• 14 years
• 8,000 participants
• Five States (MO, KS, NV, TN, NC)
• Increases strength, balance and flexibility


Physical Capacity Outcomes in Older Adults Enrolled in the Stay Strong, Stay Healthy Program: A Randomized Control Trial

Phase I
- Build the TEAM
- IRB
- RCT
- Recruit

Goal – achieve NCOA Tier III Evidence Based Status
- MU Extension, NEP, MOI, and Physical Therapy
- 60 yrs and older, sedentary, no severe cognitive impairments.
Phase II

Pre-Intervention Assessments

SSSH
N=20

Walking
N=20

Control
N=20

Total
N=60

Post-Intervention Assessments

8 weeks of intervention

NO CHANGE

Qual Study
THANK YOU TEAM!

Missouri Orthopaedic Institute
Physical Therapy
Dr. Bree Baker
Dr. Dana Duren
Dr. Trent Guess

Nutrition and Exercise Physiology
MU Extension
Kelsey Weitzel
Kristin Miller
Becky Shafer
Elena Doctor
Mikala Cessac
Betsy Embree

SSSH participants
MOI patients
Research Collaboration
Next slides – Extension SSSH
Stay Strong, Stay Healthy

Strength Training for Older Adults

April 17, 2019
Sarcopenia

Stay Strong, Stay Healthy

Young, active

Older, sedentary
Bone Density

Healthy Bone Tissue

Osteoporotic Bone Tissue

Stay Strong, Stay Healthy
Strength Training:

- Increases muscle strength
- Improves balance and flexibility
- Improves body composition
- Reduces joint pain
- Increases confidence ADL’s
- Improves social connection
Program Details

- 8 weeks
- 16 classes (1 hour each)
- Pre/post fitness assessments
- Hand and ankle weights provided
- Meets recommendations
- Certified instructor
- Social interaction
- Affordable and accessible
Stay Strong, Stay Healthy is designed to work all of the major muscle groups each class. It is also designed for individuals who may have significant difficulty moving to and from the ground independently. The exercises were chosen for their ability to significantly increase an individual’s capacity to build strength in ways that improve independent living capabilities. The following chart provides examples of life activities that may become easier when SSSH is conducted properly for the eight-week course. Participants have reported improvements within four to six SSSH classes, and research shows that exercisers derive the most benefit by developing a lifetime habit of regular strength training.

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Muscles</th>
<th>Body parts</th>
<th>Everyday activities made easier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wide leg squat</td>
<td>glutes, quadiceps, hip adductors and abductors</td>
<td>hips, butt, front of upper leg/thigh</td>
<td>moving to and from chairs, toilet, bed and car</td>
</tr>
<tr>
<td>Standing leg curl</td>
<td>hamstrings</td>
<td>back of upper leg/thigh</td>
<td>balance and walking, particularly up stairs, hills or uneven surfaces</td>
</tr>
<tr>
<td>Seated leg extension</td>
<td>quadriceps</td>
<td>front of upper leg/thigh</td>
<td>balance and walking, particularly down stairs, hills or across uneven surfaces, and rising from the floor or a kneeling position</td>
</tr>
<tr>
<td>Glute extension</td>
<td>Glutes, hamstrings, erecter spine</td>
<td>outside of hip, butt, back of upper leg, and lower back</td>
<td>maintaining balance, maintaining balance on uneven or slippery surfaces, putting on and removing shoes, turning or changing directions while walking</td>
</tr>
<tr>
<td>Biceps curl</td>
<td>biceps brachii and brachioradialis</td>
<td>front of upper arm</td>
<td>carrying groceries from the car to the kitchen, moving household items from one room to another, holding and carrying grandchildren</td>
</tr>
<tr>
<td>Overhead press</td>
<td>deltoids, biceps</td>
<td>shoulder, upper arm</td>
<td>putting household items into and taking them down from high cabinets, combing hair, putting on and removing clothing such as coats, shirts, etc.</td>
</tr>
<tr>
<td>Seated row</td>
<td>latissimus dorsi</td>
<td>middle back muscle</td>
<td>maintaining healthy posture, opening doors, dressing and brushing teeth and maintaining strong vertebrae</td>
</tr>
<tr>
<td>Toe stand</td>
<td>soleus and gastrocnemius</td>
<td>back of lower leg— calf muscles</td>
<td>walking up stairs or hills, walking on unstable ground, maintaining and regaining balance, reaching for things above head height</td>
</tr>
<tr>
<td>Flexibility</td>
<td>“joints”</td>
<td>depends on stretch being conducted</td>
<td>dressing and undressing, reaching, putting on and removing shoes, turning neck to look behind, reaching items in pants pocket, retrieving items from the floor</td>
</tr>
<tr>
<td>Deep breathing</td>
<td>diaphragm and intercostal muscles</td>
<td>muscles of the ribs and lungs</td>
<td>breathing deeply, catching breath or returning to normal breathing quickly</td>
</tr>
</tbody>
</table>
• 14 years
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**Phase II**
- Pre Testing
- 8 wk Intervention
- Post Testing
- Analyze

**Phase III**
- Manuscript
- Tier III application
- Next RCT
- REPEAT
Phase II

Total N=60
- SSSH N=20
- Walking N=20
- Control N=20

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SSSH participants
MOI patients
Research Collaboration
NEXT SLIDES ARE FOR LIMBERG
Some Nerve!

What it means to “listen” to your nervous system, the power to “ignore” and implications for sleep apnea.

Jackie Limberg, Ph.D.
Assistant Professor
Radiotelegraph transmission from the Titanic communicating a coded message of distress.
Peripheral Vessels

NE

Heart

Nerves form a fundamental means of communication.

ACH

Our ability to “decode” these messages remains in its infancy.

Peripheral Receptors

Cardiovascular Control Center

NE

NE

Department of Nutrition & Exercise Physiology
Muscle sympathetic nerve activity (MSNA) is predictive of mortality.

The greater the “distress” signal, the lower the survival rate.
What occurs as a result of a “burst”? 

- Sympathetic “burst” 
- Sympathetic Nerve Terminal 
- Neurotransmitter Release 
- Adrenergic Receptor 
- Blood Vessel
What occurs as a result of a “burst”?

- Sympathetic Nerve Terminal
- Neurotransmitter Release
- Adrenergic Receptor
- Blood Vessel
- Blood Pressure

Department of Nutrition & Exercise Physiology
Effect of apnea on sympathetic neural firing patterns

- **Breathing**
- **Blood Pressure**
- **Nervous System Activity**

<table>
<thead>
<tr>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Rate</td>
</tr>
<tr>
<td>Blood Pressure</td>
</tr>
<tr>
<td>Inspired/Expired Gasses</td>
</tr>
<tr>
<td>Tidal Volume</td>
</tr>
<tr>
<td>Muscle Sympathetic Nerve Activity</td>
</tr>
</tbody>
</table>

MU-PAW, Gwynn Hall, University of Missouri
The “distress” signal is similar in males and females...

...but a rise in blood pressure is only seen in males.
Overarching Questions

*Why* do males “listen” and females “ignore”?

Is the female “advantage” lost with *aging and/or obesity*?

Can we use the ability to “ignore” to *create an effective therapy* for female patients with sleep apnea?

Jackie Limberg, Ph.D.
limbergj@missouri.edu
Next slides are for Rui’s presentation
Financial Decision-making Responsibility and Household Wealth Accumulation: The Roles of Personality and Cognitive Ability

Rui Yao, PhD, CFP®

Personal Financial Planning
Motivations & Purpose of Study

• Making sound financial decisions is important
• This study answers three questions:
  Q1: Is financial responsibility determined by the couple’s personality and cognitive ability?
  Q2: Do the effects of the couple’s personality and cognitive ability on household wealth vary by their financial responsibility roles?
  Q3: How does inefficient financial responsibility allocation affect household wealth accumulation?
Literature Review: Summary

• Personality Predicts Financial Outcomes
• Cognitive Ability Predicts Financial Outcomes
• The Bargaining Model
  • Decision making is based on power
• The Collective Model
  • Decision making is based on efficiency
Hypotheses

**H1**: Financial responsibility allocation among a couple depends on their comparative strengths of personality and cognitive ability.

**H2**: Personality and cognitive ability of the couple are associated with household wealth, and the associations depend on the financial responsibility allocation.

**H3**: Inefficient allocation of financial responsibility is associated with insufficient household wealth accumulation.
Data & Models

• The Health and Retirement Study (HRS) 1992-2012

• Sample:
  • No proxy, no missing values, opposite-sex, both alive
  • 26,057 observations

• MFR = Relative Strengths (H-W) + Control
• Wealth = Personalities + Cognitive Abilities + Control
• Wealth = Misallocation + Control
Test H1: Relative Strengths of Personality and Cognitive Ability
Test H2: Total Net Wealth
Test H2: Financial Net Worth

Parameter estimate
FR: conscientious
Spouse: conscientious
FR: stability
Spouse: stability
FR: extroversion
Spouse: extroversion
FR: agreeableness
Spouse: agreeableness
FR: openness
Spouse: openness
FR: memory
Spouse: memory
FR: numeracy
Spouse: numeracy
**Test H3: Impact of Inefficient Allocation**

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IHS (total net worth)</td>
<td>IHS (financial net worth)</td>
<td>Share in stocks mutual funds investment trusts</td>
</tr>
<tr>
<td>Misallocation</td>
<td>-0.883*** (0.247)</td>
<td>-0.859*** (0.190)</td>
<td>-0.028 (0.017)</td>
</tr>
<tr>
<td>Observations</td>
<td>26,057</td>
<td>26,057</td>
<td>26,057</td>
</tr>
</tbody>
</table>

**Misallocation:** the counterfactual probability of the other person is the FR.

**Controls:** the average psychological characteristics
Conclusion

• The relative strength of husband’s and wife’s personality and cognitive ability predict financial decision power allocation. → Supporting H1

• Personality and cognitive ability predict wealth accumulation based on financial responsibility. → Supporting H2

• Inefficient financial responsibility allocation is associated with lower wealth. → Supporting H3
Implications

Selecting the major household financial decision-maker is vital for household financial wellbeing.

- Misallocation: forgone opportunities for sound savings and investment decisions
- Reallocation: an alternative to other interventions aiming at improving financial wellbeing
- Future research
  
  Reasons for misallocation: gender stereotype, peer effects, and culture
Thank you!

Rui Yao, PhD, CFP®

Personal Financial Planning
Next slides are for Li’s presentation

Next slide for Rui’s presentation
Fashion Informatics: Big Data in Fashion

Li Zhao, Ph.D.
Textile and Apparel Management
What is fashion informatics?
Fashion Informatics

- Data-driven discovery and innovation
- Forecasting Fashion Trends
- Influencer Analytics
- Natural Language Processing
- Style Recommendation Algorithms
- Massive data integration
- Radical personalization
- Style Recommendation Algorithms
- Visual Search
- Hyperscale real-time matching
- Visual Search

Fashion Informatics
Modi, D., & Zhao, L. (Under 2nd review). Analyzing Twitter and Instagram social networks to trace consumer opinion regarding transparency in the apparel supply chain.

Thank you!
Next slides are for Francisco’s presentation
Family, Bilingualism, and School Success

Francisco Palermo
Human Development & Family Science
My Program of Research

• Fostering children’s healthy development and school success, particularly children at-risk due to:
  – Adverse childhood experiences (e.g., poverty)
  – Limited English proficiency
My Approach

• Strength-based
  – Build-on or capitalize on the positive characteristics of individuals and families to foster children’s positive development and reduce the negative consequences of adversity
Children’s English and Spanish Skills

- Children’s literacy and math knowledge transfer across Spanish and English, but not vocabulary knowledge

Current Research Project

Leveraging the Power of Play: An Observational Investigation of Pretense as a Mechanism for Cognitive Development in Preschool Classrooms

Rachel Thibodeau (Mizzou HDFS), Rachel White (Hamilton College), and me
Francisco Palermo
Human Development & Family Science
Email: palermof@missouri.edu
Next is Arch St.
HES RESEARCH TALK

VISUALIZE SMART GROWTH DEVELOPMENT
WITH PARAMETRIC BIM

Jong Bum Kim, Ph.D.
Architectural Studies
VISUALIZE SMART GROWTH DEVELOPMENT WITH PARAMETRIC BIM

This research investigates how to envision Smart Growth Development with immersive modeling and visualization technologies for more reliable decision-making.
Smart Growth

- A multifaceted urban planning and design approach initiated by Environmental Protection Agency (EPA) in the United States.

- Controls design, form, and scale of community developments by rules, which have implicit and explicit implications to sustainable community developments.

Source: Codes Study retrieved from http://www.placemakers.com/how-we-teach/codes-study/
Research Phases

Phase 1: Smart Growth Regulation Analysis
- Analyze urban regulations

Phase 2: Parametric Modeling
- Create parametric urban model

Phase 3: Solar Radiation Modeling
- Create energy (Radiation) model
- Perform radiation simulation

Phase 4: Implementation
- BIM to VR

Decision:
- Report parameters/simulation results
  - Yes: Analyze simulation results
  - No: Terminate iteration

Flowchart:
1. Smart Growth Regulation Analysis
2. Parametric Modeling
3. Solar Radiation Modeling
4. Implementation
Parametric Modeling in BIM by using Revit

Section configuration

Parcel mapping

Parameterization
Application Development

- Use Revit API, C#, and Dynamo (Visual programming)

- Support parametric modeling, regulation information handling, and performance simulation
  - Manipulate object parameters
  - Extract model information
  - Execute performance simulation (Radiation, Energy, Daylighting, Pro-Forma)
  - Export simulation results
BIM/VR integration

- Explore a wide range of development scenarios of Smart Growth via BIM/VR integration.

- Create an interactive and expeditious communication between BIM and VR.
  - Bi-directional update
  - Parametric model update
BIM/VR platforms

- Data exchange
- BIM database access
- VR customization
- Software dependency
PHASE 4. BIM TO VR TESTING
Related Works


2019 Funded, Principal Investigator, University of Missouri Research Council, Envisioning an Unbuilt Environment: A pilot study of an urban information modeling for visualization and performance analysis of land development ($12,926 for 2019-2020)

2019 Funded, Principal Investigator, Richard Wallace Faculty Incentive Grant Award, Envisioning Smart Growth development with immersive modeling and visualization ($4,000 for 2019-2020)

2018 Funded, Principal Investigator, University of Missouri Mangel Faculty Research Catalyst Fund, Visualizing Smart Growth: A Case Study of Columbia Unified Development Plan ($3,000 for 2018-2019)
THANK YOU

Jong Bum Kim, Ph.D.
Architectural Studies