Texting for Health: The Use of Participatory Methods to Develop Healthy Lifestyle Messages for Teens

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Learning Objectives for Today’s Webinar

- Review how mobile technologies may be used to engage adolescents in nutrition education and health behavior change.
- Understand adolescent preferences for nutrition and health-related message content, format, style, origin, and frequency and mode of message delivery.
- Discuss how to align nutrition education efforts with youth motivations and lifestyle behaviors.
Behavioral factors remain leading causes of death in the U.S.

Danaei et al PLOS Med 2009, 6(4)
“We ask people to do things that they have never done before, to stop doing things they have been doing for years, and to do more of some things and less of other things.”
Promoting Healthy Lifestyle Behavior Change

- Provide **opportunity** and **ability** to engage in healthy lifestyle behaviors
  - make it easier to engage in behaviors that promote health, and harder to engage in behaviors that detract from health
- Use programs & methods that are congruent with individual **motivations**
  - taste, convenience, cost (diet)
  - enjoyment, social aspect (physical activity)

Rothschild ML 1999 J Marketing 63:24-37
The practice of public health and medicine, supported by mobile devices.

- **Assessment**: collection of community and clinical health data
  - sensors, measurement, sampling, methods
- **Intervention**: provision of health education and intervention content to educators, clinicians, participants, and patients
  - application, the user experience, outcome evaluation
The Promise of Mobile Health (mHealth)

“Cool technology is not necessarily synonymous with good science or sound health practices, and therein lies the challenge.” – Dr. Francis Collins (July 10, 2012)

“Mobile devices offer attractive, low-cost, real-time ways to assess disease, movement, images, behavior, social interactions, environmental toxins, metabolites, and a host of other physiological variables ...”
Why mHealth?

- For users
  1. **24/7 access** to information and services
  2. **High speed, real-time** communication capabilities
  3. **Self-configurable & customizable** delivery of information and services
  4. **Point-of-incident data capture** (i.e. when and where) health behavior decisions are made

- For researchers/clinicians
  1. High prevalence of use allows for increased reach compared to face-to-face
  2. Cost-effective (TBD)
  3. Also, 1-4.
The high prevalence of mobile technology use offers an accessible, interactive, and user-friendly avenue through which to promote health behavior change to diverse populations.

However,

What do users *really* want?

and

Will it change behavior and improve health?
To what extent does the use of mHealth in clinical and community settings improve health care utilization and health outcomes?

**Goal:** Explore the use of mobile technologies designed to measure and improve health-related behaviors.

**Aims:**
1. Understand the user experience (UX)
2. Determine type and “dose” of content that is desirable, acceptable, (and related to health behavior change)
3. Assess relevant contextual factors (e.g. location) that might modify the outcome of 1 & 2
User Experience (UX)

- How a person feels (perceptions and responses) about using a product, service, or system
- Highlights experiential, affective, meaningful, and valuable aspects of human-computer interactions
- Includes practical aspects such as utility, ease of use and efficiency of the system
- Subjective and dynamic

ISO 9241-210 Ergonomics of human system interaction - Part 210: Human-centered design for interactive systems
UX Methodology

Research methods by **Data Source** vs. **Approach** vs. **Context of Product Use**

- **Behavioral**
  - Usability Lab Studies
  - Ethnographic Field Studies
  - Eyetracking
  - Usability Benchmarking (in lab)
  - Data Mining/Analysis
  - A/B (Live) Testing
  - Online User Experience Assessments ("Vividence-like" studies)

- **Attitudinal**
  - Participatory Design
  - Focus Groups
  - Phone Interviews
  - Diary/Camera Study
  - Message Board Mining
  - Customer feedback via email
  - Intercept Surveys
  - Email Surveys

**Approach**
- Qualitative (direct)
- Quantitative (indirect)

**Key for Context of Product Use** during data collection
- **Natural use of product**
- **Scripted (often lab-based) use of product**
- **De-contextualized / not using product**
- **Combination / hybrid**

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Stealth Health: Youth Innovation, Mobile Technology, Online Social Networking, and Informal Learning to Promote Physical Activity

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“Proof of Concept”

- 3-year intervention, completed in phases
  - formative research, intervention, dissemination
- Explore how technology can be utilized to enhance adolescent knowledge, attitudes and behaviors related to diet and physical activity
- Our approach had several major underlying themes:
  1) Popular technology is a part of the solution
  2) Involving youth in designing and testing the approach would increase “buy-in” to intervention, thereby increasing the probability that behavior change takes place
Formative research, analysis and youth participatory development of software applications and health messages; testing of themes, messages, art, and technology

“Proof of concept” wherein we assess the impact of the technology within an informal learning context on youth physical activity, dietary choices, nutrition knowledge, attitudes/beliefs, and BMI

Adaption of the technology to different software platforms and diffusion of innovation to the general public through a nationwide effort supported by our national partners
An iterative, youth-participatory design process was used to collect formative data in three stages.

Develop, test, and evaluate health messages designed to impact adolescent nutrition and physical activity knowledge, attitudes, and behaviors, delivered entirely through a mobile phone.
Participants

- Adolescents, 12-18 years, enrolled in partner youth programs (2009-2010) that did not explicitly focus on health
- Programs reflected diverse programmatic goals and populations:
  - 1/3 of programs enrolled low-income populations
  - Programs focused on: environmental studies, social justice, science and technology, civic engagement, youth leadership, and the arts
Stage I - Content Development

- Identify key nutrition and physical activity content from which to construct messages
- Develop sample messages for testing

- Methods:
  - Literature search to identify nutrition/PA behaviors associated with adolescent adiposity
  - Scan of popular consumer nutrition/PA resources
  - Survey of undergrad students enrolled in a general education courses to obtain their nutrition/PA questions
Behaviors Associated with Increased Adiposity in Youth

- Increased total energy intake
- Higher energy density of the diet
- Low intake of fruits/vegetables
- Large amounts of fruit juice
- Large portions of food & beverages
- Frequent consumption of fast foods
- Infrequent consumption of breakfast
- Frequent “screen time” (TV, computer, video games)
Results, Stage I

- Questions were grouped into 8 thematic categories by the research team, which formed the basis for message content.

Table 1 – Questions/Topics Identified in Stage I and Thematic Categories

<table>
<thead>
<tr>
<th>Example of Adolescent Question</th>
<th>Message Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>“What is better for you, fruit or fruit juice?”</td>
<td>Fruits and Vegetables</td>
</tr>
<tr>
<td>“What will help me to lose more weight, lifting weights or doing a cardio workout?”</td>
<td>Physical Activity</td>
</tr>
<tr>
<td>“Is skipping breakfast bad for you?”</td>
<td>Breakfast Consumption</td>
</tr>
<tr>
<td>“Is diet soda actually healthy?”</td>
<td>Sweetened Beverages</td>
</tr>
<tr>
<td>What snacks would be good to eat before I exercise to give me strength and energy?</td>
<td>Snacking</td>
</tr>
<tr>
<td>“What foods should I get at fast food restaurants that are healthy?”</td>
<td>Fast Food</td>
</tr>
<tr>
<td>“Can exercise make up for consuming more calories than you're supposed to?”</td>
<td>Energy Balance</td>
</tr>
<tr>
<td>“On a Friday night, if my friends and I order pizza, what are the healthiest kind and how many slices is okay to eat?”</td>
<td>Portion Size</td>
</tr>
</tbody>
</table>
### Message types and examples of content (Sweetened Beverage category)

- **>300 messages developed**
  - Factoids
  - Polls
  - Scenarios
  - Category Quizzes
  - Knowledge Quizzes
  - Recipes

<table>
<thead>
<tr>
<th>Message Type</th>
<th>Example of Content</th>
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<tr>
<td>Factoid - Nutrition and physical activity information in ≤160 characters</td>
<td>A can of soda has 10 tsp of added sugar.</td>
</tr>
<tr>
<td>Factoid - Nutrition and physical activity information in ≤160 characters</td>
<td>How many teaspoons of sugar are in one 12 oz can of soda? a) 5 tsp; b) 10 tsp; c) I don’t know</td>
</tr>
<tr>
<td>Factoid - Nutrition and physical activity information in ≤160 characters</td>
<td>Did you know that one 12 oz can of soda has 10 tsp of added sugar?</td>
</tr>
<tr>
<td>Poll - Participants prompted to respond with typical habits</td>
<td>What is your go-to drink when you’re thirsty? a) soda; b) water; c) sports drink; d) juice</td>
</tr>
<tr>
<td>Scenario - Mini-vignettes prompt participants to make choices about nutrition or physical activities</td>
<td>Jesse is tired and thirsty after school and stops at the convenience store to buy a drink. What’s the healthiest drink choice? a) Fruit drink; b) Water; c) Energy drink; d) Sports drink</td>
</tr>
</tbody>
</table>
| Category Quiz - 5-item quiz that categorizes participants depending on how they answer each question | What Kind of Beverage Are You?
  1. It’s time for breakfast, what do you eat?
  2. When you’re thirsty after school, where do you get your drink?
  3. What’s the best color for a drink to be?
  4. Everyone’s hanging out at your place over the weekend and starting to get bored, do you …
  5. Do you like sweet drinks?                                                                 |
| Knowledge Quiz - 5-item quiz designed to informally test participants’ basic nutrition knowledge | Energy Drink IQ
  1. T or F? Most energy drinks contain the same amount of caffeine (or more!) as a cup of coffee.
  2. How many energy drinks are on the market?
  3. Guarana is an ingredient in a lot of popular energy drinks. What is it?
  4. True or false. A typical energy drink has the same amount of caffeine as the maximum recommended amount for teens.
  5. How many gallons of energy drinks do Americans consume in total every year? |
| Recipe - Meal and snack ideas in three steps prepared from ingredients typically found in a | Easy Breakfast Smoothie: 1/8 cup orange juice; 2 bananas; 4 strawberries (ok to leave out if you don’t have any); 1.5 cups of yogurt; Break bananas into |


Walking can burn about 80-100 calories per mile.
Fruit and plain milk are examples of foods that are naturally sweet - they don't contain added sugar.
To burn off the calories in one M & M candy, you have to walk the length of a football field.
One can of soda has over 9 tsp of added sugar!
The banana plant is a giant herb, not a tree.
Skipping breakfast regularly may increase your risk of becoming overweight.
Category Quiz: “Which Vegetable Are You?”

- Time for dinner, what sounds most delicious?
  1. A fresh salad with strawberries and nuts (S)
  2. A casserole with cheese on top – all the food groups in one hot dish (B)
  3. Stir-fry – I like to dump my favorite foods in the pan and eat ‘em quick! (R)
  4. A hot, thick and spicy soup (C)
  5. Something dipped in batter and fried to crispy perfection (O)
Which of these ancient civilizations would you most like to live in?

1. Ancient Egypt (O)
2. Ancient Persia (S)
3. Ancient Mesoamerica (like the Aztecs) (R)
4. Ancient Briton (C)
5. Ancient Rome (B)
Which texture do you like better?

1. Crunchy (C, B)
2. Smooth (S)
3. I like them both (R, O)
Which of these colors do you like best?

1. Green (S)
2. Purple (B)
3. Red (R)
4. Orange (C)
5. White (O)
Do you like vegetables?

1. Of course! (S, B)
2. No way (O, R)
3. Only with dip (C)
You are Spinach!
Popeye the Sailor’s favorite food was chock full of iron, you have an “iron” will: you are stubborn and strong! You are healthy and energetic, but when you get tired you really “wilt.” You know what you like, and you go all out for it.

Just like 1 cup of spinach has 1000% of the necessary Daily Value of Vitamin K, you give a 1000% to the things – and people – you care about.
Stage II, User Testing &
Stage III, Feasibility Testing

- Understand youth response and interpretation of messages
- Determine youth preferences for message format, style, message origin, and frequency of message delivery
- Develop message delivery protocol

Methods:
- Conduct focus groups and cognitive interviews
- Conduct feasibility study
Participants, Stages II and III

- **Focus Groups**
  - 9 groups
  - N = 59 youth, 12-17 yrs

- **Cognitive Interviews**
  - 4 sessions
  - N = 86 youth, 15-18 yrs

- **Feasibility Study**
  - 4 youth programs x 8 wks
  - N = 32 youth, 12-18 yrs

- **Youth Expert Panel**
  - Monthly meetings
  - N = 12 youth, 12-18 yrs

N = 189 youth
Results, Stage II: Focus Groups

- Groups of 6-10 youth from primarily non-health focused youth programs
- 12-question, semi-structured script developed to elicit information on message topics, format, “voice,” and origin
- Interviews conducted by 2 trained interviewers

<table>
<thead>
<tr>
<th>Site</th>
<th>No. of youth</th>
<th>Age</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Downtown youth center</td>
<td>7</td>
<td>12-15 yrs</td>
<td>6 M, 1 F</td>
</tr>
<tr>
<td>YMCA, Site 1</td>
<td>3</td>
<td>12-14 yrs</td>
<td>2 M, 1 F</td>
</tr>
<tr>
<td>YMCA, Site 2</td>
<td>5</td>
<td>12-14 yrs</td>
<td>1 M, 4 F</td>
</tr>
<tr>
<td>YMCA, Site 3</td>
<td>10</td>
<td>12-15 yrs</td>
<td>4 M, 6 F</td>
</tr>
<tr>
<td>Youth volunteer group</td>
<td>10</td>
<td>14-16 yrs</td>
<td>4 M, 1 F</td>
</tr>
<tr>
<td>SALT at public MS</td>
<td>5</td>
<td>12-13 yrs</td>
<td>1 M, 4 F</td>
</tr>
<tr>
<td>SALT at charter HS</td>
<td>9</td>
<td>16-17 yrs</td>
<td>1 M, 8 F</td>
</tr>
<tr>
<td>Youth cycling club</td>
<td>6</td>
<td>13-17 yrs</td>
<td>3 M, 3 F</td>
</tr>
<tr>
<td>Youth environment club</td>
<td>4</td>
<td>12-14 yrs</td>
<td>1 M, 3 F</td>
</tr>
<tr>
<td>9 focus groups</td>
<td>59 youth</td>
<td>12-17 yrs</td>
<td></td>
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Overall, participants responded well to the idea of health information through text messages

**Format and Style**
- Messages should be informative, fun, motivational, short, direct, relevant and should reference the teen age group
- Factoid and category quiz formats were rated higher than other types

**Originator**
- Messages should come from credible source

**Frequency**
- Don’t send ‘too many’ messages
Results, Stage II: Cognitive Interviews

- Pwpt with examples of messages
- Each group rated 25 messages on 3-point Likert
- Dietitian present to answer content-related questions
- Additional questions:
  - “Are there any words you do not understand?”
  - “What would you want to know more about, if anything?”
  - “Would you share this with your friend? Why or why not?”

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<th>Sex</th>
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<tr>
<td>Midtown HS Health Class</td>
<td>22</td>
<td>15-16 yrs</td>
<td></td>
</tr>
<tr>
<td>Midtown HS Health Class</td>
<td>24</td>
<td>15-16 yrs</td>
<td></td>
</tr>
<tr>
<td>Midtown HS Yoga Class</td>
<td>20</td>
<td>16-18 yrs</td>
<td></td>
</tr>
<tr>
<td>Midtown HS Yoga Class</td>
<td>20</td>
<td>16-18 yrs</td>
<td></td>
</tr>
<tr>
<td>4 classroom discussions</td>
<td>86 youth</td>
<td>15-18 yrs</td>
<td></td>
</tr>
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</table>
Specific, practical information about favorite restaurants or brand names
Use words “can” ... “may” ... “consider”
Use teaser factoids to get youth to want to know more
  - e.g. Too little sleep can lead to weight gain.
Call it physical activity, not exercise
No more than 2 messages per day (and none on the weekend)
Messages should come from nutrition professional
Test message delivery protocol to determine feasibility and acceptability of message delivery using the study-provided mobile device

- Youth were issued mobile devices (smart phones) for 8 weeks
- Two different delivery methods were tested
  1. My Experience software
  2. SMS
- Youth interviewed by research team to determine preferred message format, app function, and whether the frequency was acceptable

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<td>4-H Youth Group</td>
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<td>YMCA</td>
<td>11</td>
<td>12-15 yrs</td>
<td>6 M, 5 F</td>
</tr>
<tr>
<td>Youth environmental club</td>
<td>9</td>
<td>12-15 yrs</td>
<td>4 M, 5 F</td>
</tr>
<tr>
<td>4 youth programs</td>
<td>32</td>
<td>12-18 yrs</td>
<td></td>
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</tbody>
</table>
From the Youth

- “Some of the texts are really cool but others are boring.”
  - 12-yr-old boy

- “It’s ok to have boring texts because you still learn something new from those. You can’t always have funny ones.”
  - 16-yr-old girl

- “I show my family the messages I like.”
  - 13-yr-old girl

- “I like the quizzes, they’re cool.”
  - 12-yr-old boy

- “I use the recipes at home but I change them for what I have in the house.”
  - 15-yr-old girl
Lessons Learned by the Research Team

- ≤ 160 characters is challenging
- Messages are time consuming to construct and ‘vet’
- Youth are willing and enthusiastic research partners
- Multidisciplinary team was critical to success
  - Content
  - Youth development
  - Qualitative data collection & analysis
  - Software and hardware
Current Stealth Health Activities

Analysis of 12-week intervention data, n=148 youth

- Mobile phone data, SMS messages, survey data, web-based and mobile software application data, observations & interviews

Assessment of primary outcomes
- Nutrition and physical activity knowledge, attitudes, behaviors

Analysis of social network data
- Identify influential persons and characterize health behaviors

Disseminate mobile apps through 4-H and National YMCA
1 billion visits to physicians’ offices were made by Americans in 2011.

40% of doctors believe that mobile health technologies can reduce the number of office visits.

80% of doctors use smartphones & medical apps.

Doctors are also 250% more likely to own a tablet than other consumers.

There are more than 10,000 medical/healthcare apps available in Apple’s iTunes App Store.

It’s the 3rd fastest-growing app category for both iPhone & Android phones!

78% of US consumers are interested in Mobile Health solutions.

88% of doctors would like their patients to monitor their health at home, particularly their weight, blood sugar, & vital signs.

56% of doctors who use mobile devices say they expedite decision-making.

40% say they decrease time spent on administration.
“Roughly a decade after the start of mHealth, expectations are far from being met. The delivery system is there. But we don’t yet know what to deliver.”

- Tina Rosenberg (March 13, 2013)
“mHealth technologies can be put to highly innovative uses in biomedical research, and biomedical research can help build the evidence base that current mHealth applications lack”

- Francis Collins in Scientific American July 2012
Healthy diet decisions go hand in hand with exercising, and your mobile device can help you just as much at the grocery store as it can at the gym.

**LOSE IT!**
Provides an easy way to track calorie intake from meals, based on a vast library of food types.
- iPhone
- Free

**FOODUCATE**
Enables you to scan the barcode of food products while shopping and learn the truth about their nutritional value.
- iPhone
- Free

**RESTAURANT NUTRITION**
Contains nutritional information about menu items at many restaurants and enables users to track what they consume when they dine out.
- iPhone
- Free

**SMOOTHIE SELECTOR**
Features over 100 smoothie recipes, organized by goals like building muscle or losing weight.
- iPhone
- Free
**TOP APPS FOR EXERCISE**

The cornerstone of any healthy lifestyle is a firm dedication to exercise. Whether your goal is to build mass or slim down, your smartphone can act as your own personal trainer.

<table>
<thead>
<tr>
<th>App</th>
<th>Description</th>
<th>Platform</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runkeeper</td>
<td>Uses the mobile's GPS to track your running and progress statistics.</td>
<td>iPhone/Android</td>
<td>Free/$4.99 Pro version</td>
</tr>
<tr>
<td>Jefit</td>
<td>Enables bodybuilders to improve their workouts, track their progress with specific muscles and areas of the body, and share their results socially.</td>
<td>Android</td>
<td>Free/$4.99 Pro version</td>
</tr>
<tr>
<td>Nike Training Club</td>
<td>Provides users with the experience of having a personal trainer, with more than 85 custom-built workouts.</td>
<td>iPhone</td>
<td>Free</td>
</tr>
<tr>
<td>Nexercise</td>
<td>Turns exercise into a game and rewards users with virtual medals, discounts, and free merchandise.</td>
<td>iPhone</td>
<td>Free</td>
</tr>
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Acknowledgements

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- Stuart Marsh, 2
- Denise Roe, 7
- Kirk Astroth, 5, 6
- Lynne Borden, 5, 6

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3. Bio5 Institute/Arizona Research Laboratories
4. School of Anthropology
5. U of A Cooperative Extension
6. Norton School of Family and Consumer Sciences
7. Mel and Enid Zuckerman College of Public Health

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- UA Extension/Arizona 4-H
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- Ironwood Tree Experience
- Tucson Unified School District
- Sunnyside Unified School District

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Bio5 Institute
College of Engineering
College of Social and Behavioral Sciences
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Become an SNEB member!

- Benefits of membership
  - Professional Member - $190 per year
  - Associate Member - $95 per year
  - Student Member - $60 per year
  - Subscription to the *Journal of Nutrition Education and Behavior*
  - Free access to live and recorded webinars
  - Deepest discount to attend the SNEB Annual Conference
  - Membership in an SNEB specialty division
  - Connection to other professionals through SNEB listserv
  - [www.sneb.org/join](http://www.sneb.org/join)