The Human Factors and Aging Laboratory at the Georgia Institute of Technology focuses on understanding the fundamentals of psychology as they relate to human behavior in the context of technology interactions. Our research areas include healthcare technologies; design for aging; technology acceptance; human-automation interaction; aging-in-place; human-robot interaction; cognitive aging; aging with disabilities; and skill acquisition and training.

The laboratory is funded by: the National Institutes of Health as part of the Center for Research and Education on Aging and Technology Enhancement (www.create-center.org); and the National Institute on Disability, Independent Living, and Rehabilitation Research (Department of Health & Human Services, Administration for Community Living) (www.techsage.gatech.edu). We are also an active member of the Aware Home Research Initiative (http://awarehome.imtc.gatech.edu).

**In This Issue**

From the Directors ................. 2
Awards and Achievements ........... 4
New Faces ................................ 5
Recent Books and Publications ...... 6
Research Spotlights ................. 8
Research in Brief ..................... 13
Undergraduate Corner ............. 15
Collaborators......................... 15

www.hfaging.org
From the Directors...

Funding Support for our Research Efforts

We have recently completed the second (of five) years of funding for our Rehabilitation Engineering Research Center entitled Technologies to Support Successful Aging with Disability (TechSAge; www.techsage.gatech.edu). This effort is funded by the National Institute on Disability, Independent Living, and Rehabilitation Research, which is part of the U.S. Department of Health & Human Services, Administration for Community Living. The overarching goal of this center is to ensure the scientific foundation necessary for effective technology integration into the lives of older adults who are visually impaired, Deaf/hard of hearing, or mobility impaired. We were fortunate to have Elena Gonzalez join us this year as the Program Coordinator of the center. Elena comes to us with a Master’s degree in Gerontology and is also actively involved in a number of research projects.

The Human Factors and Aging Laboratory is the lead on two of the research projects in the center: (1) Taxonomy of Everyday Support Needs for which Wendy is the Principal Investigator; and (2) Telewellness Technologies for which Tracy is the Principal Investigator. One of our collaborators on the first project is Dr. Jenny Singleton who is a developmental psychologist as well as a “CODA” which is a Child of Deaf Adults. Jenny’s involvement has been critical to the success of our research and we were excited to join her at this year’s meeting of the Deaf Seniors of America, which was held in Asheville, NC. We were especially delighted to meet her lovely parents and many family friends at the conference who were all so welcoming and eager to assist with our research projects.

Drs. Jenny Singleton and Wendy Rogers in our exhibit space the Deaf Seniors of America Conference, and with Jenny’s parents, Julian and Bernice Singleton, who are active members of the association.
Our primary collaborator on the second project is Dr. Jenay Beer, who is an alumna of our lab and now an Assistant Professor at the University of South Caroline. We were thrilled to have the opportunity to continue to work with Jenay. This project yielded a journal publication this year entitled “Design considerations for technology interventions to support social and physical wellness for older adults with disability.” In addition, Tracy and Elena represented the TechSAge team at the National Conference of the Rehabilitation Engineering Society of North America (RESNA), which was held in Denver, CO.

We also received some additional funding to set up CREATE IV, which is our long-running Center for Research and Education on Aging and Technology Enhancement. CREATE is funded by the National Institutes of Health through the National Institute on Aging (NIA). We will be developing the next generation of the computer system we developed for older adults, namely PRISM which is the Personal Reminder, Information, and Social Management system. Our initial research with this system showed that having it in their home for one year reduced feelings of loneliness and social isolation for older individuals living alone.

Georgia Tech also was refunded for the Ruth L. Kirschstein National Research Service Award (NRSA) Institutional Research Training Grants. Along with Dr. Audrey Duarte, Wendy is the Program Director for this grant that provides Research Training in Cognitive Aging to five pre-doctoral fellows and two post-doctoral fellows in the School of Psychology. In our lab, Sean McGlynn and Kenny Blocker are pre-doctoral fellows and Dr. Mike Bixter is a post-doctoral fellow supported by this program.

In sum, we have continued to obtain research funding to support our laboratory. We are fortunate to have strong collaborators both at Georgia Tech and at other universities and companies. In addition, we have excellent undergraduate students, graduate students, and researchers who conduct so much high quality research every year. As is evident from the information in this newsletter, our laboratory is active in a broad range of research activities with the common goal of advancing psychological science and improving technology interactions for people of all ages.

Wendy A. Rogers, Ph.D. & Tracy L. Mitzner, Ph.D.
Director & Associate Director of the Human Factors and Aging Laboratory
Awards and Achievements

Laura Barg-Walkow:
Foley Scholar Finalist (2015)
Laura was 1 of 8 finalists for the Foley Scholar Award, which recognizes innovative research in shaping technology for a broad range of challenges in modern society on the basis of personal vision, brilliance, and potential impact.

Internship summer 2015 at Johns Hopkins Hospital
Laura worked as a Human Factors Engineer at the Johns Hopkins Hospital. Her work focused on making hospital processes and medical devices safer, more efficient, and more satisfying to use.

Kenneth Blocker:
President’s Fellowship
Kenneth was awarded the President’s Fellowship from Georgia Tech, which is offered annually to a select number of highly qualified students who intend to pursue doctoral degrees.

National Institute on Aging Training Grant
Kenneth was awarded the National Institute on Aging (NIA) Training Grant, which supports predoctoral students in conducting aging research relevant to the mission of the NIA.

Christina Harrington:
User Experience/User Interface Design Intern at Apple, Inc.
Christina is working as a User Experience/User Interface Design Intern at Apple, Inc. in Silicon Valley. Her work focuses on improving the usability and accessibility of interfaces and maximizing the overall user experience of hardware tools.

HFES Aging Technical Group Scholarship
Christina’s proposal Evaluating the Most Effective Format of Quick-Start Guide to Aid Older Adults in Performing Gesture-based Interactions was selected as the winner of the HFES Aging Technical Group Scholarship. The scholarship helps students pay for research-related expenses.
Awards and Achievements (cont.)

Sean McGlynn:
Human Factors and Ergonomics Society (HFES) Student Chapter
Sean was voted to be the President Elect of the Georgia Tech HFES Student Chapter.

Residential Care Facilities for the Elderly Authority of Fulton County Scholar Award
This award is to support students whose research is focused on improving the quality of life for older adults through Fulton County’s program in the College of Science.

Wendy Rogers:
Winner of the 1st International Conference on Human Aspects of IT for the Aged Population Best Paper Award

New Faces

Dr. Michael T. Bixter
Mike’s research interests include gaining a better understanding of how people make decisions about items of value (e.g., money). Recently, one particular focus has been on exploring how peers influence an individual’s decision preferences. His current study builds on this prior research by exploring social influences on reward-based decision making in both younger and older adults.

Kenneth Blocker
Kenny is a first year graduate student in Cognitive Aging with a background in aging and human factors from Florida State University. He is interested in topics such as cognitive aging, technology design and acceptance, medical human factors, and healthcare. Currently, he is investigating the misconceptions and cognitive factors involved in the adherence to medication regimens by older adults, as well as understanding how to design social networking applications for older adults based on the preferences of current users and non-users.
Amy Wing-Lam Chong
Amy is a first year graduate student in Cognitive Aging. She is broadly interested in aging, healthcare, and decision making. Her first year project aims at investigating younger and older adults’ medical risk taking and their susceptibility to social influences when making these decisions. She is also assisting on a project exploring how peers influence individuals’ reward-based decision making with a focus on age differences.

Elena Gonzalez
Elena is a Gerontologist with an interest in how technologies and environments can enable older adults to age in place. She currently serves as both the Project Coordinator and an Investigator for RERC TechSAge (Rehabilitation Engineering Research Center on Technologies to Support for Successful Aging with Disability). She is excited to be a part of the TechSAge grant center and the HFA Lab.

Rachel Stuck
Rachel is a first year graduate student in Engineering Psychology. She is interested in a variety of topics such as assistive robotics and technology, health care, and human-robotic interaction with the hope of improving lives of people with impairments. For her first year project she is interested in exploring trust in the relationship of older adults and personal care attendants.

Books under Development


Selected Recent Publications


Older adulthood is often accompanied by major life transitions such as declines in health, retirement, changes in living arrangements, widowhood, and bereavement. These transitions can negatively impact the quantity or quality of available social support and relationships and may infuse feelings of loneliness. Living alone in older age could complicate the picture further. Currently, about 30% of non-institutionalized older adults in the US live alone. Although living alone does not necessarily result in actual or perceived isolation, those who are isolated are quite likely to be living alone. It is not well-understood how older adults who live alone maintain their social connectedness, and why some older adults feel lonelier than the others.

As issues related to loneliness and isolation are rising, technologies are also being rapidly developed with the goal to enhance people’s connectivity. Internet-based platforms such as Facebook, email, and video-conferencing (e.g., Skype, FaceTime) support human-human interactions albeit the nature of interactions is quite different across these tools. These Internet tools are well adopted by younger adults and now many older adults are also becoming users. However, not much is known about the extent of usefulness older adult users perceive of Facebook, and consequently, the ways in which they use and do not use Facebook are also unknown. We designed a study to holistically understand the social lives and experiences of older adults who live alone and to identify the role and potential of Internet tools in sustaining socio-emotional needs in older age. To achieve this goal a structured interview and questionnaire assessments were conducted with 48 older adults aged 65-85 years recruited from the Atlanta metropolitan area. All participants were email users but only half of them were Facebook users. The interview focused on three main aspects:

1. To understand the experience of living alone in older age.

2. To understand how older adults who live alone maintain their social relationships with their friends and family, and also with their neighborhood, and/or community.

3. To understand the current role and potential of Internet-based social technologies in maintaining social connectedness.

Additional questionnaires on health, loneliness, isolation, and personality were also used to gain a more complete understanding of the social lives and experiences of older adults who live alone.
picture of each participant. Detailed data analysis is ongoing; however one key insight we have gathered from preliminary analysis is that for many participants, living alone is a choice that they enjoy and prefer over living with someone, as they perceive a greater sense of freedom and independence in living alone. However, a few older adults remarked that living alone was a situation that they had to get used to due to their circumstances. Therefore, it is important for researchers to understand the differences in people’s choices for living arrangements, particularly when designing interventions and measures to counter loneliness.

In regards to the Internet tools, participants perceived email to be highly useful for communication and information sharing, and relatively easy to use. Despite being familiar with video-conferencing tools such as Skype and Facetime, many participants were not active users. The reasons ranged from not having access to such a tool, not knowing how to use it, not perceiving it as useful in their daily lives, personal preference to not be on camera, and concerns related to privacy. Facebook users and non-users were not too different in their perceptions of Facebook. They were open to viewing positive, happy, or enlightening information on Facebook but not anything that is negative, offensive, or too personal. Even everyday users tended to not post much content but used Facebook to primarily view what others had posted, particularly photos and updates from family and friends.

To design effective technologies to counter age-related declines in social connectedness, older adulthood needs to be better understood as a life-stage. According to the socio-emotive theory of aging, older adulthood is the time when people’s life goals are less future-oriented and more focused on the present. There is a greater desire to invest time and effort in the sustenance of close existing relationships than in seeking new friendships. Although relocation, retirement, widowhood, and other external factors may make it harder for some older adults to stay connected with their past and existing relationships, they may be less likely to adopt a technology that only promises to enlarge their social circles. Instead, a technology or system that supports social activities (e.g., reading, exercising) that older adults already enjoy or deem important can bring people with shared interests closer, and better support connectedness needs. Through more in-depth analysis of the data from this study, we hope to generate guidelines to improve the design and deployment of tools and technologies that can help older adults stay, and more importantly, feel socially connected.
Investigating Daily Influences on Within-Person Emotional Variability in Older Adults

By Sean McGlynn

When a person asks, “How are you?” how do you respond? What types of things do you think about that make you decide whether you are feeling generally “good” or “bad”? It is likely that your response will have something to do with your subjective well-being, which is your evaluation of your own quality of life, including your satisfaction with life as a whole and your positive and negative emotional state at that time. You can imagine that your positive and negative emotions, also referred to as positive and negative affect, can be influenced by a number of factors. For example, perhaps you were late for an appointment and you were stressed, or you stepped in a puddle and ruined your shoes, or your car broke down. These types of events would probably increase your negative affect and decrease your positive affect.

However, people are different, and the extent to which they react to daily events varies. You may know a “moody” person whose emotions fluctuate between positive and negative quite often, whereas another person you know may be more emotionally stable, and is either always in a bad mood or always in a good mood. Although these two hypothetical people have very different patterns of emotion, it is possible that on average, they appear to be similar (see Figure 1).

Older adults’ remain overall emotionally positive, despite potential declines in physical and cognitive health; life-altering events such as death of friends and family members; or changes such as retirement. Additionally, people tend to become more emotionally stable as they age, meaning that if you were to ask an older adult and a younger adult about their emotions on several different occasions, the

Figure 1.
Positive affect ratings for two participants over the course of the first week. Although their averages for the week are similar, their within-person variability is very different.
probably be more similar at each occasion than the younger adults’ responses.

Although older adults do still vary in their emotions, the causes and consequences of within-person emotional variability in older adults are not well-understood. In this project, we are primarily interested in answering the following questions:

1) What daily activities and health perceptions lead to within-person emotional variability?
2) Are there between-person differences in the factors that lead to within-person emotional variability?

This is an example of the interface the survey the older adults completed

To answer these research questions, 59 older adults (ages 65-80) completed online surveys three times per day, every weekday, for one month (3 surveys X 20 weekdays = 60 total surveys). In addition to questions about positive and negative affect, these surveys asked questions about the following:

**Daily activities:**
- **Life-Space** (Distance traveled from your bedroom)
- Physical Activity (# of hours)
- Social Activity (# of hours)

**Health perceptions:**
- **Pain**
- **Sleep Quality**
- **Stress**
- **Subjective Health**
  - Physically Healthy
  - Physically Rested
  - Physically Strong

The initial results of this study indicate that stress predicts within-person positive affect variability such that on days when people were more stressed, they also tended to fluctuate more in their positive affect. For negative affect, people fluctuated more on days when they were more stressed, and also on days when they were less physically active.

Regarding between-person differences in the factors that lead to within-person affect variability, higher pain and stress lead to higher positive affect and lower negative affect; however, these relationships were not the same for all of the participants. For some participants positive affect increased as stress increased but for others positive affect decreased as stress increased.

Further analyses are being conducted to better determine exactly what the nature of the individual differences are in the relationships between daily factors and affect. The results of this study will provide us with a better understanding of the relevant factors involved in older adults’ daily emotional fluctuations. Furthermore, we can use this information to guide the development of personalized technologies and interventions that have the potential to aid older adults’ maintenance of healthy emotional profiles, which will in turn lead to better health.
People are increasingly playing a more active role in maintaining their health. Technologies, like activity trackers, may help support health self-management by promoting awareness and providing encouragement for healthy habits. Activity trackers allow users to log their physical activity, food intake, and other wellness-related information. We partnered with Georgia Tech’s Homelab (http://homelab.gtri.gatech.edu/) to explore how adults over age 65 use activity trackers.

Prior to using activity trackers, participants were open to trying the technology, and felt it would be easy to use and useful. While using either the Fitbit One or myfitnesspal.com for four weeks, these 16 participants described potential barriers to use. These barriers included the perceived inaccuracies of the trackers and the amount of time required to use the trackers. However, participants also noted that the trackers were indeed easy to use and had help resources that supported use. Participants also valued being able to view their progress towards health-related goals. These themes re-emerged in a final interview wherein participants had stronger opinions about these technologies. Participants liked the automated features, the extensiveness of the found database, and the encouragement to be more active and adhere to healthier diets. However, manually adding to these logs was sometimes difficult, especially for homemade foods.

Based on these findings and human factors principles, we suggested training and deployment strategies to make activity trackers more congruent to the needs of adults over age 65. For example, manually entering data into the logs would be easier if their formats were consistent. We also suggest trackers communicate uses especially helpful to adults over 65, such as the food log tracking sodium intake. In sum, these activity trackers could help older adults to manage their health, but could be improved to do so in a more user-friendly way.

The Fitbit One is an example of an activity tracker that includes both a wearable device and a website.
Research in Brief

Age-Related Differences in Medication Risk Taking and Susceptibility to Social Influences
Amy Chong is investigating medication risk taking and the role of social influences in individuals’ risk taking tendency among younger and older adults. The aim of this project is to understand more about the factors affecting risky decision making processes in both age groups.

Aging, Health, and Emotion Variability
Sean McGlynn is investigating the extent to which older adults’ emotions fluctuate throughout the course of the day. He is interested in what leads to these fluctuations (e.g., pain, physical activity) and why some people might fluctuate more than others. The overarching goal is to develop tools and strategies older adults can use to maintain emotionally healthy lives.

Exergames
Maintaining physical activity is a key component of successful aging. Exergames, which are video games designed to promote exercise, are a promising method for engaging in physical activity. However, the majority of exergames were not designed for older adults in terms of content and usability. Laura Barg-Walkow is investigating older adults’ perceptions of usefulness and ease of use regarding exergames.

Everyday Technology Use by Deaf Older Adults
Dr. Jenny Singleton and Elena Gonzalez are conducting a technology survey exclusively for deaf/hard of hearing adults (ages 50+). This nationwide survey explores current technology use among deaf/hard of hearing seniors in terms of their attitudes toward and challenges with technology, as well as particularly frustrating devices.

Interruptions
Interruptions are arguably an unavoidable part of life. When you get interrupted, it can become challenging to continue what you were doing before being interrupted. Additionally, different factors (e.g., time pressure, task priorities) can affect how tasks are resumed. Laura Barg-Walkow is currently investigating how, why, and in which order people resume original tasks following interruptions.

Knowledge and Automation
This study seeks to understand how individuals interpret, and react to automation imperfections. Kimberly Preusse is utilizing an everyday automation, wearable activity trackers, to assess how users troubleshoot when automation imperfections occur.
Research in Brief (cont.)

Social Influences on Temporal Decision Making in Younger and Older Adults
Temporal decisions refer to decisions between outcomes that occur at different points in time. For instance, would you prefer to spend new income immediately or put it in a savings account to be experienced later in the future? Mike Bixter’s current study seeks to understand the social influences on temporal decision making, and whether these social influences differ between younger and older adults.

Technology to Support Emotional Well-Being
Sean McGlynn is exploring how technology can be used to enhance emotional well-being, for example through stress reduction. The goal of this project is to improve the well-being and quality of life of individuals who are at risk for social isolation.

Understanding Dimensions of Trust in Personal Care Attendant and Older Adult Relationships
Rachel Stuck is investigating trust in the relationship of older adults and personal care attendants. The goal of this project is to improve these relationships and then use this to improve human-robotic interaction as robotics become more of a part of home health care.

Understanding Medication Adherence for Older Adults with Hypertension
Kenneth Blocker is investigating the misconceptions and cognitive factors that affect the adherence to medication regimens by older adults with hypertension. The overarching goal of this study is to better understand how to improve the ability of older adults to successfully take their prescribed medications, as well as to aid in the design of interventions to ensure that those impacted by chronic illnesses are provided with the appropriate information and strategies necessary to manage them effectively.

User Needs
Dr. Jenny Singleton, Elena Gonzalez, and Kimberly Preusse are working on a project to assess the user needs for technology, access to community and health resources, and aging in place for individuals aging with vision, hearing, or mobility impairments.

We are on Facebook!
Visit our new Human Factors & Aging Laboratory Facebook page to get updates on our recent activities!
You can like us at www.facebook.com/hfaging/
Undergraduate Corner

We would like to recognize the hard work of all of our undergraduate research assistants for the year 2015: Jaudale Banks, Hiyong Byun, Evelyn Chang, Kevaghn Hinckley, Nathan Katica, Sameera Omar, Yeirun (Erica) Park, Timothy Perry, Mimi Phan, Danielle Redmond, Yingbo Shi, Kaitlyn Shinault, Banafsheh (Bonnie) Shoai, Catherine Stephens, Joshua Terry, Joshua Whitley, and Xi (Alessandra) Zhang

Featured Undergraduate: Bonnie Shoai was a recipient of a Georgia Tech President’s Undergraduate Research Award in Summer 2015. Bonnie assisted Akanksha Prakash with research on the social connectedness of older adults who live alone and use internet.

Research Support and Collaborators

Center for Assistive Technology and Environmental Access

College of Architecture
We are updating our participant registry! We use this registry to recruit for research studies.

Please let us know if any of your contact information (phone number, email, address) has changed.

If you know anyone interested in joining our participant registry, please have them call us (404-894-8344) or email us (hfaging@psych.gatech.edu).