Mobile Measurement and Motivation: A Feasibility and Pilot Study of Smart Watches for Health in the United States and Portugal

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UT Center for Health Communication

• Vision:
  – Communication for Healthier People in a Connected World

• Mission:
  – Improve the health of people in Texas, the US, and globally through leadership and excellence in health communication research, teaching, programs, and partnerships.

Center Kickoff Meeting – September 3, 2014
UT Center for Health Communication

- Health Communication Leadership Institute
  - June 23-26, 2015 in Austin, Texas, USA
- Society for Health Communication
  - New international, multidisciplinary organization to unify and advance the field of health communication
  - More info soon at http://societyforhealthcomm.org

- Web: http://moody.utexas.edu/healthcomm
- Facebook: http://facebook.com/uthealthcomm
- Twitter: http://twitter.com/uthealthcomm
Adult Gadget Ownership (2006-2013)

Source: Pew Internet surveys 2006-2013

http://www.pewinternet.org/Trend-Data-(Adults)/Device-Ownership.aspx
Mobile Health Revolution

• **mHealth** (aka m-health or mobile health)
  
  - Application of mobile devices including phones, tablets, and integrated monitoring devices to support all aspects of healthcare and public health
mHealth for Type 2 Diabetes

• Reviewed 13 telehealth interventions for T2
  – 4 studies showed improved glycemic control
  – 5 of 8 showed improved dietary adherence
  – 5 of 8 showed improved physical activity
  – 3 of 8 showed improved blood glucose monitoring
  – 3 of 8 showed improved medication adherence

• Conclusion: Behavioral telehealth has promise

SMS Systematic Review of Reviews

• Reviewed 15 systematic reviews and meta-analyses
  – Explored 89 individual studies using SMS for public health
  – SMS-based interventions were effective for diabetes self-management, weight loss and physical activity, smoking cessation, medication adherence for antiretroviral therapy
  – Limited consistent evidence across studies and reviews to inform recommended intervention characteristics
  – Additional research needed to establish longer-term intervention effects, identify recommended intervention characteristics, and explore issues of cost-effectiveness

A BRIEF HISTORY OF WEARABLE TECHNOLOGY

INNOVATIONS

- **1975**
  - Pulsar Calculator Watch
  - Hamilton Watch Company introduces first calculator watch

- **1979**
  - Sony Walkman
  - Introduced a new portable way of listening to music.

- **1984**
  - Casio Databank CD-40
  - One of the first digital watches created that allowed the user to store information

- **1987**
  - Digital Hearing Aid
  - Nicolet introduces the first body-worn digital hearing aid

- **1993**
  - Apple Newton PDA
  - One of Apple's first attempts at reinventing personal computing

- **1999**
  - First Blackberry Launched
  - The first Blackberry device was an email pager

- **2000**
  - First Bluetooth Headset Shipped

- **2001**
  - Apple iPod

- **2003**
  - Viatron C-series
  - The world's first fully digital pacemaker

- **2004**
  - Motorola RAZR
  - Sold more than 130 million units, becoming the best-selling clamshell phone in the world to date

- **2004**
  - GoPro Camera
  - GoPro creates a personal camera that is wearable and mountable

- **2006**
  - Bike iPOD Kit
  - Records the distance and pace of a walk or run

- **2007**
  - Apple iPhone

- **2008**
  - Fitbit
  - Designed to be clipped onto clothing, it tracks steps taken, distance traveled, calories burned, activity intensity, and sleep

- **2010**
  - Samsung Galaxy Gear
  - Samsung announces their first foray into wearable tech off the success of their Galaxy mobile phone

- **2011**
  - Jawbone Up

- **2012**
  - Nike FuelBand

- **2012**
  - Pebble Watch
  - Connected to a sports car to provide data on its performance in real-time

- **2013**
  - Nissan Nismo Smartwatch
  - Connects to a sports car to provide data on its performance in real-time

- **2013**
  - Misfit Shine
  - Headmounted display that presents smartphone-like information hands-free

- **2013**
  - Google Glass
  - Headmounted display that presents smartphone-like information hands-free

- **2013**
  - Samsung Galaxy Gear
  - Samsung announces their first foray into wearable tech off the success of their Galaxy mobile phone

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Fitness Trackers & Quantified Self

- Trackers & Wearables:
  - Steps, Sleep, Air, Mood, Performance, etc.
- Rapid sales growth
- Frequent innovation
  - Kickstarter/Indiegogo
  - CES 2014 & 2015
- Limited functionality
- Limited health research
Mobile and Smart Watches
Basis Smart Watch (B1): A closer look
Basis Band synced with phone/email

<-Notifications on your smart phone

Within the basis app itself ->
Users choose “habits” from a prescribed list, Basis lets you know how you’re doing.
Basis Sleep diagnostics

Information about your sleep patterns come weekly in the form of an email and are also available daily on your paired smartphone.
Smart Watches & Fitness Trackers

• Cross Platform
  – Pebble Steel and Watch
  – Basis
  – Jawbone
  – Fitbit

• Android Platforms
  – LG G watch, Samsung Gear Live, Moto 360, etc.
  – Android phones much more powerful and functional…
http://thefinancialbrand.com/37114/smartwatch-google-glass-banking-technology/
mHealth Game Changer?

“...the most personal device we’ve ever created.” – Tim Cook
Apple Watch and Health

Get a pat on the back, right on your wrist.

When you reach your personal bests or hit milestones, Apple Watch is quick to celebrate. You’ll get a special badge for each achievement, which is then stored in the Fitness app. And that gives you encouragement to keep going and keep improving.
What’s up with Millenials’ purchases in the next year?

Percentage of Millenials likely to purchase:

- 23% Smart Glasses
- 24% Smart Clothing
- 40% Smart Watch
- 51% Fitness Band

PwC, 2014
Smart Watch Research

WHAT DO WE KNOW?
Tracking, Physical Activity, Motivation

- Low-income, obese mothers engaged in more physical activity (PA) after participating in a pedometer program (Clarke et al., 2014)
- Pedometers helped school-children create and maintain PA goals, made parents more aware of their children’s PA levels, allowed for better monitoring of in and out of school PA, and allowed students to compare and choose between different types of PA that worked best for them (Beighle, Pangrazi, & Vincent, 2001)
- Providing pedometers to children along with ideas for increasing their daily PA led to increases in students’ PA during school (Butcher et al., 2007)
- The use of a pedometer alone motivated individuals to engage in higher levels of PA (Tudor-Locke, 2002)
Smart Watches and Health

- Smart watches paired with smart insoles are being used to prevent foot ulcers in diabetics (Mertz, 2014)
- Children with cerebral palsy have benefited from using interactive and multi-touch input devices (Dunne et al., 2010)
- Smart Watches “…improve on standard pedometers by measuring and providing feedback on several health/fitness dimensions including calories burned, type of exercise activity undertaken, sleep quality and measurements of heart rate, skin sweat and body temperature.” (Lyons et al., 2014)
Smart Watch Opportunities

• Wearable technologies could likely be used on a greater scale to help those who truly need it the most: people with chronic medical illnesses such as emphysema, diabetes, or congestive heart failure (Glatter, 2014).

• Smartwatches can bridge the gap of time and distance between clinicians and consumers (PwC, 2014).

Smart Watch Challenges

• Liability and insurance concerns in work spaces, a lot of people believe this technology is still a fad, there are privacy concerns, manufacturers are at risk if private data is breached (Tom Starner, 2014, Risk and Insurance)

• The groups who need these devices the most cannot access them; wearables marketing targets a primarily affluent and already healthy audience (J.C. Herz, Wired, 2014)

• These devices need to be highly customized so that the user can adapt the device to fit his/her needs and to be conducive for his/her environment (Dagar, Yadav, & Kilhore, 2014)
Research Questions

• Determine the **feasibility** of using smart watches for health behavior monitoring and behavior modification in diverse populations

• Determine the **acceptability and preferences** for using smart watches for behavioral monitoring and modifications in diverse populations
Research Plans

1. Market analysis and literature review of wearables and smart watches including demographic or geographic differences among users.
2. Systematic testing of selected smart watches among members of the research team.
3. Collecting mixed data collection on smart watches with diverse consumers to assess their needs and preferences related to specific health behaviors.
4. Implementing pilot tests of the feasibility and acceptability of smart watch use among diverse consumers focused on one or more health areas.
5. Pilot research on wearables and smart watches led by our research partners in Portugal.
Future Research

- Grow and strengthen collaborations between UT and Portuguese researchers on related projects.
- Develop proposals to test smart watches for health and behavior monitoring and motivation among diverse populations.
  - Possible audiences/Issues of interest:
    - Chronic disease self management
    - Older adults and medication adherence
    - Physical activity among sedentary populations
    - Tailoring motivational messaging to individuals
OBRIGADO!

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