0.5)
• No adaptive meshing	• Adaptive meshing
• Higher number of elements (2.5 million)	• Lower number of elements (1.5 million)
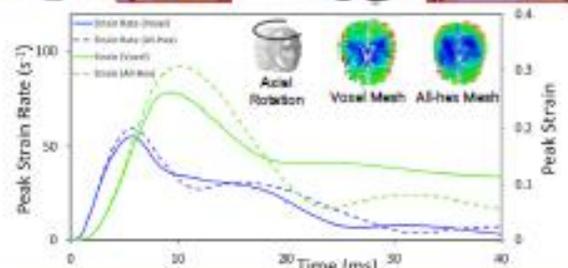
Maximum principal strain (MPS) and strain rate (MPSR) vs. time from voxel and hexahedral mesh models under axial rotations.

Results

Peak Maximum Principal Strain (MPS)

Female, 9 yrs; Male, 9 yrs; Female, 13 yrs; Female, 17 yrs; Female, 18 yrs; Male, 17 yrs

Axial Rotation

Variability ~ 30%
Variability ~ 20%
Variability ~ 50%
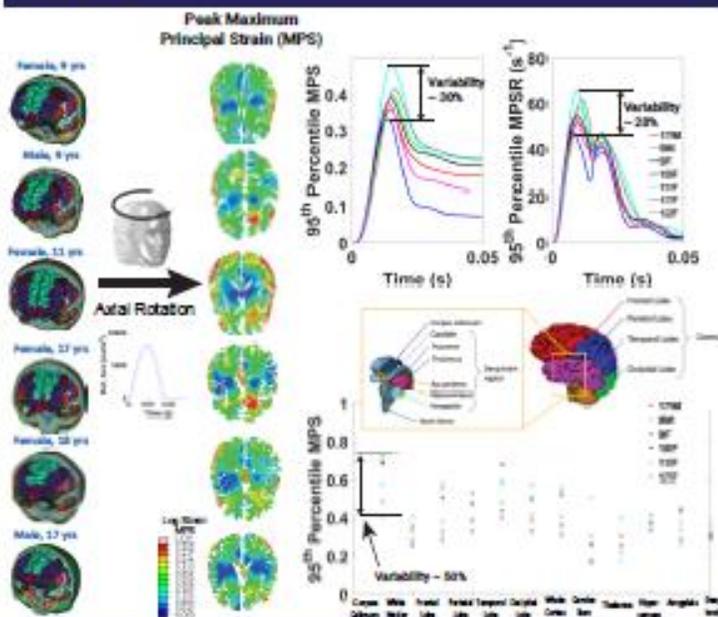
Conclusions and Future Work

- Our simulations show that individual anatomical variations lead to approximately 30% variability in strain and strain rates magnitudes in the entire brain, and approximately 50% variability in ROI specific strains
- We have developed a semi-automated workflow to generate subject-specific FE models for mTBI prediction
- Current work focuses on automating the entire workflow and providing an opensource platform for FE modeling and predicting mTBI risk
- Future work aims to investigate the effect of different anatomical features on mTBI risk (head size, skull shape, gyrification) to understand the level of details required for accurate mTBI risk assessment
- This effort aims to provide automated and efficient patient-specific care to the general population

Acknowledgments

High Resolution MR Imaging and Finite Element Modeling of Porcine Optic Nerve under Tensile Stretch

Anu Tripathi[1,2], Yijen Wu[3], Walter Schneider[4], Rika Wright Carlsen[1]

[1]Robert Morris University, [2]University of Wisconsin-Madison, [3]University of Pittsburgh, [4]University of Pittsburgh Medical Center Children's Hospital

Introduction

Lack of efficient clinical treatments after traumatic optic nerve injuries (TON) results in nearly 30% of the victims left blind in the injured eye. To improve this outcome, we need to improve our understanding of the bio-mechanical response of the optic nerve (ON). Currently, we have limited knowledge of the micro-structure and mechanical behaviour of tissues in the optic nerve. This study aims to investigate:

1. The micro-structural arrangement of neuronal bundles (fasciculi) and the surrounding connective tissues in the optic nerve using high resolution magnetic resonance imaging (MRI),
2. The deformation and failure response of the ON using high resolution MRI under stretch and finite element (FE) modeling.

The acquired MRIs are used to develop a detailed 3D FE model of the porcine ON that is validated against experimental stretch data and is used to investigate the response of the ON under traumatic loading.

Background
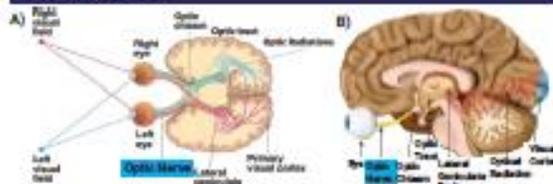
Schematic of visual pathway showing optic nerve (a) axial view, (b) sagittal view

Micro-structure of the optic nerve showing the neuronal bundles (fasciculi) and the connective tissue
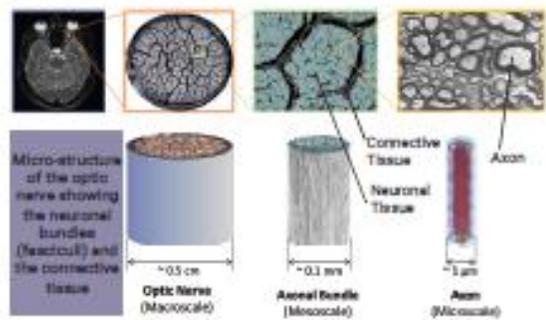
Goal: Image the neuronal and connective tissue pathway from the optic nerve head to the optic chiasm and develop a 3D finite element model to investigate the biomechanics of ocular trauma

Experimental Setup
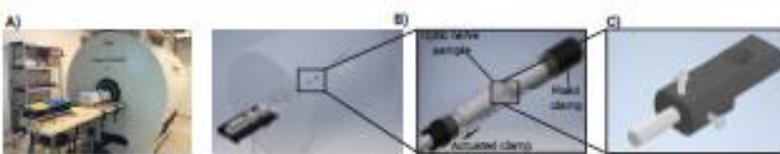
A)Tension platform mounted in 7 Tesla MRI scanner, B) ON chamber at the center of the coil, and C) custom clamps designed to prevent optic nerve slip
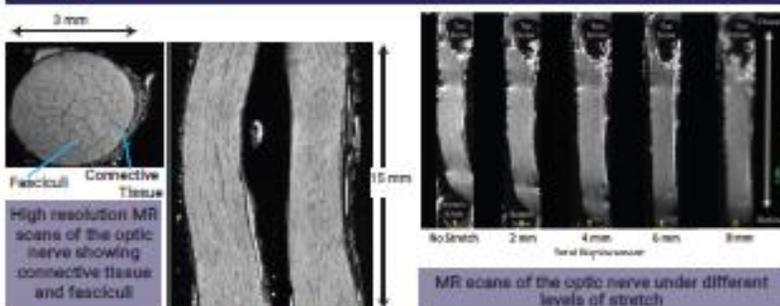
- The custom experimental platform allows for simultaneous MR imaging while streching the ON
- Device consists of a cantilever tube and rod which is connected to a stepper motor and a linear actuator controlled by Arduino microcontroller for displacement-controlled stretching of the ON
- Sections of the device within the scanner are built entirely of non-magnetic materials
- ON sample is submerged in Fomblin-Y oil to prevent sample dehydration and to reduce imaging artifacts at the ON surface
- Fixed ON is housed within a sample chamber and clamped using custom designed clamps
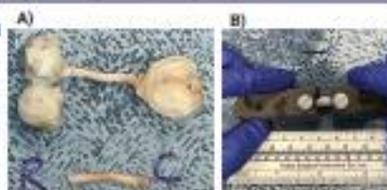
A) Fixed porcine ON between the eyes and the optic chiasm, B) ON fastened between the clamped

Imaging Results

High resolution MRI scans of the optic nerve showing connective tissue and fasciculi

MR scans of the optic nerve under different levels of stretch

- High resolution MR imaging of the ON (29 µm x 29 µm x 29 µm)
- Unstreched ON images provide the micro-structure of the neuronal bundles (fasciculi) and the surrounding connective tissue
- MR images at different stretch levels show the local deformation of the fasciculi and the connective tissue

Computational Modeling
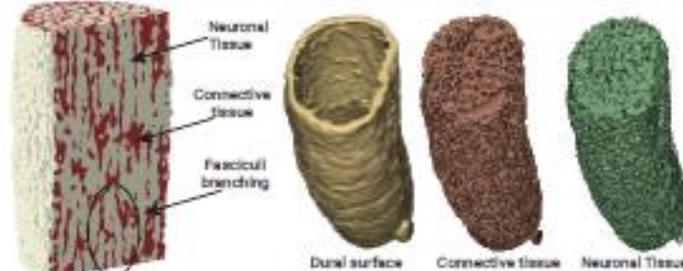
Discontinuous connective tissue walls allowing fasciculi branching

Segmentation showing the outer dural surface, connective tissue and neuronal tissue (fasciculi)

Details of the finite element model

Hyperelastic Strain Energy Function: 2nd order Ogden Model

$$W = \frac{\mu}{\alpha^2}(\lambda_1^\alpha + \lambda_2^\alpha + \lambda_3^\alpha - 3) + \frac{K}{2}(J - 1)^2$$

Tissue	µ (kPa)	α	K(kPa)
Dura	357.4	22.65	0.1
connective Tissue	357.4	22.65	0.1
Neuronal Tissue	0.40	-23.3	2.19

- No. of elements: 2.15 million
- Size of ON: 5 mm x 3.2 mm x 3.2 mm
- Boundary Condition: Displacement controlled stretch at 0.1 mm/sec up to 20 mm
- The material properties were obtained from literature [1, 2]

Finite Element Modeling of the ON stretch showing stress concentration in the connective tissue

1. Rubin, 30 Viv, et al. Anh. Comput. Methods Eng. 27.4 (2020): 1187-1280.
2. Wang, Xiaofei, et al. Investig. Ophthalmol. Vis. Sci. 57.10 (2016): 4316-4372.

Conclusions and Future Works

- We developed an MRI compatible test setup and protocol to image the ON under stretch
- The high-resolution images show the branching in fasciculi pathway of the ON for the first time using MRI
- Current work focuses on MR imaging of the ON under tensile stretch to elucidate the failure response of the ON sub-structures
- The 3D FE model is being validated against the stretch experiment and the validated model will be used to study the mechanical response of the ON under traumatic loading for improved design of interventions after TON

Acknowledgement

Rate Inclusive Strain Estimate (RISE) for Rapid Prediction of Brain Injury from Blast and Blunt impact Induced Head Accelerations

Sushan Nakarmi[1], Yaohui Wang[1], Anu Tripathi[1], Wenqiang Fang[2], Yang Wan[2], Haneesh Kesari[2], Alice Lux Fawzi[3], Christian Franck[3], Rika Carlsen[1]

[1]Department of Engineering, Robert Morris University, Moon Township, PA; [2]School of Engineering, Brown University, Providence, RI; [3]Department of Mechanical Engineering, University of Wisconsin – Madison, Madison, WI

Background

To reduce the risk of traumatic brain injury (TBI) from blast and blunt impacts, we must first fully understand how mechanical loads to the head translate to deformation-induced cellular damage. The complex loading conditions in these events make it challenging to determine which characteristics of these loading events cause the most injury and lead to the greatest risk of long-term impairment. The goal of this work within the PANTHER program is to rapidly predict brain injury through physics-informed models. By identifying the loading conditions that lead to the greatest risk of injury, we can begin to develop new targeted approaches to reduce the risk of injury to the warfighter.
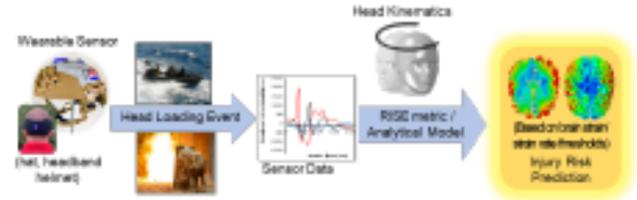
Figure 1: Workflow of predicting brain injury from head impacts.
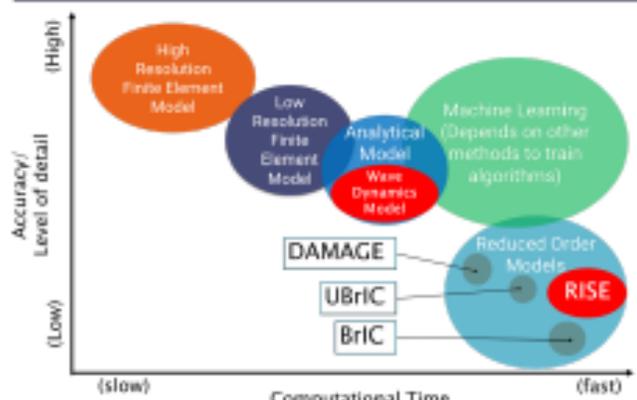
Computational Methods for Estimating Brain Strain

Figure 2: Comparison of different computational methods of estimating brain strain.

Method 1: Rate Inclusive Strain Estimate (RISE)

RISE: $z^{-1} = a + \dfrac{b}{\omega} + \dfrac{c}{\dot\omega^{1.3}}$

z = peak logarithmic strain or strain rate (s^{-1})
ω = peak angular velocity (rad/s)
$\dot\omega$ = peak angular acceleration (krad/s^2)
a, b, c = fitting parameters (based on rotating direction)

Table 1: Sagittal Rotation Fitting Parameters

	a	b	c
Peak Strain	0.5531	113.6	0.556
Peak Strain Rate	1.74E-03	0.1497	0.2983

*Additional fitting parameters available in Carlsen et. al, Brain Multiphysics, 2021

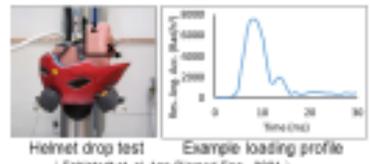Example Helmet Evaluation using RISE:

Helmet drop test   Example loading profile
(Fahlstedt et. al, Ann Biomed Eng , 2021)

Table 2: Brain strain prediction of helmet drop test using different methods

	FEA	RISE	BrIC[1]	UBrIC[1]	DAMAGE[2]
Peak Strain	30.10%	33.40%	62.20%	26.10%	67.40%
Peak Strain Rate	53.8/s	56.4/s			

[1]Gabler et. al, Ann Biomed Eng., 2018   [2]Gabler et. al, Ann Biomed Eng., 2019

Figure 3: Head kinematic data from published studies overlaid on peak strain predictions from RISE

Peak Ang Vel (rad/s)
- Voluntary Head Motions
- Non-concussive Sports Impacts
- Concussive Sports Impacts

Limitations of RISE:
- Only accounts for acceleration, not deceleration
- Based on results of 2D FE models

Method 2: Analytical Wave Dynamics Model Strain Estimate

Analytical solution:

Model the brain as incompressible material:
$U_i^I[r,t] = 0$

By solving the equation

we get

$U_i^I[r,t] = \sum_n A_n \left[\frac{\cdot}{\cdot} \right]_n \left[\frac{\cdot}{\cdot} \right]_n$

where

Assumptions:
- GEOMETRY: Brain and skull are simplified as an infinite rigid cylinder and hollow cylinder, respectively
- MATERIALS: Brain is homogeneous, isotropic, incompressible, linear elastic solid and skull is a rigid solid
- INTERFACE: Brain outer surface is rigidly bonded to the skull's interior surface
- LOADING: Angular acceleration applied to the skull
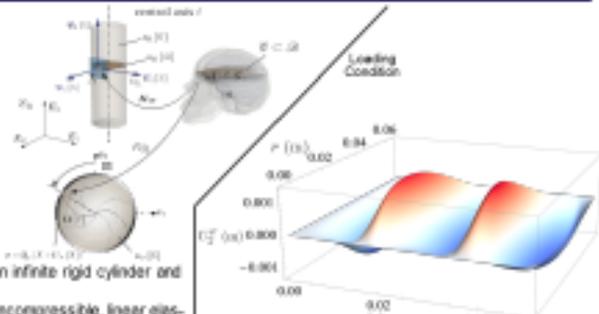- ASSUME small deformation and plane strain conditions for the problem

Figure 4: Brain tissue displacement prediction from analytical solution

Advantage: Accounts for complex loading conditions
Limitations: Simplified geometry and material properties

Critical Kinematic Parameters

Acceleration only :
A=0.1-20 krad/s²
T=5-30 ms

Acceleration / deceleration:
A1,A2=0.1-20 krad/s²
T1,T2=5-30 ms

(Results derived from analytical model of wave dynamics)
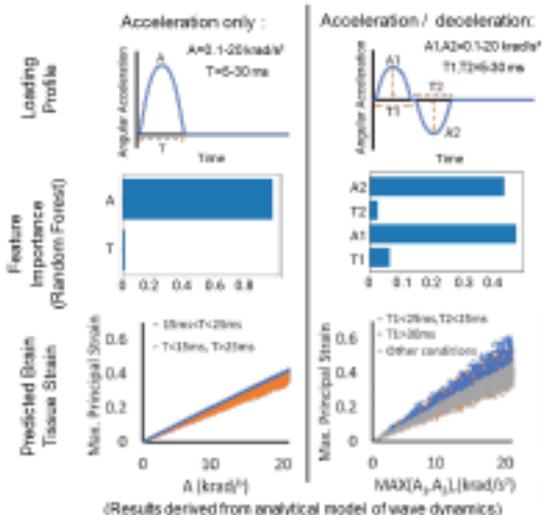
Primary importance:
Angular Acceleration (Linear relationship with strain magnitude)
Secondary Importance:
Pulse Duration (Causes larger strain at pulse duration ~20 ms, i.e., shear wave travel time from brain surface to center & back)

Conclusions

- RISE shows that angular acceleration and angular velocity both contribute to injury
- Analytical wave dynamics model shows that maximum principal strain (MPS) increases with angular acceleration and that shear wave interactions in the brain increase MPS for a particular acceleration pulse duration
- These results can be applied to the development of protective equipment and fast prediction of injury for a given head kinematics

Acknowledgments

CIS Cyber Scholars:
Developing a Faculty-Student Mentor Model

Karen Paullet (SIHSS), Natalya Bromall (SIHSS), Abdur Shahid(SIHSS)

Introduction

The Computer and Information Systems (CIS) Department will establish the CIS Cyber Scholars Program to equip low-income, academically talented community college transfer students with a demonstrated financial need with the financial, academic and practical support to advance into STEM careers or graduate school.

Objective 1: Recruit 30 low-income, academically talented undergraduate students into the CIS Cyber Scholars Program.

Objective 2: Through the CIS Cyber Scholars Program, 100percent of scholars will graduate with a STEM degree.

Objective 3: Through the CIS Cyber Scholars Program, 90 percent of enrolled scholars will enter STEM careers or graduate programs.

Objective 4: Institutionalize effective practices to support transfer students which promote their success in computing majors and careers.

Supporting CIS Cyber Scholars

Faculty-Student Mentorship Model

- Joint Professional Development
- Research Partnership
- Personal Development
- Faculty-Student Mentorship

IntegrateRMU Course

- Specialized Orientation Student Seminar
- Identify existing support structures
- Form peer networks
- Discuss pathway to graduation and beyond
- Design tentative course trajectory

Active Learning Component

- Cybersecurity
- Data Analytics
- Information Security and Cyber Forensics

Proposed Evaluation

Formative Assessment

- Evaluators will conduct focus group interviews with students to identify what is working well and what changes need to be made. Interview and survey data will be collected each semester

Summative Assessment

- Evaluators will evaluate longer-term outcomes in the final year of the project.
- Questionnaire responses, focus group data, STEM graduation rates, GPAs and career interest for graduating CIS Cyber Scholars. will be collected.
- Select individual interviews will be conducted to obtain deeper insights into the program.

The Wicked Problem of the Global COVID-19 Vaccine Rollout

Aleks Rebeka (Georgia Institute of Technology), Anna Abdulmanova (RSBUS, Robert Morris University), Ellyn Fritz

Research Question and Context

Broad Research Question:
- How did COVID-19 vaccine makers make sense of their role in the pandemic and manage their relationships with various stakeholders?

Sensemaking:
- Companies need to make sense of surprising and challenging events
- It is a socially constructed process of creating meaning and enabling action (Christianson and Barton, 2020)

Context:
- The COVID-19 pandemic allows us to advance theory of sensemaking because it is a wicked problem:
  - The issue has no precedent
  - It is constantly changing
  - It involves many stakeholders
  - There is no indication of a right answer (Camillus, 2008)

Methods and Data

Method:
- An inductive multiple-case study
- Iterating between data analysis and theory development

Data:
- Sample: Four COVID-19 vaccine makers
- Publicly available data:
  - Company press-releases
  - Financial reports (10-k, 10-q)
  - Conference calls with investors
  - CSR and ESG reports
  - Social Media (Twitter)
- Time period: Jan 2020-May2021

Background Theory - Relevant Literature

Organizational Sensemaking and Identity:
- Weick 1993 & 1995; Gioia and Thomas 1996; Maitlis 2005; Maitlis and Christianson 2014
- Dutton and Dukerich 1991; Hatch and Schultz 2002; Brickson 2005 & 2007; Gioia *et al* 2013

Corporate social responsibility and stakeholder management:
- Mitchell *et al* 1997; Pater and van Lierop 2006; Basu and Palazzo 2008; Carroll and Shabana 2010; Scherer *et al* 2013; Bundy *et al* 2013

CSR communication:
- Morsing and Schultz 2006; Grant and Nyberg 2011; Castello *et al* 2013; Crane and Glozer 2016

Theoretical Model
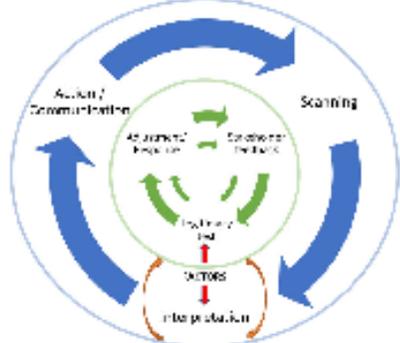
Factors:
- Strategic and financial considerations
- Organizational identity
- Power and other characteristics of stakeholders
- Issue at stake

Key elements:
- Slow loop (blue): Companies make sense of "who they are" in the pandemic and enable action: major decisions about vaccines and official communication
- Fast loop (green): Companies respond to specific stakeholder feedback

Companies in the Study

AstraZeneca
- Not-for-profit pricing model
- Prioritized interests of customers over investors
- First deal with COVAX – resisted a pushback from EU on shipment delays (consistent identity)

moderna
- For-profit pricing model
- Prioritized interests of investors and customers
- Singular identity - no polyphony in communication

Johnson & Johnson
- Not-for-profit pricing model
- Prioritized interests of customers over investors
- No polyphony in communication but lack of transparency
- Shifting identity as a result of repeated pushback from investors

Pfizer
- 3-tiered pricing model
- Prioritized interests of investors and customers
- Possible multiple identities – polyphony in communication
- Repeated pushback from key stakeholders (US govt and investors)

Contributions

Organizational sensemaking:
- Introduced a double-loop model of sensemaking to distinguish between responsibility and responsiveness
- Proposed that the fast and slow loop affect each other:
  - Response to stakeholder feedback depends on how companies make sense of "who they are"
  - Companies' interpretation of "who they are" evolves as they get more feedback from different stakeholders and adjust their actions and communication as a response

CSR communication and stakeholder management:
- Observed significant heterogeneity in communication and in how companies responded to stakeholder feedback
- Proposed that polyphony in early communication would allow for a wider range and a more flexible response to stakeholder feedback

Implications

- Understanding organizational sensemaking during the COVID-19 pandemic is useful beyond the pandemic as most strategic issues are wicked
- Dealing with constantly changing and conflicting expectations of multiple stakeholders is a new normal for all companies

Data Poisoning Attack Against Wearable Artificial Intelligence Systems

Abdur R. Shahid*, Ahmed Imteaj+, Peter Y. Wu*, Diane A. Igoche*, Tauhidul Alam^
*SIHSS, RMU, +SIUC, ^LSU Shreveport

IEEE SSCI 2022 SINGAPORE

Secure Intelligence Group

Introduction

- Data poisoning attacks manipulate the data used by machine learning algorithms to mislead or degrade their performance or create bias in their output.
- The research presented in this work focuses on a label flipping data poisoning attack on human activity recognition (HAR) systems.
- The effectiveness of a K-nearest neighbors (KNN)-based defense mechanism in combination with a hybrid data collection model against the proposed attack is also assessed.

Methods

- We present a label-flipping attack for multi-class sensor-based HAR systems.
- We extend K-Nearest Neighbor (KNN)-based defense mechanism to evaluate the proposed attack.
- We empirically evaluate the effectiveness of the proposed attack and defense mechanisms.
- Implementation: Multi-layer Perceptron, Decision Tree, Random Forest, and XGBoost in a blackbox setting.

Results

ACCURACY ON THE RECOVERED DATASET AFTER APPLYING THE DEFENSE MECHANISM WITH $K = 9$ (IN %)

Models	Amount of Label Flipped Data (in %)						
	1	5	10	15	20	25	30
MLP	94	93	93	91	91	89	85
DT	85	85	85	84	82	82	82
RF	92	92	91	89	90	89	88
XGBoost	94	93	92	90	90	90	88

ACCURACY ON THE POISONED DATASET (IN %)

Models	Amount of Label Flipped Data (in %)						
	1	5	10	15	20	25	30
MLP	93	77	71	39	27	21	19
DT	83	65	63	35	27	21	18
RF	92	84	80	56	45	35	27
XGBoost	93	83	80	55	45	35	27

Original Dataset — Poisoned Dataset — Recovered Dataset

Multi-layer Perceptron
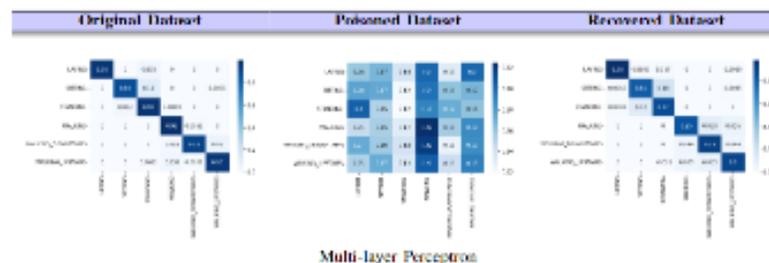
Conclusions

- The open structure of HAR systems allows adversaries to inject poisonous data to disrupt the recognition process.
- The paper investigates the label-flipping data poisoning attack on wearable-sensor-based HAR systems.

Sensor Data contributors — Database — Preprocessing — Feature Extraction — Model Training — Deployed Model

- Behavior Analysis
- Healthcare
- Biometric Signature
- Elderly and Youth Care
- Industry Manufacturing
- Security

Sensor Data contributors — Defense Model — Database — Preprocessing — Feature Extraction — Model Training — Deployed Model
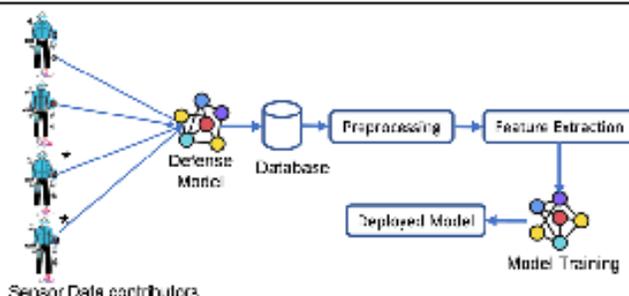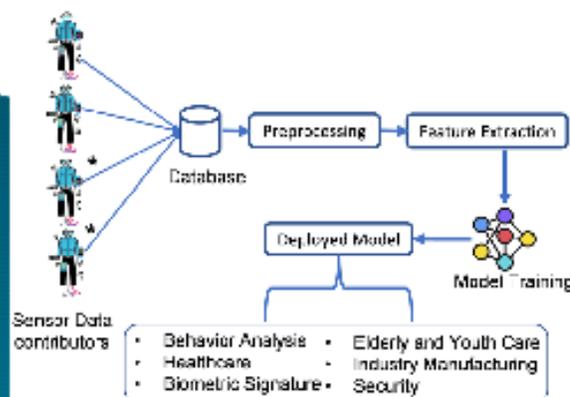
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A. R. Shahid, et al., "Label Flipping Data Poisoning Attack Against Wearable Human Activity Recognition System," 2022 IEEE Symposium Series on Computational Intelligence (SSCI), Singapore, Singapore, 2022

Create With VR

Dr Timothy Jones

RMU Academic Media Center (SIHSS), Society for Animation Studies (SAS)
Society of Motion Picture and Television Engineers (SMPTE)

Introduction

In June 2022 the Academic Media Center received a grant from Unity and Meta Immersive Learning to support virtual reality learning with the Meta Quest 2 Head Mounted Display (HMD).

We are happy to share with interested faculty an exciting training provided by Unity to implement VR in the classroom - everything from "Why VR?" to how to design a university course using VR development - like the Create With VR curriculum.

New Student Experiences
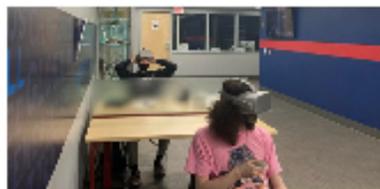
Students in Prof. Andrew Ames' 4D Studio (ARTM 1022) exploring Oculus Go

Applications

Virtual Reality and other immersive technologies are becoming central to a range of industries globally, but especially here in Pittsburgh - from professional sports and medical simulation to real estate.

VR HAS THE POTENTIAL TO

ENHANCE	ADD
23 million jobs by 2030.*	**$1.5 trillion** to the global economy by 2030.*

Full Dome Display

Students in Prof. Christine Holtz Digital Photography (ARTM 3300) in the AMC dome 2.0

Meta Quest 2

The AMC received 13 Quest 2 headsets for use by all RMU, faculty, students and staff.

Resources

TIPS FOR GET STARTED

1 GET THE RIGHT TOOLS Make sure you have headsets, internet access, and real-time 3D software like Unity on hand to get started teaching with VR.

2 JOIN THE COMMUNITY Tap into a vibrant community of educators on Facebook and Discord to get advice on hardware setup, best practices, and more.

3 TAKE A FREE COURSE Access Unity's on-demand Create with VR course to learn how to deliver effective VR education and get access to teaching resources assembled by experts.

4 INSPIRE LEARNING Check out the free content on Unity Learn to upskill yourself and your students, plus find inspiring examples of VR in action across industries.

Join an RMU training cohort at: https://create.unity.com/create-with-vr-for-educators

Next Steps

Expanding Virtual Reality (VR) technologies in a classroom and residential setting at RMU has the potential to add unprecedented depth and breadth to our campus learning environment:

- Granting students access to real and virtual spaces
- Expanding imagination, creative thinking, and problem solving skills.

Providing inclusive access to VR hardware and the Unity development environment.

- Regardless of identity, background, discipline, or professional objectives

Results in learners who are both savvy consumers and innovative producers of the experiences that will increasingly shape how we all live and learn in immersive worlds.

Matching Intra-functional Integration with Inter-firm IT Link to Facilitate Flexibility for Customers

Kihyun Park
Department of Management, RSBUS

Introduction

This study aims to suggest a moderated mediation model addressing how internal integration interacts with information technology (IT) link with external customers to meet customer needs more efficiently and effectively.

Figure #1
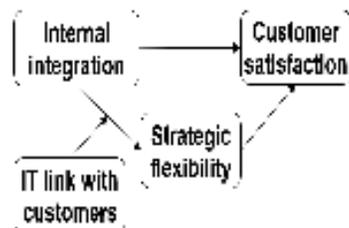
Methods

By integrating the previous literature, this study suggests a theoretical framework and tests the proposed hypothesis using data collected from 268 manufacturing companies worldwide.

After conducting confirmatory factor analysis, Cronbach's alpha, average variance extracted, and combination reliability are checked to verify convergent and discriminant validities.

To test the four hypothesized relationships, hierarchical regression analysis is carried out.

Table #1

	Strategic flexibility			Customer satisfaction		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	3.399	2.783	2.553	3.564	2.786	2.341
Firm size	-0.002	-0.013	0.001	0.005	-0.008	-0.006
Internal integration		0.234***	0.190**		0.283***	0.247***
Strategic flexibility						0.160**
IT link with customers			0.113**			
Internal integration* IT link with customers			0.121†			
R^2	0.068	0.114	0.157	0.088	0.160	0.182
Adjusted R^2	0.054	0.097	0.134	0.075	0.144	0.162
F	4.818***	6.725***	6.527***	6.381***	9.970***	9.650***

Results

The results of this study reveal that internal integration plays a very important role in promoting customer satisfaction directly and indirectly by enhancing the ability to meet customers' flexibility needs.

Conclusions

By combining IT connectedness with external customers with internal capability, this study provides valuable insights into how manufacturing firms apply internal integration more effectively to enhance customer satisfaction.

A cross-cultural analysis of product meanings in sport licensing

Artemisia Apostolopoulou, RSBUS, Robert Morris University, USA

Dimitra Papadimitriou, University of Patras & Yannis Lianopoulos, Aristotle University of Thessaloniki, Greece

Purpose of Research

1. To explore whether meanings embedded in sport licensed products are culturally transferable by examining the applicability of the *MSLP* scale across 4 countries: Greece (250), Poland (290), Portugal (101) and USA (235).

2. To test a model using product meanings as a predictor of post-purchase satisfaction and consumers' intentions to buy and wear team licensed products in the future.

Literature Review

- Sport licensed products are carriers of meanings that are functional, experiential and symbolic in nature, and hold value that extends beyond the products' utility and performance (Apostolopoulou et al., 2010; Kwak et al., 2015; Kwon & Kwak, 2014).

- The *Meanings in Sport Licensed Products* scale (Papadimitriou & Apostolopoulou, 2018) identifies five sources of meaning of sport licensed products: *Experience, Socialization, Aesthetics, Personal history,* and *Locality,* and can help predict WOM and purchase intentions.

- Consumers' cultural background may influence their perceptions of product value (Karana, 2010; Wallendorf & Arnould, 1988).

- The context in which a product is consumed could affect the specific meanings embedded in that product (DeBerry-Spence, 2008).

Study Participants

- *N*=876 sport consumers who had bought sport licensed merchandise of their favorite team in the past 12 months.

- Study participants were in their majority males (67.1%), between 18 and 24 (58%) and 25 and 34 (31.4%).

Main Findings

1. The *MSLP* scale had good psychometric properties with significant loadings and evidence of discriminant and convergent validity in pooled and independent national contexts.

2. The baseline model remained identical across the four countries with all 17 indicators producing satisfactory loadings to the initial factors.

3. With few exceptions, the proposed relationships were significant and positive across all study participants, regardless of their country of origin.

Contributions

- Enrich our understanding of the value of sport licensed products by identifying sources of product meaning that remain relevant across the 4 countries.

- Guide licensing executives, especially those of global sport properties, in their brand positioning and sales campaigns, which should incorporate themes of emotional connection with one's favorite team and special people, camaraderie among team supporters, and connection with the local area.

Testing the Geopolitical Theory of European Countries' Soft Power Use

Judit Trunkos, PhD

SIHSS, Robert Morris University

Introduction

Soft power has been defined as the ability to achieve goals using persuasion and attraction (Nye 2011).

To answer the question, why some democracies use more soft power than others, this article turns to a theory based on geopolitics.

Methods

Based on Trunkos (2020), the dependent variable was created by:

- Separating Soft Power Actions and Soft Power Resources (Figure 1)
- Recoding the ICEWS event data into two categories, either as a soft power action or as a hard power action, and then calculating the soft power action percentage over the total power usage (Figure 2)

Theory and Methods

The theory implies that when there is the perception of threat, the political elite creates a narrative that focuses on national security and the country starts to rely on a higher level of soft power in order to balance against the threat.

Using statistical analysis of 29 European democracies, this article looks at the impact of geopolitical threat on democracies' soft power reliance.

H1: Democratic countries with more geopolitical threat use more soft power actions than countries with less geopolitical threat.

Figure 1. New Classification of Foreign Policy Instruments Based on the Separation of Resources and Actions into Soft Power and Hard Power Categories
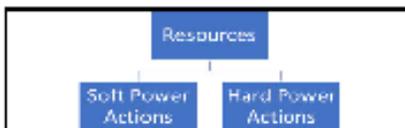
Figure 2. 15 Democracies' Soft Power Action % for the time frame 1995-2010
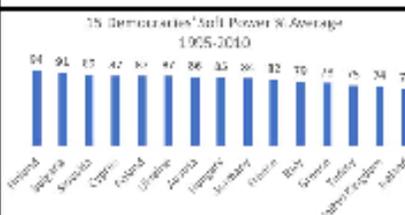
Results

For the time-period of 1999-2010, the results reveal that geopolitical threat is a statistically significant variable which boosts soft power use.

This result provides a strong explanation to why Finland, Austria, Hungary, Germany use a high level of soft power each year while countries with lower geopolitical threat scores such as Ireland and Turkey do not.

Conclusions

The findings provide answers regarding countries' alliance-building processes as well as suggest that the three main paradigms of international relations, namely Realism, Idealism and Constructivism, are more compatible than previously stated.

NOTE: This article was first published in the Journal of Political Power in 2022 and later selected to be part of an edited book by Gallarotti in 2023 titled "Alternative Paths to Influence. Soft Power and International Politics."

The book earned Joseph Nye's endorsement from Harvard University.

Bibliography

Nye, J.S. (2011). *Future of Power*. New York: Public Affairs.

Trunkos, J. (2020). Comparing Russian, Chinese and American Soft Power Use: A New Approach. *Global Society*, 1-24.

External Enablers and Entrepreneurial Ecosystems: The Brokering Role
Of the Anchor Tenant in Capacitating Grassroots Ecopreneurs

Norma Juma, Ph.D., Joy Olabisi, Ph.D., and Eliada Griffin-EL, PhD.
(Washburn University, Rochester Institute of Technology, RSBUS-Robert Morris University)

RMU — ROBERT MORRIS

AACSB ACCREDITED

Introduction

We study how environmental enablers, specifically disruptive ecological shifts, and subsequent regulatory activity, led to the formation of a local ecopreneur ecosystem in Kenya and how this process was facilitated by the brokerage role of an international NGO.

Research Question:
"How do environmental changes invoke systems that enable ecological venture creation in a resource-constrained setting?"

FIG. 1: External Enablers

"External enablers" are outside forces that 'disequilibriate' environmental conditions which enable venture creation.
(Davidsson, 2015, 2020, 2022)
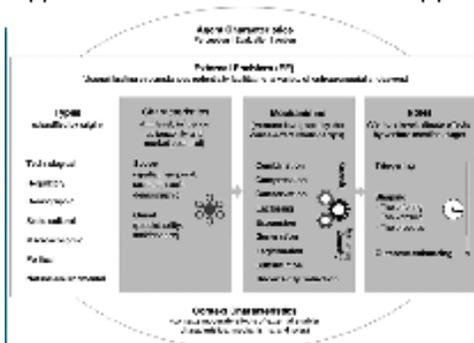
Methods

We draw from the **entrepreneurial ecosystem literature**, and using **strategic network perspective** to conceptually map salient interorganizational ties, multilevel engagement, and resource generation.

Data Collection:
Multi-level, Purposive Sampling Framework

Macro-Level	
Meso-Level	
Micro-Level	

FIG. 2: Qualitative Grounded Theory Analysis

Open Coding

Axial Coding

Selective Coding

FIG 3: Enabling the Entrepreneurial Ecosystem Emergence

Results

Ecosystem emergence is facilitated by two dynamics:

1) Regulatory Enablement: The "stage-setting" by regulatory actors to enable the coordination activities of the core organization, or anchoring tenant.

RE is carried out through 3 processes: a) problem framing, b) prioritization, and c) boundary configuration.
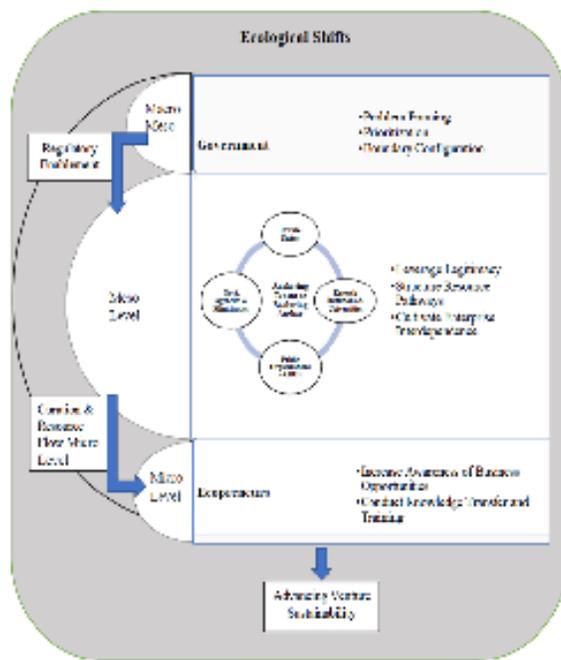
Conclusions

Forthcoming 2023 Publication in **Strategic Entrepreneurship Journal** Special Issue "
" Environmental Change, Strategic Entrepreneurial Action, and Success."

1. This is the first study to use the external enabler framework to examine the emergence of venture-creation on a **systems level**.

2. This study emphasizes that the "emergence point" of the entrepreneurial ecosystem can be identified at the interaction of external forces and strategic actors.

2. Brokering Anchor: The connecting activity of the anchoring tenant that forms the ecosystem network. Three processes:
a. Micro-level capacitation
b. Meso-level network curation and resource mediation
c. Advancing venture sustainability

Behavioral Responses to Taxation and Enforcement

Zhou Yang, Department of Social Sciences, SIHSS

Abstract

This paper develops a theoretical model to examine how taxpayers respond to income taxation and enforcement. The study focuses on tax evasion behavior and avoidance behavior. It is important to understand how tax policy and enforcement directly affect each type of behavior as well as any indirect effects that ripple through to the other type of behavior. The findings have important implications for tax enforcement.

Background and Motivation

- Conventional wisdom suggests that eliminating avoidance opportunities can reduce loopholes and increase revenues and efficiency.
- Similarly, efforts to reduce evasion are often assumed to increase the tax base.
- These results may not hold depending on the interaction between avoidance and evasion behavior.
- Avoidance behavior may generate positive externalities.
- Behavioral responses to taxation and enforcement vary across individuals.

Purpose of the Paper

- Explore behavioral responses to taxation and enforcement
- Investigate the interaction between avoidance behavior and evasion behavior
- Examine heterogenous responses to tax enforcement

Theoretical Model

- Taxpayer's Problem:

$$\underset{A,E}{\text{Max}}\ U = V(X) + u(A, E)$$
$$s.t.\ X = L - \tau(L - \alpha A - E) - A - p\tau(\beta + 1)E$$

A: donations to charity (avoidance)

E: underreported income (evasion)

X: consumption good

α: allowable deduction (share of donations)

τ: tax rate

p: probability of being audited

β: penalty on unpaid taxes

Results Summary

- Enhancing tax enforcement discourages tax evasion behavior, but does so at the cost of reduced donations to charity if $U_{EP} > 0$ and $U_{AE} > 0$.
- Enhancing tax enforcement has no impact on tax evasion if $U_{AE} < 0$ and $U_{AE}U_{AP} = U_{AA}U_{EP}$.
- Increasing the tax rate encourages both evasion and avoidance behavior for taxpayers with moral costs if $U_{A\tau} < 0$ and $U_{AE} > 0$.
- Increasing the tax rate encourages evasion but reduces avoidance behavior for taxpayers with moral costs if $U_{A\tau} > 0$ and $U_{AE} < 0$.
- Increasing the scope of deductibility reduces evasion behavior while encouraging donation behavior for taxpayers with moral costs of evasion if $U_{AE} < 0$.

Conclusion

- Evasion and avoidance responses to tax enforcement are interdependent.
- Tax policies aiming to reduce avoidance opportunities alter evasion behavior.
- Responses to taxation and enforcement depend on risk preferences.
- Tax enforcement should take into account the potential substitution between evasion and avoidance.

Studying Disney

Dr. Cody Havard, PhD, Sport Commerce, Director of Bureau of Sport and Leisure Commerce, The Kemmons Wilson School, University of Memphis

Prof. Barbara Burgess-Lefebvre, M.F.A. in Directing, Theatre and English professor in the Department of Arts and Humanities, School of Informatics, Humanities and Social Sciences, Robert Morris University

A Spoonful of Sugar helps the Medicine *(of interdisciplinary education and applied research)* go down!

How two faculty members, in different fields and schools, and in different universities, use an interdisciplinary approach and Disney to educate their honors students.

"For the strength of the Pack is the Wolf, and the strength of the Wolf is the Pack." -Mowgli (Jungle Book)

The two courses are taught with an interdisciplinary focus which reflects the variety of majors represented in our students. Guest lecturers provide content area that support the knowledge areas of the professors:

Disciplines studied in the RMU class include:
- Storytelling
- Performance
- Art Design
- Tourism and Hospitality
- Engineering
- Marketing
- Cyber Security
- Management and Leadership

Disciplines studies in the Memphis class include:
- Psychology
- Sociology
- Fandom
- Management
- Marketing/Promotion
- Strategy
- Media Studies (discussions of projects released by Disney)

"We keep moving forward, opening new doors, and doing new things, because we're curious, and curiosity keeps leading us down new paths." -Walt Disney

A Disney Class? How did your university allow such frivolity?

At RMU, the Walt Disney World class is an honors seminar class. Students in the honors program elect to take a seminar class and the courses offered are within a professor's unique research area. I was approached in 2015 with a request to create a team-taught course focusing on Disney. I quickly found that "Disney," as a whole, was much too large in scope and narrowed the focus to Walt Disney World. I team-taught with Professor Nell Hartley from the Business department. She was a lover of Disney and handled the "leadership and management" part of the course; while I covered the storytelling and fandom sections of the course. Prof. Hartley retired after that semester and left all of her lecture notes and thoughts; since then, I have taught the course solo.

In Memphis, the class is part of the Helen Hardin Honors College. Within the school, honors forum classes are offered to allow students to take classes outside of their traditional major or general education classes. As faculty in the Sport Commerce program, I regularly use the Walt Disney Company in my marketing and fandom classes. Based on my interest in the company and use of it in my classes, a colleague encouraged me to teach an honors class on Disney. In Spring 2018, I started teaching the class, and have been allowed to do so on a semester basis (some as a 1 hour credit, some as a 3 hour credit) since Spring 2020. Further, a similar fandom class on the Walt Disney Class is also being proposed for me to teach within my program of study.

"Venture outside your comfort zone, the rewards are worth it"
-Rapunzel (Tangled)

What is the approach to the material and how does the course use Disney as the means to teach?

At RMU, honors students are expected to cap their honors experience with a piece of original research or a creative project. Many of the honors students find the capstone project overwhelming and drop out of the program before its completion. The WDW course provides an introduction to research by requiring a substantial (20 page) paper of original research or an equivalent creative project. By opening the door to appealing student-led research in this course, they learn that academic research, when focused on a student's passion, is exciting and fulfilling. Research/creative projects have included:
- A comparison of fandoms of Disney and Apple.
- A creation of a new Pet adoption themed attraction (featuring many of Disney's dogs)
- Many new World Showcase pavilions (Brazil, Russia, Greece, etc.)
- A critical look at the emotional and financial value of theming at Disney resorts.
- The impact of portraying a Disney face character on disordered eating.

At Memphis, honors students are expected to take at least one honors forum class during their time at the university. Being a class based on fandom, I do not require a book for the course. Instead, students are required to watch assigned programs on Disney+ and through the YouTube channel or Being a Fan of Disney Podcast that I produce. The YouTube videos and podcast episodes feature class discussions and lectures, or visits by 'friends of the class,' individuals who share their fandom for the Walt Disney Company in its many facets. On a weekly basis, students are expected to watch/listen to at least two visits or lectures and produce a discussion post on relevant topics. Class time is spent discussing what it means to be a fan of Disney, the latest news with the company, and/or discussing and voting on topics such as favorite Marvel Character and Project, favorite Disney/Pixar movie, favorite WDW attraction, and favorite Disney movie.

In addition to the discussion posts, students complete two case studies meant to foster critical and creative thought. Specifically, the students write one paper detailing what MCU superhero(s) they identify with and why (paper available at QR Code below), and another on how they believe Disney influences fans, entertainment, and society.

"To Infinity and Beyond"
Buzz Lightyear (Toy Story)
Takeaways from a Disney class:

At RMU:
- Knowledge about some effective leadership strategies – and some that failed. Applying those strategies to working with colleagues on projects
- Being empowered to chase dreams – talking to Disney engineers, performers and those who focus on Disney without depending on them for a paycheck
- Learning the power that storytelling has in a business and the ability to apply storytelling in their education, job searching, and lives
- And getting to be the "expert" for every family trip!

At Memphis:
- Students learn more about the company and its many facets of operation. Students are encouraged to reflect on the influence of the company on themselves and also on society.
- Students engage in discussion-sometimes critical, sometimes whimsical- about the company.
- Overall, the students hopefully leave the class understanding what fandom means, and that if fandom brings joy to someone-without hurting themselves or anyone else; it is generally a good thing because it increases happiness and contribution to a civil society.

Being a Fan of Disney Podcast   YouTube video   What Marvel Superhero are You!

Prelicensure Nursing Students' Usage and Perceptions of Medical Marijuana

Dr. Jessica L. Kamerer EdD, MSN, RNC-NIC, Dr. Nadine Englert PhD, MSN, RN, Dr. Stephen Foreman, PhD, JD, MPA Nancy Tamilia MSN, RN

SNEHS, Robert Morris University

RMU ROBERT MORRIS

Introduction

Marijuana use medically is still considered illegal by federal law which classifies it as a Schedule I Drug under the Substance Control Act (Hansen, Alas & Davis, 2022). However, states individually have been legalizing it since 2012 for recreational and medical use. The majority of states in the United States have legalized medicinal marijuana (Kurtzman, Greene, Bigley & Drenkard, 2022). There has been research conducted with nursing students on recreational substance use reported. A study of 4,033 nursing students by Boulton and O'Connell (2017) reported past-year marijuana use by nursing students at 18%. In an earlier study by Baldwin et al. (2009), nursing students also reported that within the past year they 19.8% experienced blackouts, 6.3% went to class or work while under the influence, and 3.9% administered patient care while under the influence of controlled substances.

With rates of prescriptions and reported use increasing, it is likely nursing students may also be using medicinal marijuana. However, research is lacking on the use of medical marijuana, current or potential, by students while enrolled or planning to enroll in pre-licensure nursing programs. Use in this population could lead to challenges for schools of nursing (SON) such as monitoring medicinal versus recreational use, reporting use to clinical agencies hosting nursing students for educational experiences as necessary, policy creation and implementation, and adherence to state boards of nursing regulations and guidelines.

Participants
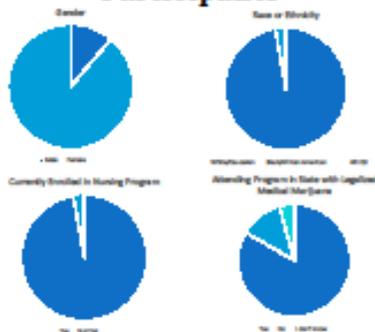
Methods

Purpose: To investigate the usage, or interest in using, medicinal marijuana by pre-licensure nursing students to enable schools of nursing (SON) to identify policy and management needs. A secondary purpose is to review participants' knowledge and perceptions of medical marijuana use by pre-licensure nursing students.

Sample
- Prelicensure nursing students enrolled in or potentially enrolling in undergraduate nursing programs
- 36 participants

Instrument
- Investigator created survey
- Questions based on previous literature and specialist opinion
- Participants knowledge and usage will be measured using fixed-alternative questions. Perceptions are assessed by Likert scale items (response sections are Strong Agree, Agree, Disagree, and Strongly Disagree)

Results: Usage

Please see results in tables below related to student usage of medical marijuana.

Results: Knowledge

Related to participant knowledge of related medical marijuana policy:
- 58.3% were not aware if their nursing program had policies or restrictions related to student medical marijuana use
- 52.8% were not aware if clinical agencies related to their nursing program had policies or restrictions related to student medical marijuana use
- 91.7% were required to participate in drug testing by their nursing program
- 97.2% would discontinue using medical marijuana if it jeopardized their ability to participate in the nursing program

86.1% of respondents indicated their program of study did not include, or they did no know it if it included, formal education on medical marijuana use. 55% indicated they strongly agreed or agreed they understood how medical marijuana use was addressed in their school related policies. Please see results in tables below related to nursing student knowledge of medical marijuana.
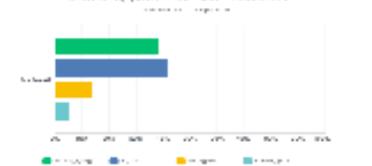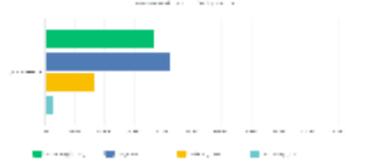
Results: Perceptions

Related to participant perceptions of medical marijuana use by healthcare workers:
- 38.9% strongly agreed or agreed they were concerned about dependence/addiction potential of medical marijuana
- 77.8% strongly agreed or agreed nursing students should be permitted to use medical marijuana for approved medical conditions, 80.6% strongly agreed or agreed licensed healthcare providers should be permitted and 94.4 % strongly agreed or agreed patients should be permitted

Given students were participants, they were also asked about their concerns related to their role and students and how they would be perceived if they used medical marijuana.
- 77.8% strongly agreed or agreed they would be concerned use could influence their status in a nursing program
- 77.8% strongly agreed or agreed they would be concerned about participating in clinical based education while using medical marijuana
- 77.8% strongly agreed or agreed they would be concerned about nursing instructors judging or treating them negatively, 75% that patients would do so, 38.9% that classmates would do so, 77.8% that other licensed healthcare providers would do so

Conclusion

This survey is ongoing, and data is continuing to be collected. Results thus far though demonstrate potential use and concerns related to use in prelicensure nursing students of medical marijuana. The respondents indicate a high level of knowledge related to medical marijuana, yet the majority also indicate a lack of formal education. This could indicate that their knowledge is inaccurately self assessed, or that they are gaining knowledge from source outside of their programs. Further research should be conducted on this. There also seems to be a majority in favor of use by students, patients and healthcare providers. However, the majority are also concerned with their use by peers, instructors, patients and other providers.

Does A Private School Education Have Premiums in the Corporate Executive Labor Market?

Yao Zhang

RBUS, Robert Morris University

Introduction

The paper examines whether attending a private school has a positive effect on the career outcomes of individuals in the corporate executive labor market. The research uses data from a sample of over 500,000 directors and 8,000 executives to analyze the relationship between holding an undergraduate/graduate degree from private universities and CEO compensations.

Figure #1

Methods

The study uses archival data from specialized databases:

BoardEx - board of members (directors)
Execucomp - corporate executives' compensations
Compustat - public companies' financial statements
CRSP - public companies' stock prices

Here are some research methodologies used to analyze archival data in these databases:

Descriptive statistics
Longitudinal analysis
Comparative analysis
Regression analysis

Figure #2

	Private U Degree	Public U Degree
Total Compensation ($ in thousands)	6,706.69	6,388.69
Salary ($ in thousands)	749.88	709.89
Bonus ($ in thousands)	499.47	988.28
Value of Stock Awards ($ in thousands)	2,784.14	2,468.42
Options Granted ($ in thousands)	8,297.16	8,174.99
Total Assets ($ in millions)	19,180.95	9,851.68
Sales/Revenue ($ in millions)	5,626.91	5,200.48
ROA	1.99%	2.97%
MV ($ in millions)	8,775.25	8,095.81

Regression

Dependent Var: TOTAL Compensation

Results

The study finds that private school attendance does indeed have a positive effect on career outcomes. Specifically, candidates with a private university degree are more likely to be selected as directors in public companies. Executives who attended private school on average annually earn $1.3 million more than those who only attended public universities. Additionally, the study does not find that graduate degrees have any extra benefits in the corporate executive labor market.

Conclusions

The authors suggest that the advantages of a private school education may stem from various factors, such as greater social networks, better educational resources, and higher-quality teachers. They also note that the advantages of a private school education may be perpetuated through alumni networks and other forms of social capital.

Overall, the paper suggests that attending a private school can confer significant advantages in the corporate executive labor market, particularly for individuals who attend elite private schools. The findings have implications for policymakers and educators who are interested in promoting equal opportunities in the labor market.

Bibliography

If you want to list your bibliography here (many don't list this unless they are referred in the poster)

In the Eye of the Sufferer: Perceived Motivation of Compassion and Impacts

Hongguo Wei[1] Jason Kanov[2]

[1] RSBUS, Robert Morris University [2] Western Washington University

Introduction

The sufferer's (receiver) perception of the compassion giver's motives is absent (Dutton et al., 2014)

1) The appraisal process may determine the actual responses of the observer (Atkins & Parker, 2012).

2) Not only voluntarily personalized behavior is involved, but also forcible and impersonalized institutional behavior (Zucker, 1987).

Other-orientation (concern for others) and self-orientation (concerns for oneself) coexist in the person engaging in prosocial behavior (De Dreu & Nauta, 2009; Vaish et al., 2018).

Research question: How does a sufferer's perception of the compassion giver's motivation affect the sufferer's subsequent experience at work?
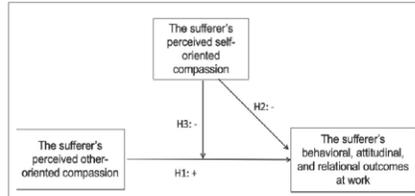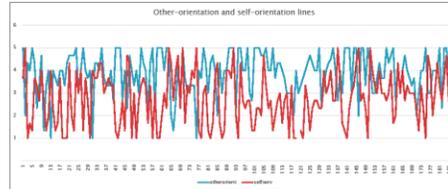
Figure 1 Theoretical Model

Table 1 Summary of Studies

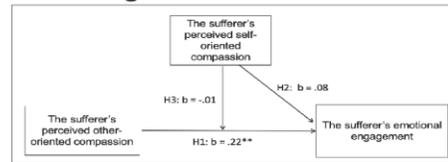|	
Pilot studies (1-2) Collected compassion stories (MTurk; business students)	Examine whether the motives in compassionate acts are more complicated than the pure other-orientation. How sufferers' perceptions of a compassion givers' motive related to their experiences of compassion.
Study 1 Recall design (employed workers; N=186)	Examine the role of the sufferer's perceived self-oriented vs. other-oriented motives and their impact on the sufferer's positive experience at work.
Study 2 Vignette-based experimental design (Prolific; N=229)	Validate the relationship between the sufferer's perceived self-orientation vs. other-orientation in compassion, and how the sufferer's expected compassion plays a role.

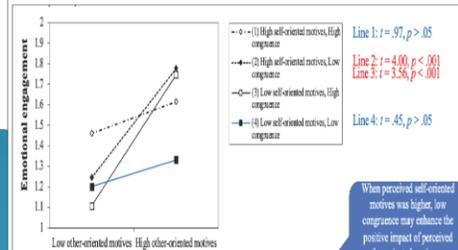## Study 1 Results

Figure 2 Other vs. Self-Orientation

Self-oriented and other-oriented compassion are independent and coexist.

Figure 3 Model Results

H3: b = -.01
H2: b = .08
H1: b = .22**

But the three-way interaction was significant ($b = -.26$, $p < .05$).

Figure 4 Three-way Interactions

Line 1: $t = .97$, $p > .05$
Line 2: $t = 4.00$, $p < .001$
Line 3: $t = 3.56$, $p < .001$
Line 4: $t = .45$, $p > .05$

Pair of slopes	Slope difference	t-value	p-value	95% Confidence Interval
(1) and (2)	-0.231	-2.125	0.035	[-0.444, -0.018]
(1) and (3)	-0.297	-2.335	0.021	[-0.546, -0.049]
(1) and (4)	0.015	0.076	0.940	[-0.371, 0.401]
(2) and (3)	-0.066	-0.543	0.588	[-0.304, 0.172]
(2) and (4)	0.246	1.363	0.175	[-0.108, 0.599]
(3) and (4)	0.312	1.383	0.168	[-0.130, 0.754]

When perceived self-oriented motives was higher, low congruence may enhance the positive impact of perceived other-oriented motives on emotional engagement.

When congruence was high, perceived self-oriented motives negatively moderated the relationship between perceived other-oriented motives and emotional engagement (v3).

Study 2 Results

Table 2 Analysis Results

Variables	Emotional engagement		Affect-based trust		Job satisfaction	
	b	SE	b	SE	b	SE
Frustration	.01	.08	.06	.07	.01	.07
Grief	-.18	.11	-.11	.10	-.20	.11
Perceived other-oriented motives (POO)	1.34***	.10	1.32***	.08	1.31***	.09
Perceived self-oriented motives (PSO)	-.62***	.09	-.61***	.08	-.62***	.09
Expected compassion (EC)	.11*	.05	.12**	.05	.09	.05
POO x PSO	.93***	.19	1.18***	.16	.98***	.19
POO x EC	.23*	.10	.21*	.08	.23*	.09
PSO x EC	-.20*	.10	-.21**	.08	-.28**	.10
POO x PSO x EC	.37	.19	.18	.17	.30	.19

Figure 5 Interaction Plots

Low self oriented motives
High self-oriented motives

Figure 6 Additional Analyses

Low-expected compassion
High-expected compassion
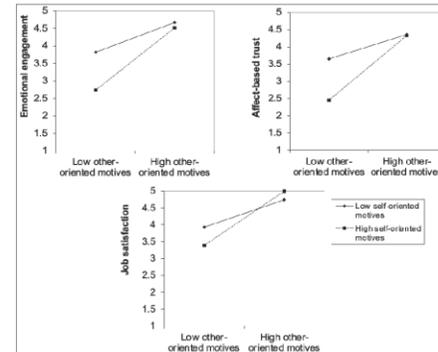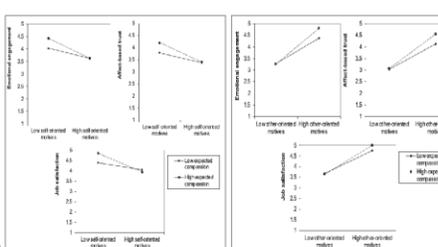
Conclusions

☐ Sufferers are not passive recipients of compassion. Understand compassion appraisal from the sufferers' perspective (Atkins & Parker, 2012).

☐ Self-oriented motives may comingle with other-oriented motives in any instance of compassion, which does not necessarily _compromise_ compassion's efficacy.

Practical Implications

☐ It is ok for employees/organizations to have self-oriented motives for engaging in compassion as long as they also have high other-oriented motives.

☐ For employees/organizations with too much emphasis on self-orientation, it is important to bring in other-orientation.

☐ Cultivate and convey feelings of empathic concern when displaying compassion interpersonally and when designing and implementing compassionate systems and structures.

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Esports and Physics Misconceptions

Gavin Buxton[1], Armand Buzzelli[2], Marina Fontolan[3] & Alexander Gagnon[4]

Abstract

Forces, velocities and accelerations. Friction and circular motion. Physics can be hard for students. So we used our Esports suite and physically realistic racing car simulations as an opportunity for students to physically feel and experience the physics of extreme driving conditions.

Physics of Racing Cars

Imagine as you turn a corner. The car (and everything within) appears to be pushed outwards. It isn't. This misconception and the role of static friction when drifting can be difficult for student to visualize. To help students elucidate the role of frictional forces in racing cars we made use of our Esports suite with racing car simulations.

Esports and iRacing

RMU's dedicated Esports center is an ideal space to to teach introductory physics principles in an non-traditional setting. This gives our students a tactile experience that immerses participants in a sensory adventure that includes seeing, hearing, and feeling what it is like to be a racing car driver.

iRacing and Physics Students

Our physics students met at RMU's Esports facility on campus and participated in an iRacing simulator session where we were able to experience and discuss physics concepts.

Conclusions

The Esports environment provided us with a framework for exploring different teaching techniques and the students a framework for discussing the physics. We found the use of our increasingly popular Esport facilities to enhance and enrich traditional class instruction.

Acknowledgments

A huge thanks to our iRacing team for sharing their expertise and equipment!

[1] Science Department, [2] Director of Campus Recreation, [3] University of Campinas (Rooney Scholar in Spring 2022), [4] Club Sports Marketing and Recruitment Coordinator.