

Use of Mobile Technologies for Social Connectedness and as a Tool for Research Data Collection

**Karen Fingerman, PhD
Kira Birditt, PhD*
Debra Umberson, PhD**

**University of Texas at Austin
*University of Michigan**

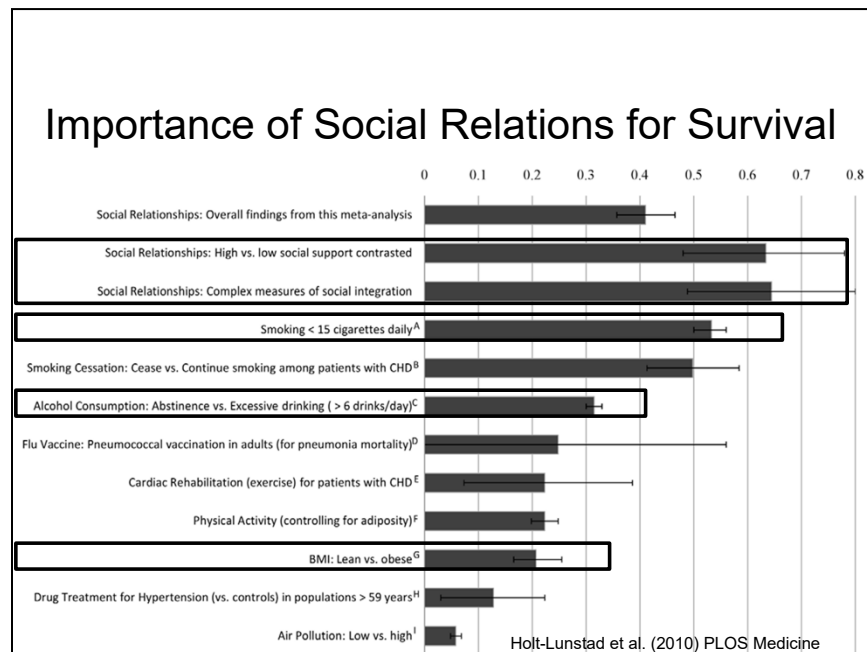
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TV viewing and computer use?

Slide 1

FKL3 Fingerman, Karen L, 12/6/2019



First, why focus on social relations. This is a graphic to illustrate how important social relationships are for health compared to other key Lifestyle factors that we consider to be highly important

This is based on meta analysis of the literature on the social relationships and mortality. You can see here that social relationships are more important predictors of mortality than many other factors that we consider highly important for health including smoking, alcohol consumption, and weight.

But also the quality of relationships in terms of how supportive their relationships were was a better predictor than more simple relationships status variables such as the number of network members or marital status or whether they were living alone

But this all assumes that relationships are positive and supportive

Abstract:Results: Across 148 studies (308,849 participants), the random effects weighted average effect size was OR = 1.50 (95% CI

1.42 to 1.59), indicating a 50% increased likelihood of survival for participants with stronger social relationships. This finding remained consistent across age, sex, initial health status, cause of death, and follow-up period. Significant differences were

found across the type of social measurement evaluated ($p < 0.001$); the association was strongest for complex measures of

social integration (OR = 1.91; 95% CI 1.63 to 2.23) and lowest for binary indicators of residential status (living alone versus

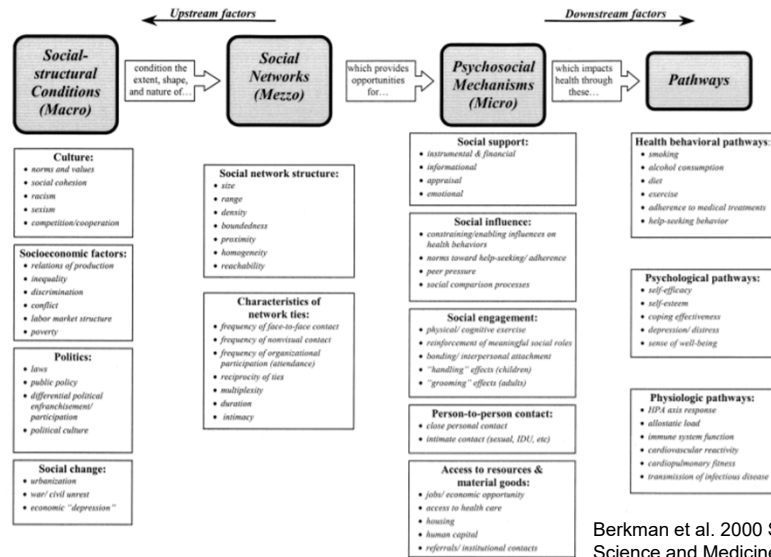
with others) (OR = 1.19; 95% CI 0.99 to 1.44)

Figure 6. Comparison of odds (lnOR) of decreased mortality across several conditions associated with mortality. Note: Effect size of zero indicates no effect. The effect sizes were estimated from meta analyses: ; A = Shavelle, Paculdo, Strauss, and Kush, 2008 [205]; B = Critchley and Capewell, 2003 [206]; C = Holman, English, Milne, and Winter, 1996 [207]; D = Fine, Smith, Carson, Meffe, Sankey, Weissfeld, Detsky, and Kapoor, 1994 [208]; E = Taylor, Brown, Ebrahim, Jolliffe, Noorani, Rees et al., 2004 [209]; F, G = Katzmarzyk, Janssen, and Arden, 2003 [210]; H = Insua, Sacks, Lau, Lau, Reitman, Pagano, and Chalmers, 1994 [211]; I = Schwartz, 1994 [212]. doi:10.1371/journal.pmed.1000316.g006.t

How do social connections increase longevity?



Effects on well-being: Social Integration



Berkman et al. 2000 Social Science and Medicine

Effects on Well-being: Close Ties

- Social support
- Feelings of connection
- Affection
- Buffer against stress
- Health behaviors
- Meaning/Generativity
- Companionship



... socioemotional selectivity theory

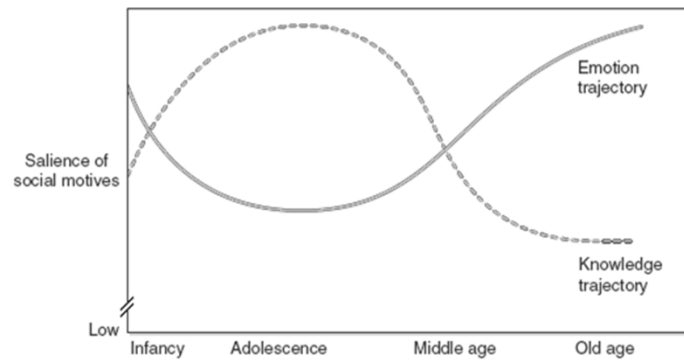


FIGURE 9.4
Socioemotional
Selectivity Theory

Source: Carstenson, Gross, & Fung, 1997.



**It's difficult to make friends
in an old age,
so any loss is
crucial**

~ Vauvenargues ~



A few other things to consider
about social ties....

Social ties are not necessarily good for old people

- Demands: Caregiver burden
- Stress: Conflicts
- Victimization: Abuse
- Bad health behaviors



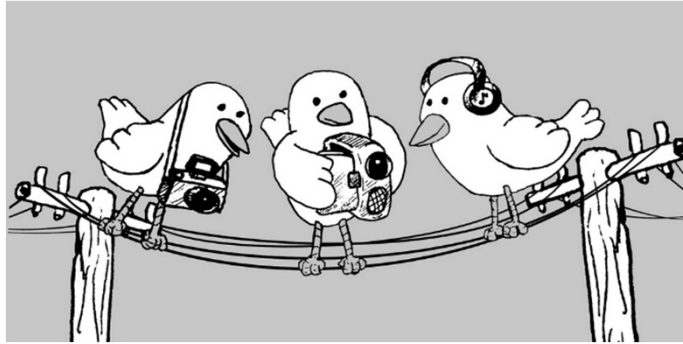
Family most likely to commit financial abuse- estimates difficult to get/under-reported

National council on aging says 1 in 10 older adults suffers some type of abuse- financial, physical, emotional, passive neglect

SEC investigated and found that for every 1 reported incident of financial abuse 44 went un-reported

Cannabis use is on the rise-The Gerontologist 2019 Gerontology and Geriatric Medicine 2018

Homophily



Definitions

- Social isolation:
Lack of connections to social partners or infrequent contact
- Loneliness:
Discrepancy between actual and desired levels of social connection
- Solitude:
Absence of social pressure/restorative experiences



Definitions from
Holt-Lunstad 2018
Birditt et al. 2019

What we know about social isolation in late life

- Older adults spend $\frac{1}{2}$ of time alone.
- 24% of community dwelling adults 65+ socially isolated
- Black and Hispanic lower odds of social isolation



Data were from the NHATS – Cudjoe et al 2018 online 2019

Definition –

1 point for live with another person- Talk to 2 or more people about “important matters” in the past year, attended religious services in past month- participate in other activities in the past month.

Score of 1 or 0 classified as socially isolated

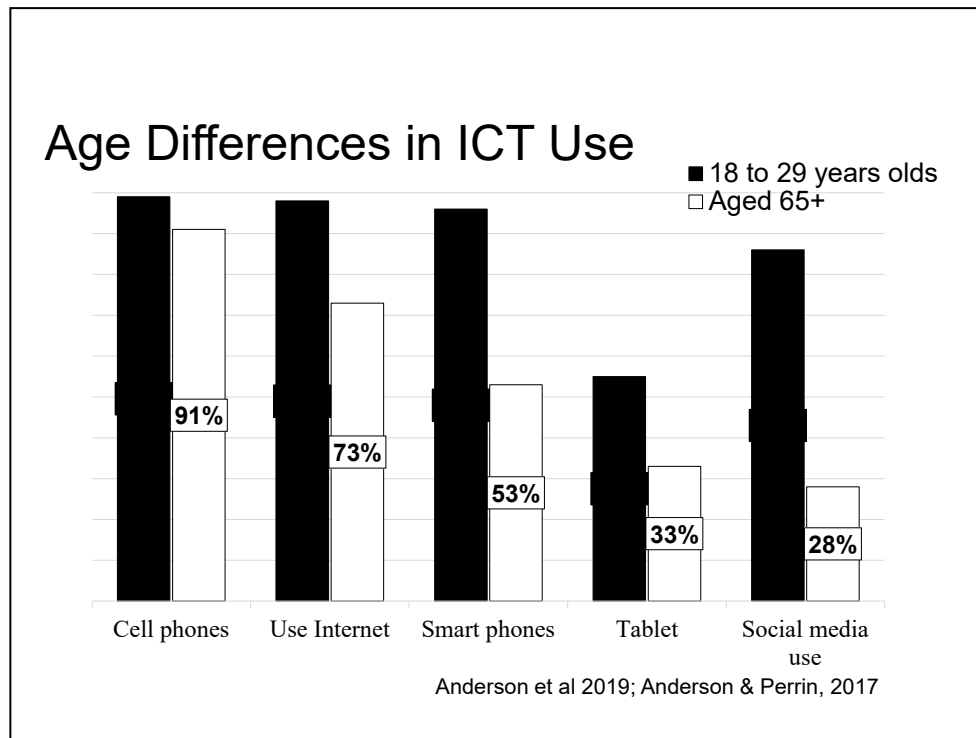
ICTs and Social Connection

Key Questions about ICT Use in Late Life

- Who uses ICTs in late life?
- Why do they use it?
- What are the consequences?
- Can we shift the patterns?

https://commons.wikimedia.org/wiki/File:The_Who_Logo.svg

PROJECT with/ICT QUESTIONS	Health and Retirement Survey (HRS) 2002-2016	Health and Retirement Survey (HRS) 2012-2018	National Health and Aging Trends Study NHATS	PEW RESEARCH FOUNDATION*
Sample	• National • Aged 50+ N = 22,000	• Subsample of HRS • Aged 50+ Technology module N= 1800	• Community-dwelling Medicare beneficiaries • Aged 65+ • 8,000+	• Older adults who are community dwelling and healthy
Design	• 1992 • Every 2 years	• 2012 • Every 2 years	• 2011 • Every year	• Single cohort designs
Technology	Do you regularly use the World Wide Web, or the Internet, for sending and receiving e-mail or for any other purpose...?	10 ICTs Email Video phone SNS Smartphone Devices to monitor health	12 ICTs Landline Cell phone Text or email Used computer not at home Internet for various uses	Specific technologies in subgroups at one point in time



Anderson et al. 2019 Use of internet

Anderson and Perrin 2017

Pew Survey June 12 2019- no author specified- data on cell and smart phone

<https://www.pewresearch.org/internet/fact-sheet/mobile/>

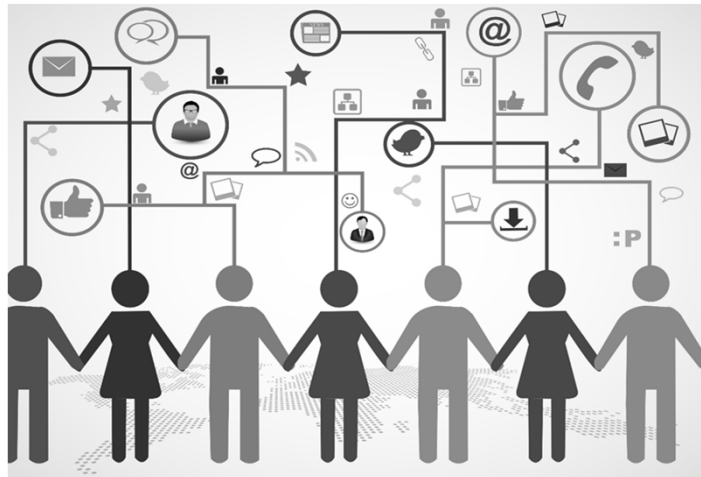
Vogels 2018 Own a tablet use social media

Which older adults use ICTs?

- Younger
- Male (Female use for communication)
- Non-Hispanic White
- Urban
- Cognitively well-functioning
- Healthier, wealthier, better educated

Advantaged

What We know about ICT Use and Social Connection in Late Life



Theories of Technology UCoals to New Castle



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Theories consider...

- 1) Perceived usefulness
- 2) Ease of use
- 3) Self efficacy, etc.
- 4) Fears – privacy, identity theft
- 5) Social influence



Unified Theory of Acceptance and Use of Technology model (

ICT use for Social Connection

**Complement
existing ties**



**Generate
new connections**



Complementary perspective

- When social partners encourage
- When social partners help
- Usefulness seen as engaging with family

Francis et al., 2018; Lee & Coughlin, 2015



Francis et al., 2018; Lee & Coughlin, 2015). Similarly, older adults who wish to use technologies such as social network sites (SNS) often are motivated by a desire to communicate with family members and friends who also use these network sites (Charness & Boot, 2016).

Older Adults' Facebook Use (compared to younger adults)

- Smaller networks
- Greater proportion of “actual” friends
- Individuals who have a greater ratio of “actual” friends in their SNS less lonely

Cheng et al. 2015 Jnl of Broadcasting and Electronic Media

A nationally representative sample of adults 18 + in the US

N = 1,000

Subsample of Facebook users N = 577

Answered self report data about Facebook- didn't provide actual Facebook data.



Compensation: New social contacts

- Widows and homemakers use ICTs more for social network sites (Yu et al., 2016)
- People who live alone benefit more from internet use (Cotten et al., 2014)

Both studies used the HRS

Yu used 2012 wave

Cotton used 2002 to 2008 waves Retired older adults- changes in depression. .
Effects of internet use on depression may be mediated via loneliness and social isolation

When things go wrong with technology... Complementary and Compensation

- 9 focus groups in mid Michigan



- Turn to:
 - Children & Extended family
 - Peers
 - Technical support Representative/the Genius Bar

Francis et al. 2018 American Behavioral Scientist

Older adults acknowledge they are not experts and turn to more knowledgeable friends and family for guidance. Children and Extended family. Younger generation may download or set up new software or apps

My parents once called my nephew to restart their Roku – Tangible support

Informational support

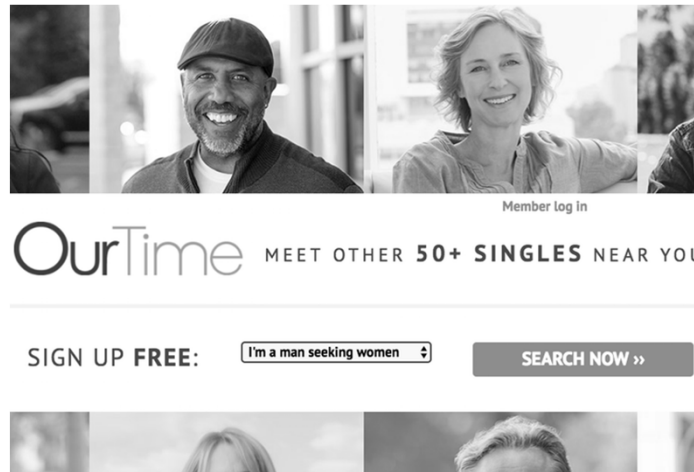
Emotional Support

Aged 59 to 88 (all but one were aged 65+)

Technical difficulties- Passwords – can't remember them all

Felt as though they developed relationships with some of the technical support assistants

Compensation: Seek Dating Partner (to complement existing ties)



Davis & Fingerman 2016, Griffin & Fingerman, 2018

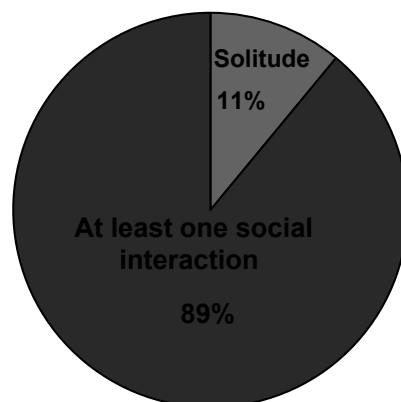
From our work- one of the fastest growing groups. Data scraping of 4,000 profiles- across the nation by zip code all age groups.

All groups use words like "affection"

BUT older adult ads tend to mention bringing the new person in to their existing social world.

Can Technologies Improve Social
Connection and Well-being in Late Life?

Percentage of Time Spent In Solitude: Counting Phone and Text as Social Contact



Birditt et al. Forthcoming

Loneliness and Depression

- **Internet use → Less depression**
Cotten et al (2014) Longitudinal HRS 2002 to 2008
- **Going online for social purposes → Less loneliness and more social engagement**
Szabo (2019) Longitudinal New Zealand $N = 1,000$ 2013 to 2016

Szabo compared social, instrumental (banking) and informational (e.g., health information) uses of going online

Ge

ICTs and Well-being-Smaller Samples

- Facebook use → More satisfied with social life but not less lonely

Bell et al. (2013) select sample N = 142 from the Georgia Tech Home Lab

- Oldest old adults use ICTs for social connection → Less lonely & better psychological well-being

Sims et al (2017) Nationally representative 445 adults over the age of 80

Sims et al assessed use of 16 ICTs regular/at least monthly use of text, cell phone, video or computer games, social media, video call, PC, tablet, wearable health monitor/fitness tracker digital books.

They ended up with a scale of No device/app, One device/app, or 2+ ICTs.

What about voice activated assistants?



Amazon Echo

Amazon Alexa

Google Assistant

Microsoft Cortana

Samsung Bixby

The imagined future for older adults...

- MODERN FAMILY: Jay Pritchett aged 71

Jay had his 65th birthday in Season 4.

This is season 10

<https://www.youtube.com/watch?v=0HLAkSNOgL4s>

Voice-Activated Digital Assistants

- Study adults aged 55 to 94 ($n = 12$) from volunteer list at UICU
- Amazon Echo owners
- Semi structured interviews

Koons et al 2019 Ergonomics in Design

22% of adults these ages own these devices

Social Aspect of the Echo

- Most: Family bought device
- Most: Family set up the device
- Those who set up on own had experience with technology

Follows the UTAUT2 model – believe social partners think device is useful

And following Tsai et al (2015) older adults were more likely to use the device if it were gifted by family.

Echo- “Good” but Not Social

- **Upside:** Ease of use, memory aid, music , games, information
- **Downside:**
 - It says “I don’t know what you mean” often
 - She can’t understand my accent
 - Phone just as good for communication
 - Cognitively impaired may not remember its name

New York accent Boston accent less of an issue in younger cohorts

Voice-Controlled Intelligent Assistants for Disability-Reviews

- Reviews of Amazon Echo that mention having a cognitive, physical, or sensory disability
- 478 out of 65,000 reviews
- 86% of reviews were positive
- 12% of reviews were negative
- Only 6% (n = 23) indicated it gave companionship

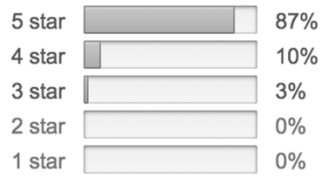
Pradhan et al 2018 Association for Computing Machinery (ACM)

From Pradhan et al 2018 Association for Computing Machinery (ACM)

Customer Reviews

★★★★★ 38

4.8 out of 5 stars ▾

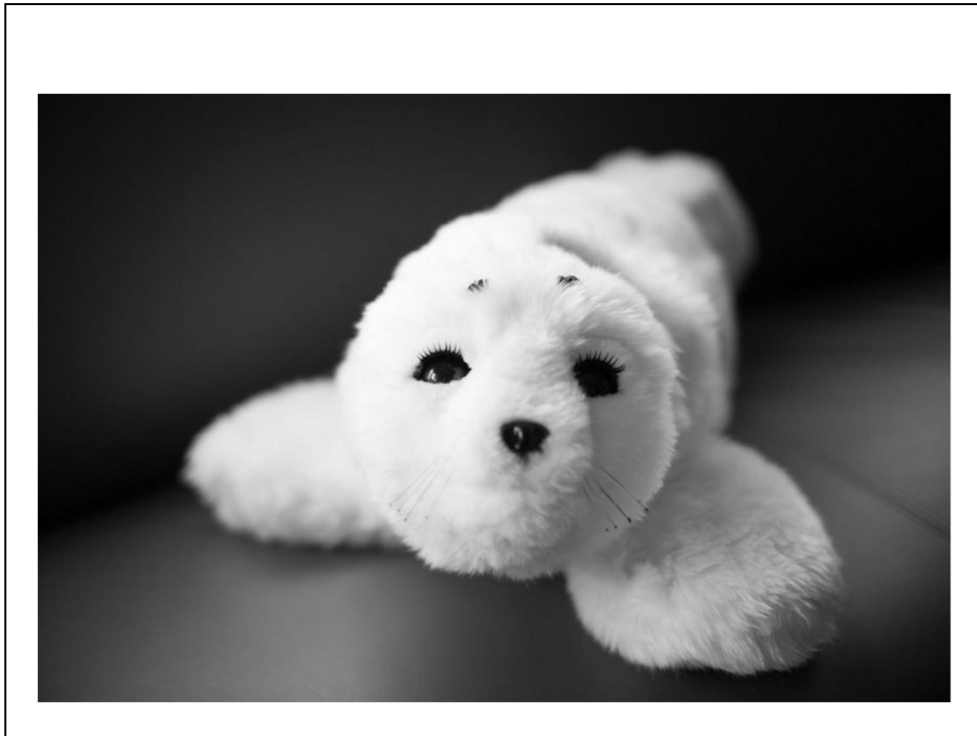


Share your thoughts with other customers

Write a customer review

See all 38 customer reviews ▶





Robot = (i.e., device w/sensors, processor, motor)

Bemelmans (2012) review of the literature on socially assistive robots concluded that studies were weak

Harlowe's Monkeys



Interventions to Increase Social Connections via ICTs

Limitations in Synthesis of Intervention Studies

- Definitions of social involvement vary
- Interventions use different ICTs
- Intervention involves training- Training introduces social contact

RTC	STELA Longitudinal Randomized Controlled Trial Cotton et al (2017), Shillair (2015), Tsai (2019)
Sample	Assisted Living and Independent Living communities 101 in ICT, 112 in AC arm
Conditions	•Lap top computers •Placebo received activities •True control 8 weeks- 90 min instruction 2 X week
Timing	3 mos, 6 mos, 12 mos
Findings	More confident using ICTs. Felt more socially connected. Improved life satisfaction. But depended on attitudes towards ICT use

RTC	Personal Reminder Information Social Management System (PRISM) Czaja et al (2018), Pauly et al. (2019)
Sample	300+ volunteers community dwelling
Conditions	•Mini PC, internet, “buddy tab” email, online help etc •Binder condition- Similar information and opportunities to share phone # and interests with other participants
Timing	6 mos, 12 mos
Findings	6 mos – PRISM > social support & less loneliness 12 mos- both groups showed improvement

Interventions for Dementia

Remote Activity Monitoring (RAM)

64 out of 132 dyads assigned for 6 mos

- 6 mos follow up - No reduction in caregiver burden in treatment group (Gaugler et al., 2018)

Gaugler- qualitative interviews and post-hoc tests revealed that it did help at the milder stages of the impairment and if the care recipient wandered around the house.

Braley Two researchers viewed archived videos

and recorded the observed behaviors of the PWDs and their reflections watching the PWDs. Using qualitative descriptive

methods, an interdisciplinary analytic team reviewed transcripts and organized data into themes using content analysis.

Results: Context and Communication emerged as the major themes, suggesting that positive user experiences will require

auto-prompting systems to account for a multitude of contextual factors (individual and environmental) such as level of

cognitive impairment, previous exposure to task, and familiarity of environment.

Interventions for Dementia

Smarthouse with task reminders -15 PWDs
8 ADLS

- Fold laundry
- Clean kitchen counter
- Sort the mail

No reduction in burden (Braley et al., 2019)

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cognitive impairment, previous exposure to task, and familiarity of environment.

Interventions for PWDs Braley

- Coding of video tapes
- Depends on level of impairment
- Human may be necessary to match needs, familiarity of task, etc.
- Perhaps future AI will be able to account for more contextual factors?



Conclusions

- Older adults remain heterogenous with regard to ICT use
- Communication with younger generations is a key motivation
- Some technologies mitigate social isolation and encourage complementary and compensatory social engagement
- Interventions with healthy populations suggest avenues to maximize on these patterns

Acknowledgments

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wiki **How to Say Thank You**





EXTRA SLIDES measurement and other topics



Using Technologies to Measure Social Connections

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Ambulatory devices for physical/ biological indicators

Social ties and quality are associated
with

- Physical activity via accelerometers
- Sleep duration and quality via actigraphs
- Blood pressure and heart rate via ambulatory assessments (e.g., watch, cuffs, ECG patches)



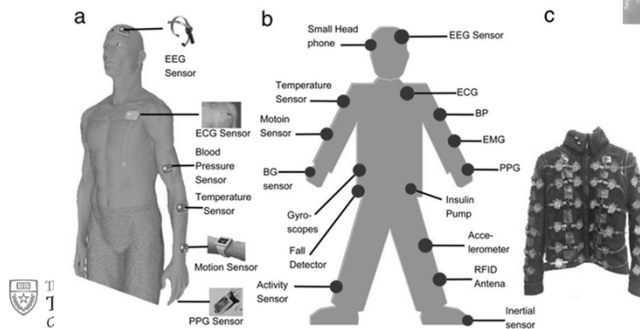
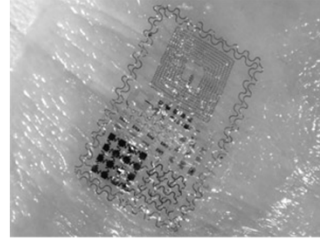
Observational studies of Social Connection

- Texts and call logs –frequency and types of communication
- GPS and Bluetooth – location and size of social groups
- Electronically activated recorder-30 seconds every 7 minutes



New Areas of Technology

- Tattoos
- Clothing and textile wearables



New Areas of Technology

- Wearable cameras



Age Differences/Pew data

	18 to 29 year olds	Aged 65+
Use internet	98% +	73%
Cell phone	99%	91%
Smart phones	96%	53%
Tablet	55%	33%
Social media use	86%	28%

Anderson et al. 2019 Use of internet

Anderson and Perrin 2017

Pew Survey June 12 2019- no author specified- data on cell and smart phone

<https://www.pewresearch.org/internet/fact-sheet/mobile/>

Vogels 2018 Own a tablet use social media

Theories of Technology Use

- Unified Theory of Acceptance and Use of Technology (UTAUT 2)
- Senior Technology Acceptance Model (STAM)
- Senior Technology Exploration, Learning and Acceptance (STELA)



STELA also covers the transition from learning to acceptance

Senior Technology Exploration Learning and Acceptance Model (STELA)

