

## Using mHealth (mobile health technology) to Communicate Nutritional Information and Treat Obesity

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### Outline of presentation

- **Background on use of technology in obesity**
- **Recent controlled clinical trials in mHealth for treatment of obesity**
  - TRIMM
  - FITT
- **Lessons Learned/Conclusions**

- Text messages and other remote technologies have also been used for self-monitoring and as a means to communicate educational messages for management of obesity.
- A review of interactive electronic interventions for the prevention or treatment of obesity in youth concluded that, although the studies were generally of poor quality and intervention effects were modest, electronic approaches seemed promising.

**Article 5/6: Lancet series on obesity, 2015**

### Text Messages Opportunity

- 67% of the US population use text messages
- Underserved populations have some of the highest rates of cell phone and text message usage
- There have been a limited number of trials that scientifically evaluate the efficacy of text messaging interventions in health behavior modification

### Currently, there are over 1,000+ weight-related mobile apps available (Apple / Android)

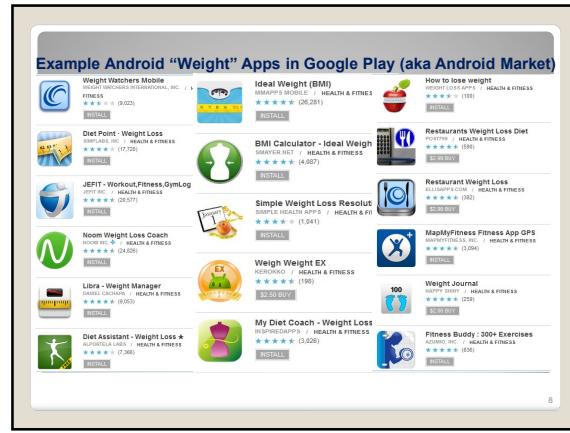
'Health & Fitness' mobile apps available for download

Search criteria	iTunes	Google Play (Android Market)
'Weight'	1,803	1,000+
'Weight management'	43	1,000+
'Weight loss'	538	1,000+

- Depending on the search specifics, different apps are recommended for users
- Results are sensitive to search criteria → extreme drop in the number of available apps from iTunes searching for 'weight management' apps

### Some Major Categories of "App" Type

Categories
Weight Monitoring
Weight Tracking (with 'target' reference)
Dietary Monitoring (Quality Estimation)
Diet Plan (e.g. WeightWatchers) Support
Chronic Disease (e.g. Diabetes) Support
Sensor-linked Exercise (e.g. Fitbit, Nike)
Exercise Guides (Tracking / Information)
Social-support Network Facilitation
Commercial / Restaurant Food Information



**Reviews and (attempted) meta-analyses:**

- There is a very limited literature on mHealth and obesity
  - Both adult and childhood obesity: limited
  - Both prevention and treatment: limited
  - **Essentially no controlled clinical trials**

**What reviews have found...**

## Tailored Rapid Interactive Mobile Messaging (TRIMM)

- An SMS-based Weight Control Intervention for Underserved African-American Adults in Baltimore

### Overview of Study Design

- **Design:** randomized, controlled trial – blinded outcome (weight)
  - **Control:** Standard of Care (Enhanced)
  - **Intervention:** Standard of Care + TRIMM Messages
- **Participants:**
  - 134 African-American adults with BMI > 27 and SMS-capable phone
  - Recruited via local churches: services, clubs, pastors
- **Duration:** 6 months, follow-up at 3 and 6 months
- **Primary Outcome:** weight change: 0 to 6 months

## TRIMM Design

- Messages informed by behavioral theories
- Structured and interactive
- Personalized to each individual
  - Lifestyle tailoring
  - Weight loss goals
  - Interactive "pull" messages

## Lifestyle Tailoring & Weight Loss Goals

**Michael**

- Wakes up at 6am, lunch at 12pm
- Exercises regularly
- Loves Twinkies, not veggies
- Munchies when I'm studying

**Michael's Mom**

- Wakes up at 9am, lunch at 2pm
- Mostly sedentary, little physical activity
- Enjoys fried foods
- Large portions

**TRIMM Goals**

- Reduce Sugar Intake
- More Balanced Diet
- Eating Only When Hungry

**TRIMM Goals**

- Reduce Fat Intake
- Practice Portion Control
- Increase Physical Activity

## Interactive Messages

Send Michael a text

A smartphone screen displays a text message from "Michael" to the user. The message reads: "Please Respond! Michael, how much do you weigh today?". The phone's status bar shows the time as 12:02 PM and battery level at 60%.

## Interactive Messages

Michael weighs himself and responds

The same smartphone screen now shows Michael's response: "166". The message bubble is green, indicating it was sent by Michael. The phone's status bar shows the time as 12:02 PM and battery level at 60%.

## Interactive Messages

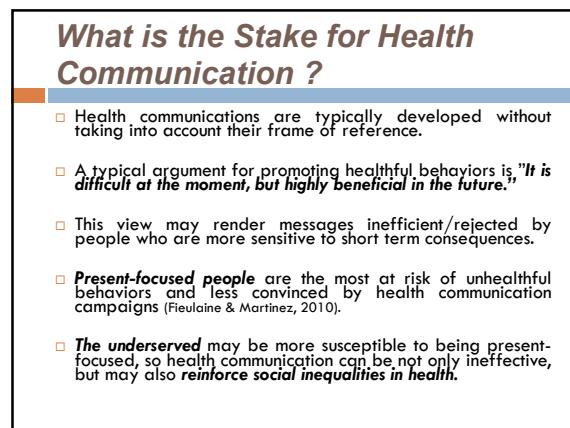
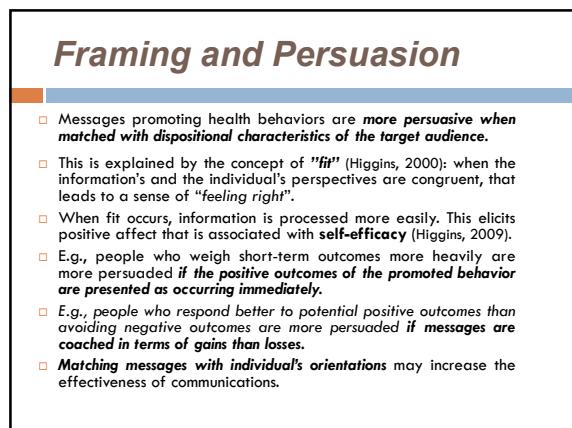
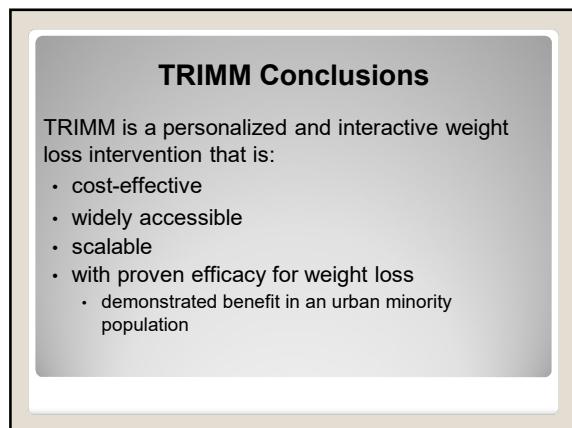
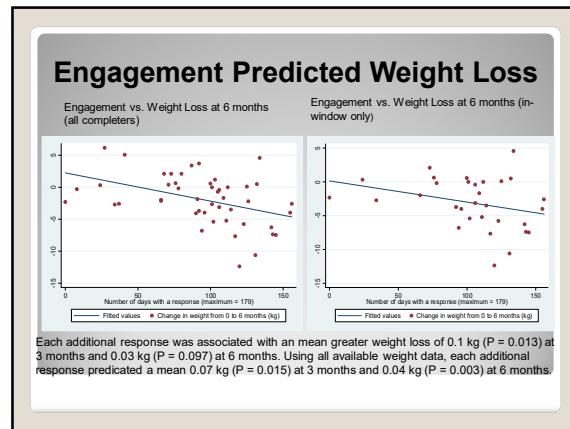
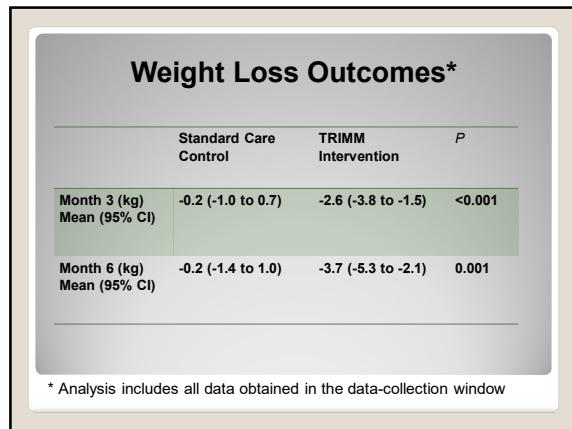
Respond to Michael based on his progress

The smartphone screen shows a response message to Michael: "You've lost 3 pounds since the first week, Michael! Keep up the great work! You're on track to lose another 1 or 2 pounds this week!". The phone's status bar shows the time as 12:05 PM and battery level at 64%.

## Interactive Messages

If Michael gains weight

The smartphone screen shows a message: "You've gained 5 pounds Michael, but don't be discouraged. If you reduce your portion sizes and increase your exercise, the weight will come off.". The phone's status bar shows the time as 6:52 PM and battery level at 37%.



## Hypothesis

When valence of the message is congruent with individuals' motivational orientation (i.e., gain-framed = approach-oriented/promotion-focused; loss-framed = avoidance-oriented/prevention-focused) intentions to undertake efforts to lose weight will be greater than when the message is incongruent with individuals' motivational orientation.

## FITT Design

- **Design:** 1-month trial; 80 participants randomized to 4 message framing groups:
  - Motivational orientation (gain- vs. loss-motivated) was measured using established instruments
  - Valence (gain vs. loss framed messages) was randomized to be matched or mismatched with the motivational orientation of each participant
    - using 2 versions (frames) of the text messages
  - Messages were sent twice a day, three times per week
  - Message delivery days/times were tailored to the individual's schedule.
- **Study Population:** Urban, African-American adults recruited from collaborating churches in East Baltimore.

## Full Intervention

- Recruited 80 participants (completed in March, 2015).
- Conducted interviews with 20 participants (10 high and 10 low engagement per back-end data).
- Matched groups showed greater intention to change behaviors than unmatched groups

## mHealth: Lessons Learned

- Future research opportunities and directions:
  - Tailoring interventions to populations
  - Tailoring interventions to individuals
  - Adaptive messaging
  - Physician/health care provider extender/stand-in potential? Integration into EHRs, care maps, protocols

**The challenge:**

## mHealth: Lessons Learned

- Challenges:
  - Needs to avoid overload and technology fatigue... this is just a tool.
  - Limits integration of social and environmental determinants that accompany chronic conditions like overweight and obesity for many underserved populations.
  - May be less popular and less acceptable as an application for older individuals.
  - Still don't know enough to assess the long-term benefits of mHealth for weight loss and management.

## Opportunities

- mHealth is a surprisingly versatile and effective tool for driving health behavior change at minimal cost.
- It can potentially be useful in underserved/less educated/younger/rural populations globally because of higher levels of use and dependence on this technology.
- This is a "ground-floor" opportunity that has only begun to be explored.

### CBPR Lessons Learned

- ❑ Chronic conditions like overweight and obesity for many underserved populations are pervasive and both behaviorally and environmentally favored
- ❑ Need to continually engage participants to maintain behavior changes; tools may need to be tailored by age, gender, personal preferences and goals
- ❑ Ecological (e.g., cultural, family, policy systems) and other theoretical perspectives need to be considered (e.g., self efficacy).
- ❑ Faith-based organizations are a valuable source of participants, and engine of change, but regular churchgoers may not reflect the motivational level, and motivations of "average" members of the community

**Thanks!**

