Global Digital Health Forum

Nutrition and Digital Health
Session 9, Tues Dec 6, 2:30-3:30

Developing a behavioral rationale for maternal nutrition messaging content: Does understanding linkages with emotions matter?

Peter Winch, Johns Hopkins Bloomberg School of Public Health, pwinch@jhu.edu

Background

Formative research project team: "Linking Digital Health with Changes in Nutrition Outcomes: a formative research study"

- **National Department of Health, Republic of South Africa:** Drs. Peter Barron, Lesley Bamford
- **Praekelt:** Charles Copley, Eli Grant
- **University of Capetown:** Drs. Chris Colvin, Landon Myer, Ali Swartz, Zara Trafford
- **Johns Hopkins Bloomberg School of Public Health:** Drs. Amnesty LeFevre, Peter Winch

Background: MomConnect, South Africa

- MomConnect is the National Department of Health's national level mHealth initiative that registers pregnancies, links expectant mothers to gestation age-specific pregnancy information, and provides a help desk
- Help desk reports compliments and complaints on health services received at public health facilities.
- Maternal SMS messaging component has registered over 1.5 million women since August 2014 in over 95% (3,300) of public health facilities nation-wide in South Africa

Background: MomConnect, South Africa

- Messages were designed to provide expectant mothers will critical health information via SMS based on their stage of pregnant across domains of pregnancy care, nutrition, postpartum care, family planning, immunizations, hygiene
- Nutrition, including infant feeding and maternal nutrition constitute the largest share of messages
- Content developed nationally by a panel of experts but without an explicit behavior change strategy

Exclusive BF in 2016 DHS

Age in months	Not BF at all	Exclusive BF
0-1	19%	44%
2-3	29%	28%
4-5	27%	24%
6-8	41%	5%
18-23	82%	0.1%

Main determinants of exclusive breastfeeding

- Social norms
- Social support
- Breastfeeding self-efficacy

Early termination of breastfeeding

- Early termination attributed to range of factors:
  - Return to work or studies
  - Maternal health status
  - Perceived insufficiency of milk
  - Absence of support

- Need to understand user experience, how women experience breastfeeding and whether they are receiving the right messages at the right time ➔ user-centered design principles

Aims of formative research

- In-depth analysis of content of current SMS messages, and propose new SMS messages
  - Improve both **information** content and **emotional** content ➔ emotional drivers
- Strengthen breastfeeding support through complementary interventions:
  - Help desk
  - User support groups

➔ Formative research process informed by principles of **user-centered design**

Potential arms for RCT in Phase 2, to be developed out of formative phase

1. **Revised MomConnect messages only**: Current MomConnect passive SMS package + revised SMS messages
2. **Modify SMS recipients + BF buddy**: Maternal messages + Husband/partner messages
3. **Modify the dose/ frequency of messages**: Revised MomConnect messages + targeted SMS reminders
4. **Digital chat group**: Nurse support digital women's group for breastfeeding
5. **Comparison**: No nutrition messages

Emotional drivers

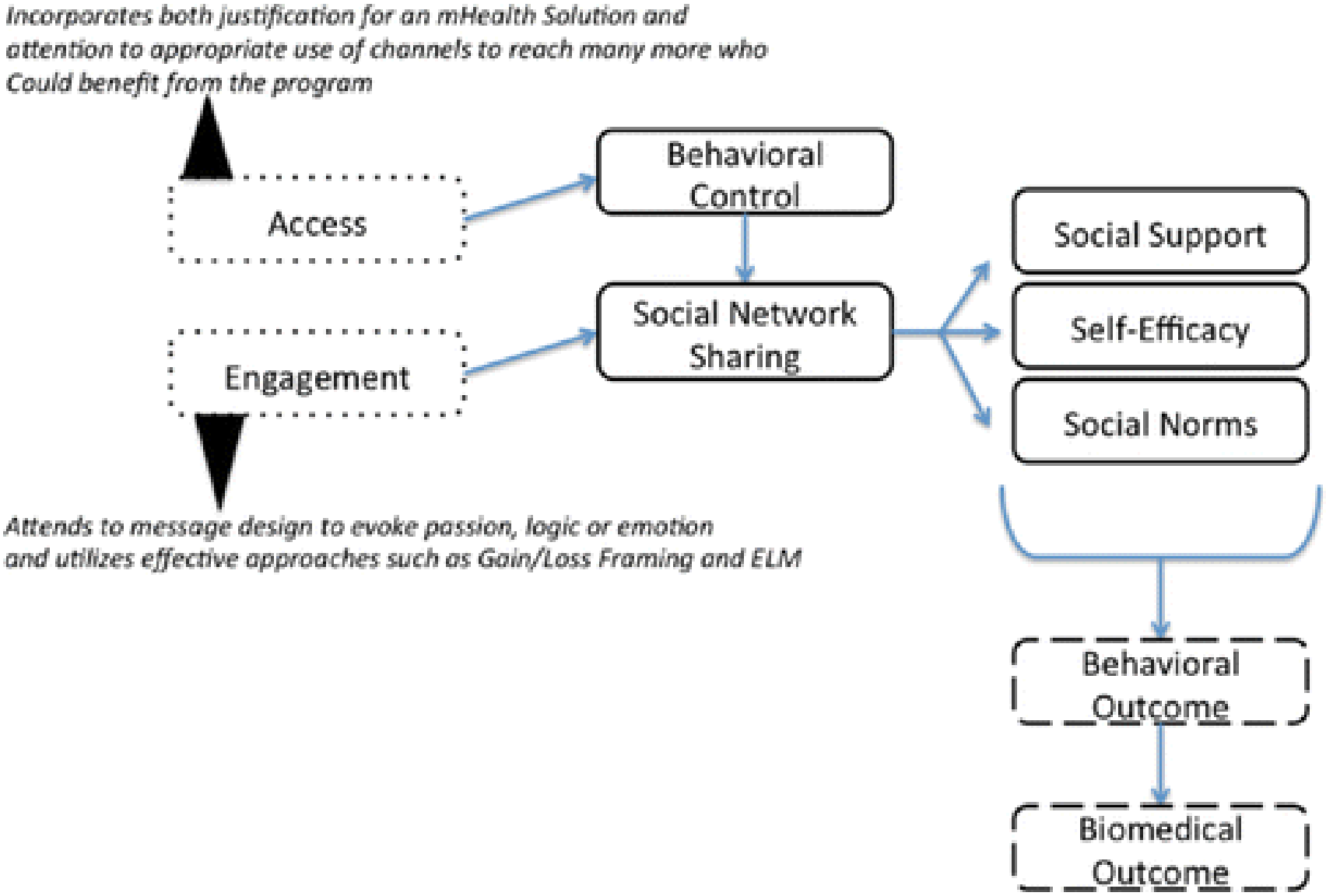
Emotional drivers of behavior

- In general, we have not examined or asked about emotions in qualitative and quantitative studies of health behavior
- Difficult to formulate direct questions about emotions on surveys or in qualitative interviews
- Emotions do not have their own "box" in different behavior change models

Emotional drivers of behavior: Disgust

- Sense of revulsion in response to an object considered distasteful or unpleasant
- Identified by Valerie Curtis and her group at LSHTM as key driver for water, sanitation and hygiene (WASH) behaviors such as:
  - Handwashing
  - Latrine use

Integrated theory of mHealth
Figure 2, Bull & Ezeanochie 2016



Dotted lines represent those constructs of particular relevance for mHealth; solid lines include constructs used across mHealth and traditional behavior change interventions; dashed Lines represent outcomes

Options for measurement of emotions

- Facial electromyography
- Functional MRI
  - Activation of the insula / insular contex in response to disgust stimuli
- Video recording
  - Analysis with automatic facial recognition software e.g. iMotion
  - Manual coding of facial movements
- And others…

Assessing emotional content in MomConnect messages

- Questions:
  - Can we refine emotional content in existing messages?
  - Can we introduce new messages with improved emotional content?

Examples of three messages

- Have you felt your baby's kicks? They feel like butterflies fluttering in your belly. Kicking shows your baby is growing well.
- Your baby is warm & cozy inside you.
- Plan to breastfeed your baby as soon as he is born. This will give your baby your precious first milk

Research plan for formative research (1)

- Recruit from current MomConnect users
- In-depth interviews:
  - Current content of breastfeeding (build on considerable existing literature)
- Focus groups:
  - In-depth examination of individual messages

Research plan for formative research (2)

- Video recording and coding of facial expressions:
  - Assess emotional response to existing and candidate messages

Steps in video recording

- Identify a quiet, neutral venue
- Provide a scenario:
  - "Imagine a 23 year old women named X with a 2-week old baby. I am going to read some SMS messages that she might receive through the MomConnect system.
- Read messages one at a time, wait for person's face to respond
- Code facial expressions, and correlate with feedback on same messages from focus groups

Plan for Phase 2 randomized control trial

- Conduct an individually randomized controlled trial to measure changes in episodes of exclusive breastfeeding among women randomized to different arms, including MomConnect messaging;
- Determine differences in phone survey response rates over time postpartum and by user characteristics;
- Identify user characteristics associated with breastfeeding practices;
- Generate recommendations for improving MomConnect nutrition content, delivery, linkages with breastfeeding practices.

Plan for Phase 2 randomized control trial

- Across the 3 provinces (Free State, Gauteng and KZN), women appearing at ANC1 recruited for enrollment into MomConnect will be randomly assigned to each treatment groups (to be determined during the formative phase)
- SMS surveys to measure key outcomes across study arms:
  - 2 weeks postpartum
  - 1 month
  - 3 months
  - 6 months

Sampling for phase 2 trial

- We will enroll and randomize **13,100 women into each study arm to complete the requisite number of interviews for 4 surveys and accommodate opt-outs**.

	Sample size		
Baseline EBF	**5%**	**7%**	**10%**
DHS EBF 2 weeks: data unknown – assume 44%	2,428	1,241	609
Adjusted sample size Survey 1: 80% LTFU	**12,140**	**6,205**	**3,045**
DHS EBF 0-1 months: 44%	2,428	1,241	609
Adjusted sample size Survey 2: 80% LTFU	**12,140**	**6,205**	**3,045**
DHS EBF 0-3 months: 36%	2,311	1,190	590
Adjusted sample size Survey 3: 80% LTFU	**11,555**	**5,950**	**2,950**
DHS EBF 0-5 months: 32% [1]	2,206	1,140	568
Adjusted sample size Survey 4: 80% LTFU	**11,030**	**5,700**	**2,840**
Total intervention population	**46,865**	**24,060**	**11,880**