

EatWell: Sharing Nutrition-Related Memories in a Low-Income Community

Andrea Grimes, Martin Bednar, Jay David Bolter*, Rebecca E. Grinter

School of Interactive Computing & GVU Center

Georgia Institute of Technology

85 5th St. NW Atlanta, GA 30308

{agrim, beki}@cc.gatech.edu, bednar@gatech.edu

*Wesley Center for New Media

Georgia Institute of Technology

686 Cherry Street Atlanta, GA 30032

jay.bolter@lcc.gatech.edu

ABSTRACT

Low-income African American communities face a disproportionate amount of diet-related health problems in the United States. To address this issue, we developed EatWell, a system that allows people to use their cell phones to create voice memories describing how they have tried to eat healthfully in their neighborhoods (*e.g.*, at local restaurants) and listen to the memories that others have created. In this paper, we describe the results of our field trial of EatWell, specifically characterizing how our participants were able to craft stories that were both emotive and culturally-relevant, the challenges that arose in creating these memories and finally how sharing these stories facilitated a sense of community empowerment. We conclude by presenting implications for the design of future applications that facilitate the sharing of health-related experiences.

ACM Classification Keywords

H.5.3 [Information Interfaces and Presentation]: Group and Organization Interfaces – Computer-supported cooperative work.

General Terms

Design, Human Factors.

Author Keywords

Cell phone, culture, health, low-income, memories, mobile, nutrition, underserved communities, voice.

INTRODUCTION

While existing research on health has addressed issues such as supporting caregiver networks [12,21] and using social influence to encourage physical activity in the general population [3,5,16,20], few researchers have examined how

technology might address some of the extreme health disparities that exist in the United States (U.S.) today. One segment of the U.S. population that experiences a disproportionate amount of diet-related health problems are low-income African American communities. For example, diabetes is 60% more prevalent in African-Americans than it is in Caucasians [2]. Furthermore, members of low-income communities may be even more prone to these health problems because access to healthy foods in these communities is significantly lower than in wealthy neighborhoods [19]. Because of this disparity, public health researchers have overwhelmingly advocated for health interventions that account for the ways in which eating habits are culturally situated [2,23]. In our research, we have examined what role CSCW research might have in addressing these health issues. In particular, we contribute to existing studies of health within CSCW by examining how technology can be used to promote healthy eating practices within low-income African American communities.

The guiding research question for our work has been: *How can technology be used to help individuals in low-income African-American communities share their experiences of trying to eat healthfully?* To address this question, we developed a cellphone application called *EatWell* that allows individuals to record audio memories of how they have tried to eat healthfully and share them with others. In creating EatWell, our goal was to support the sharing of experiential knowledge and subsequently help individuals gain a practical understanding of how to eat healthfully given the particular constraints and affordances of their socio-cultural context. In this paper, we report the results of a four week study of EatWell, in which we used system usage logs and semi-structured interviews to examine how and why our participants used EatWell, and their reactions to the system.

In the following sections, we first describe previous research that contextualizes our own work. We then discuss the EatWell system in greater detail, and explain our study before turning to the results. Our results highlight the implications of allowing people to create and share their nutrition-related *memories* (*i.e.*, short recollections of their experience trying to eat healthfully) with members of their

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

CSCW'08, November 8–12, 2008, San Diego, California, USA.

Copyright 2008 ACM 978-1-60558-007-4/08/11...\$5.00

local community. In particular, we describe how by creating these memories, our participants were able to richly craft stories that were both emotive and culturally-grounded. We also discuss the challenges that our participants faced when creating these memories and finally, how sharing these stories facilitated a sense of community empowerment. We conclude by presenting implications for the design of future applications that facilitate the sharing of nutrition-related experiences.

RELATED WORK

It is widely recognized that in the U.S., African-American—particularly low-income—communities face disproportionately high rates of serious diet-related health problems such as diabetes and hypertension [2,23]. Public health researchers argue that these health problems are often tied to cultural behaviors, traditions and norms, necessitating careful consideration of these factors when designing preventative programs [2,23]. Various initiatives (such as the Center for Disease Control's REACH 2010 and the National Center on Minority Health and Health Disparities, both sponsored by the U.S. Federal Government) have been created to address this challenge, but to date these efforts have primarily resulted in culturally-grounded educational campaigns [4,10,27], which while important, do not typically leverage the benefits that technology could provide. In the following sections, we show the potential of technology to address these health disparities by providing an overview of previous research on health and geographically-bounded online communities within CSCW-related disciplines.

Social Support for Health

A number of researchers have examined how technology can be used to promote healthy living. For example, researchers have designed applications that use social influence to encourage individuals to be more physically active [3,5,16,20]. Some of these applications make a person's physical activity (*e.g.*, step counts) visible to their social network and through this transparency friends can encourage one another to be more active [5,16]. This encouragement can come in the form of social support (*e.g.*, friends motivating one another to increase physical activity) or social pressure (*e.g.*, not wanting to look bad in front of them) [5]. In our research we similarly examine the ways in which people can help one another in living healthfully. In particular, we look at how individuals within a shared geographical and cultural context can support one another in eating healthfully as a community.

Other research has examined how online health communities assist people in coping and seeking help with their health problems [14,15,18,24]. Kummervold *et al.* [14] point out important characteristics of online health communities: they facilitate the sharing of experiential knowledge and peer support, and they are sources of empowerment. The work of Salem *et al.* [25] and Maloney-Krichmar and Preece [18] provides examples of each of

these characteristics. First, Salem *et al.* [25] highlight the role of experiential knowledge and social support in an online health community for individuals coping with depression. They found that people were four times more likely to share knowledge that they had built up through their own personal experiences (*i.e.*, experiential knowledge) than information that they had learned second-hand through professional sources. Furthermore, almost half of the message posts offered some form of social support, for example, in the form of emotional encouragement. Second, the work of Maloney-Krichmar and Preece [18] points to the ways in which online health communities can help individuals feel empowered. These researchers found that in an online community for individuals dealing with knee injuries, people felt that the information they received empowered them to interact more adequately with healthcare workers.

Thus, online communities are particularly well suited for allowing people to share their experiences, for providing social support, and for empowering people to take charge of their health. EatWell is a type of virtual community in that it uses technology to facilitate interaction amongst individuals over a distance. The existing virtual communities that we have described here have been designed for PCs with Internet access and have allowed individuals to communicate using text. Thus, we extend this research by designing EatWell, a system in which people use their cell phones to access the community (instead of a PC) and in which voice is the medium for sharing experiences (instead of text).

Geographically-Bounded Online Communities

Another distinction between our research and previous work on online health communities is that while those studies have noted the benefit of bringing together individuals living in various parts of the world [18,25], in our work we examine the implications of facilitating a community composed of individuals within a constrained geographic area. Our research is informed by existing work on what Kavanaugh *et al.* [11] define as *community computing*, that is, “computer networking among and between residents, organizations, government and businesses in a geographically bounded setting for local purposes and activities.” While the community computing projects we will describe here do not focus on health, they do point to the effectiveness of geographically-bounded online communities in catalyzing individuals to address locally-relevant issues.

For example, Redhead and Brereton [22] examined how individuals communicate about local interests and in particular, the researchers discussed one community's protest of a proposed motorway (highway) project. As individuals contributed to the protest, they necessarily gained knowledge about the project and the actions being taken to stop it. Redhead & Brereton argue that technology could support the persistence of this knowledge, should

Table 1. Examples of memories created in EatWell by category.

Restaurants	Fast Food	Cooking at Home	Grocery Stores & Markets
I'm calling particularly about a restaurant that's called Up the Creek. Up the Creek, when um choosing your restaurants, um in terms of your diet and also things that you may or may not want to eat it's also important sometimes to understand their seasonings that they may use on their foods. Um, I particularly had fish that was grilled and this particular restaurant which was Up the Creek, which I do recommend, has a Cajun style of tilapia fish which was very tasteful and uh, I certainly recommend it. – P13	Hi um, I heard the gentleman talking about the fast food Burger King veggie burger. So I just went by there 'cause I hadn't had anything to eat before I went to work. And I actually enjoyed the veggie burger. And it was very cheap. And actually, I went back to the fast food place and got another veggie burger but that's another story. But it's actually real good, and it's an experience. I let my girlfriend try it and she loved it too. So I recommend the veggie burger from Burger King. I got it from 2 different burger kings so that means it's at every burger king. So, I just wanted to share my experience. Thank you. – P2	I have a great memory for a lentil loaf. I actually got it off the food network. That Italian cook, the one they say is so sexy, did a lentil loaf. So it's like meatloaf only it's made with lentils! And it is <i>absolutely</i> fabulous! It took me a long time to make it the first time. Um, and I actually as I was making it I said, 'I am never doing this again 'cause it's just too much trouble.' In reality it's not that much trouble but you just gotta remember to soak the lentils like a day ahead of time. It is <i>so good</i> that my daughter who is 4 and a half wanted to take it for lunch the next day <i>and</i> asked if we had any extra to take to her teacher. Now you know it must be really tasty. Good and good for you! I also gave the recipe to a friend of mine who is vegetarian. She said she has made that lentil loaf 5 times since I gave it to her. So, give it a try. –P3	Greetings. This morning I am making a run to the Dekalb farmer's market. And it's unfortunate because I really enjoy the prices that I gather there, however it's clearly on the other side of town (I live in Southwest Atlanta, 30 or so minutes away). So I have to kind of strategize and do it in conjunction with trips to Walmart or other places to make it worthwhile to drive. But the produce is very fresh and the cost of the produce is very affordable, so in instances it's worth my while to make that drive all the way tot he Dekalb Farmers' market. So if you don't know about that place definitely look it up – you can basically get produce from the entire world and under one roof. So the international market is a pretty good deal. Thanks, take care, bye. –P4

these key individuals have to disassociate themselves with the collective action, for example, because of family commitments. In another project, researchers described how a neighborhood email list allowed individuals to extend their real-life surveillance of the neighborhood into their online community [7]. Residents were able to discuss issues that online they had observed while keeping an eye on their neighborhood (*e.g.*, burglaries and residents driving at excessive speeds).

Previous work points to the benefits of virtual communities both for supporting individuals in sharing health-related information and for mobilizing neighborhoods to address locally-relevant issues. We extend this research by designing and evaluating a system that supports residents of low-income African American communities in addressing a very pertinent local issue—the state of diet-related health in the African American community. EatWell enables this by allowing people to share their experiences with trying to eat healthfully in local neighborhoods, and thereby learning from the experiences of others. In the next section, we will further describe our motivation for creating EatWell and overview the system details.

EATWELL

EatWell is a system that allows people to use their cell phones to create voice memories detailing how they have tried to eat healthfully in their neighborhoods (*e.g.*, at local restaurants) and listen to the memories that others have created. Our system design reflects the three principles for designing culturally relevant technologies (*i.e.* systems that take into account the norms, values, behaviors, and

challenges of a particular cultural group) that we have articulated in our previous work [6]. First, EatWell accounts for *environmental effects on eating practices* because as people leave memories they (either implicitly or explicitly) describe how their experiences were shaped by living in their particular neighborhood. Second, since community members have complete control over the content that is in the system, we enabled them to express what they thought were *common health attitudes and behaviors within their culture*. Finally, by helping people share stories of success that reference the particular constraints and affordances of their socio-cultural context, we accounted for the final principle, supporting *culturally-relevant behavioral modification suggestions*.

Given that we were targeting low-income communities, it was important that we create a system that was cost-effective. Thus, we chose to leverage the mobile phone since it is a computational platform with a high penetration rate among low-income individuals [1]. Furthermore, by designing the user interface to rely purely on voice and keypad interaction, participants were not required to have sophisticated cell phones that supported graphically-intensive applications. In addition, we were able to explore the benefits and challenges in creating and sharing health-oriented audio content. Finally, our goal was to create a relatively unstructured and open-ended system that put few constraints on our users, thereby allowing us to see the range of ways in which people might appropriate this type of experience-sharing application.

Users access EatWell by dialing a phone number on their cell phone. The first time they dial this number, they are asked to input a set of code numbers that allow them access to the EatWell system. Users are then given the option of having the system remember these codes so that they will automatically be connected to the system in the future (all of our participants were instructed to do this). Once connected to EatWell, users are greeted with the following message: *"Welcome to EatWell. You can listen to or record memories about trying to eat healthfully in your neighborhood."* Users are then placed in the main menu in which the system asks them to select one of the following memory categories: Fast Food, Restaurants, Cooking at Home, Grocery Stores & Markets, and Other. Once a category has been selected, the user is able to either listen to the current memories in the category or record their own. Examples of memories that our participants created are shown in Table 1.

If the user chooses to listen to memories, the newest one is played first and subsequent memories are played in chronological order, newest to oldest. After a memory has finished playing, users have the option of listening to the next memory, the previous memory, recording their own, or returning to the main menu to select a different category. If a user chooses to record a memory, they are given up to three minutes to speak their memory into the phone, and after they are finished it is played back to them for review. The user has the option of saving the memory, re-recording it, or discarding it. If they choose to save their memory, it is stored on a web server, thus making it immediately available to anyone with access to the EatWell system. Once a week, our participants were sent an SMS update letting them know how many new memories had been added to the system (they were also given the option of opting out of this update).

We developed EatWell as a server-side application using the Tellme Studio suite, a set of development tools for creating voice-based applications. We programmed the application using PHP and VoiceXML and user actions (e.g., logging into the system and accessing memories) and memory information (e.g., audio file locations) were stored in a MySQL database. By creating a server-side application, we were able to provide a system that works on any cell phone platform, meaning the only technological requirements for participating in our study was having the ability to make and receive cell phone calls.

METHOD

By designing and evaluating EatWell, our goal was to better understand how technology can help people share how they have tried to eat healthfully. We recruited participants at a YMCA branch in an urban, low-income community in Atlanta, GA, USA. The YMCA is a non-profit organization that provides a number of services to local communities, including exercise facilities and health and wellness programs. The branch that we recruited at is located in a

predominantly African-American community with an average adjusted gross income that is 37% lower than the state average (<http://www.city-data.com/zip/30311.html>). By recruiting at the YMCA, we felt that we would be more likely to attract participants with some interest in trying to live healthfully. Finally, recruiting at a neighborhood-oriented organization such as the YMCA allowed us to obtain participants who had a common geographic frame of reference. As the EatWell system is designed to support individuals in learning how to eat healthfully in the neighborhoods that they frequent, it was important for us to recruit participants who lived, worked, or spent a significant amount of time in the same geographic area.

Twelve people participated in this study. At the beginning of the study participants were shown how to use the EatWell system and asked to complete a survey with demographic questions as well as questions about their nutrition-related attitudes and practices and their cell phone usage. Each participant was given access to our system for at least four weeks and over this time period we collected log data about how they used the system (e.g., date and time of access, what memories they listened to) and interviewed them one to two times to further examine how they used EatWell. Our goal was to interview all participants twice, but due to scheduling conflicts, three participants were unable to complete a second interview. The survey responses in conjunction with the log data (showing system usage patterns) and interview data allowed us to get a vivid picture of how EatWell supported individuals in sharing their nutrition-related experiences with one another.

We suggested to participants that they might want to use the system at least once or twice a week, but we encouraged them to use it to whatever extent they felt was appropriate for them. We did this because we were interested to see what level of involvement makes the most sense for this type of knowledge sharing application. Furthermore, we made the decision to not seed EatWell with example memories because we wanted to see what type of content participants produced on their own, without too much leading from the researchers. In addition, we advised participants that they could create *any* type of nutrition-related memory that they liked.

Analysis

We conducted an inductive analysis of the interviews in which two researchers examined the transcripts to derive a set of codes describing phenomena in the data (similar to the approach used in Grounded Theory analysis [28]). The researchers then met to review the codes and reach consensus. Once the final set of codes was extracted from the interview data, the researchers came together to iteratively cluster these codes and arrive at higher-level themes. In addition to analyzing the interview data, we examined the system usage logs to understand the frequency and nature of our participants' interactions with

EatWell. In the next section, we give an overview of the individuals who participated in our study.

Participant Overview

We had 12 participants in this study, eight female and four male. We had a range of age groups participate (from the 18-24 age range to the 46-54 range) though most participants were above 30 years old. Four of our participants were married, and eight had children. All participants had access to a cell phone. In our surveys, we asked questions that gave us a sense of how often our participants listen to and leave voicemail, as these activities are similar to the interactions that they would be having with EatWell. The majority of our participants used their cell phone more than three times per day and they varied in how often they left and listened to voicemail (from a few times per week to multiple times a day).

To understand our participants' experiences with changing their eating habits, we asked if they had ever decided to *stop* or *start* eating certain foods. Eleven of our 12 participants had taken foods out of their diet previously, whereas eight people had experience introducing foods into their diet. This history of changing their diet meant that our participants had a set of experiences to draw upon when creating memories in EatWell. Furthermore, seven participants said that they were not satisfied with their current eating habits and all said they were interested in learning how to make changes to their current habits. These attitudes suggested that a system such as EatWell (which allows people to listen in on the strategies of others) might be of particular interest to our participants.

RESULTS

Overview of System Use

Overall, our participants enjoyed using EatWell. First, they appreciated having the opportunity to share their favorite restaurants, recipes, and nutrition tips with others (only one participant said that she could not see herself using this type of system in the future). For example, P13 felt he had a lot to contribute since he had over 30 years of experience to draw upon in terms of trying to eat healthfully. Furthermore, for some of our participants, sharing memories in EatWell was akin to sharing their experiences with others in real life. As P3 noted, *"We [share experiences] all the time, anyway with our friends, so this was just one more friend."*

In addition, being able to listen in on others' memories helped our participants learn about other options for healthy eating in their neighborhoods. For example, while some participants said they gained new ideas for restaurants to try out in their area, others said that they were reminded of places they had tried out in the past or had meant to try out but had not yet had the chance to. Participants also learned new ideas for eating healthfully at home; for example, some noted that they learned new recipes through EatWell and also how to snack in moderation. Furthermore, four

participants noted actually trying out some of the ideas shared in EatWell and eight thought about trying or were planning to try out tips.

Over the course of this study, 38 memories were created and the average memory duration was 52s (min=16s, max=130s). Cooking at Home memories were the most frequently created and listened to (memories created=13, memory accesses=42), followed by Fast Food (memories created=11, memory accesses=31). This ranking was further supported by the interview data: when we asked participants for which categories they were most interested in creating memories, most said Cooking at Home and the second most popular category was Fast Food. On average, participants accessed EatWell a total of 5 times (min=2, max=8), created 3 memories (min=1, max=10), and listened to 9 memories (min=2, max=38).

In the remainder of this section, we provide a more detailed description of how our participants appropriated EatWell and in particular the implications of creating and sharing memories. We will first describe how in creating memories, our participants were able to richly craft stories that were both emotive and culturally-grounded. We also note the challenges that arose in creating these memories. We will then describe how the sharing of these stories facilitated a sense of community of empowerment.

Sharing Experiences by Crafting Stories

The memories created were seen not simply as impersonal facts, but rather as intimate stories, little windows into the storytellers' lives. As one participant noted, *"Everybody has stories. And [EatWell] reminded me of just the days of old where everybody has a story to tell."* They were intimate because individuals talked about the ways in which they go through their days, their routines, and the small victories that they had in terms of trying to eat healthfully (e.g., learning how to make healthier selections at a local fast food restaurant). They also talked about significant achievements in their lives, for example in one memory, P12 described how she had lost a large amount of weight. By providing a window into the very routines and achievements (whether big or small) in their lives, participants made themselves vulnerable and shared part of themselves with other EatWell community members.

Our participants said that hearing these stories was valuable in part because it is useful to hear strategies that everyday people had tried out themselves (as opposed to hearing impersonal recommendations). For example, one participant noted, *"Real stories ... those are always more effective to me. Once you have gone through it ... and you see the before and the after."* Tried and tested strategies are important sources of inspiration for individuals trying to build their repertoire of healthy eating tactics. P4 noted that hearing the personal experiences of others was valuable because he didn't feel that getting information solely from the medical community was sufficient: *"I didn't have the reservations that well, this isn't – this information that I'm*

gathering isn't from a quote-unquote established medical authority or things of that nature because of my own personal thoughts that the medical establishment doesn't always give you everything you need to know about being able to maintain your own health."

In examining our interview data and reviewing the stories that were created in EatWell, we noticed how asking people to record *memories* seemed to affect the tone of these recordings. Recall that when individuals use EatWell, the system first tells them that they can "listen to or record *memories* about trying to eat healthfully in their neighborhoods". In terms of tone, we noticed that most of the memories our participants created contained positive reflections. Indeed, P2 said, *"the word 'memories', you know that helps you think of things that you really enjoy."* Furthermore, P5 told us that, *"Even with [the terms] 'comments' or 'suggestions', they can be preachy. Maybe with you using 'memories' it is not preachy. It's not overwhelming."* These quotes reflect how the memories created—while often offering suggestions for how individuals might make healthier choices in their lives—were not seen as abrasive, condescending, or off-putting but rather, positive and accessible. Thus, even beyond interface design decisions, the terminology we used to describe the recordings influenced the ways in which our participants crafted and shared content in EatWell.

Feeling Memories: The Role of Emotion

The fact that individuals recorded voice memories (as opposed, for example, to sharing written experiences) was important because it allowed the stories to have an emotional quality to them. As P1 noted, when listening to memories in EatWell, *"You getting to experience they joy, you get to hear the joy in they voice. You can't get the joy in a text."* Similarly, P2 noted that, *"with the voice reflections ... you really felt what they were saying."* Thus, listening to memories was different than simply reading about people's experiences. Our participants valued the emotive quality of these memories because it brought the experiences to life. This happened, for example, because as people created audio memories, aspects of their character were conveyed. P12 told us that, *"You definitely found out a lot about the person's personality. Um, it gave you a personal touch when they, you know, talk, and they leave a message. Rather than an email? Oh yeah absolutely. You never get a chance to find out what they even sound like, you know, if you're [reading] an email!"* Beyond getting a sense of their personality, participants noted that they liked being able to hear the joy, excitement and pride in individuals' voices as they shared the nutrition tips and strategies that have worked for them. Thus, by allowing users to create audio memories, EatWell provided a way for people to capture and convey the emotional aspects of developing strategies of eating healthfully, for example the joy that results from making a change to one's diet and seeing the positive impact of that change.

Culturally-Relevant Content

The EatWell system—by its very flexibility in terms of how it is appropriated—was able to support individuals in sharing stories that contained culturally relevant information. That is, we designed EatWell to be open-ended and flexible such that it might be appropriated by community members in a way that made sense for them. Thus, the content that users created was itself inherently culturally relevant because the stories that people shared were a reflection of their experiences in their particular socio-cultural context.

For example, when describing restaurants and grocery stores, individuals often referenced local streets without having to give much explanation of where those streets were. Memory creators were able to assume that listeners would know where those places were as EatWell is designed for individuals who orient towards a similar geographic area. P3 noted, *"You know if it was from a wider source, I don't know. ... I mean, if you talk about restaurants, I don't need to hear about restaurants in New York City."* This quote demonstrates the value of hearing memories with practical ideas for how to eat healthfully within the specific local context in which EatWell listeners live in. In addition, some of the memories reflected sensitivity to the economic situation of many individuals living in the neighborhoods that we targeted. That is, a number of memories mentioned how their ideas for eating healthfully were cost-effective.

Thus, without giving our users much scaffolding in terms of what types of memories to leave, they naturally created culturally relevant memories because their stories were a reflection of, or a reaction to, their particular socio-cultural context. Indeed P8 told us, *"I think it kinda tied in right—definitely where I live, because of the culture of where I'm at and everything. You know, the types of food that was talked about when I listened to messages and also the ones that I did leave in regard to myself kinda fits the community and the area where I live."*

Challenges in Creating Memories

Although they were able to produce emotive and culturally relevant stories, our participants did encounter some challenges in creating memories. First, most people said they took steps to make sure that the memories they created were as understandable as possible. In particular, they noted the challenge that arises when trying to make one's point come through clearly in an audio recording. P2 said that there were a lot of 'ums' and 'ahs' in her memories and to counteract this she even tried writing out what she wanted to say beforehand. While no other participants mentioned using this strategy, some did use the re-record feature to revise memories that they felt were not clear enough. For example, P5 said that after listening to a memory she had just created, she realized she was speaking too slowly and so she re-recorded the memory with the goal of speeding up her speech. Thus, our participants were concerned that the message they wanted to share came across clearly, and this

necessitated them paying attention to how articulate and clear they were in their speech.

While most of our participants felt comfortable sharing their experiences with others, in addition to making sure they got their point across, they were concerned about creating memories that would be useful and interesting to others. For example, one participant noted that she did not leave a memory because she noticed that someone had already said something similar to what she was going to say and she did not want to duplicate that information. Another participant said that it was difficult for her to tell what others might find interesting, so she was sometimes unsure of what memories to leave in the system. Similarly, P4 told us that he was cautious about leaving racially-focused memories (*i.e.*, talking about the status of health in the African-American community) because he was unsure of how that content might be received. (This participant was initially unaware that all of the participants were African American. Once we clarified this, he told us that he would likely have left that memory had he known the makeup of the community.) Finally, when she first used the system, P12 said that she did not leave memories in part because she was so impressed by what others had to say: *"I need to make sure I have a warm and wonderful experience like everyone else so they'll be interested in listening to my message."*

Community Empowerment

Despite the challenges that participants faced, we found that in allowing individuals to share their stories, EatWell facilitated a sense of community empowerment. We describe this empowerment below by detailing how EatWell provided a platform for individuals to have their voice heard, facilitated a sense of identification among community members, and allowed them to share and build a sense of hope in the midst of the health disparities that are prevalent in their neighborhoods.

A Platform for Having One's Voice Heard

Some participants spoke about the democratizing nature of EatWell, in that it allowed everyday people to share their experiences with one another. For P4, this was because he felt that the medical establishment was not a sufficient means of gathering health information. (Indeed, in our surveys, while the most frequently cited source of nutrition-related information for our participants was doctors, some participants also noted that friends, magazines and books were important sources of information.) P4 liked the decentralized nature of EatWell, that instead of consolidating the control of who gets to disseminate knowledge, this control is put into the hands of the community: *"I have my own concerns about media consolidation in terms of there being a small number of companies that control the majority of what information we're exposed to which cuts out our opportunities to be able to find ways of sharing information with each other. So technologies that play in that realm in terms of providing*

people means of exposing each other to the information I really like." P13 thought that EatWell is beneficial because it gives people the *opportunity* to share their experiences, particularly individuals who may not have had a platform to do so before. P12 was similarly excited to have the opportunity to share her experiences saying, *"I mean it's almost to me like being maybe on a talk show. Yeah, like you know having a chance to tell your opinion and people are actually listening."*

Identifying with Community Members

Some of our participants felt that they could identify with the other people using EatWell, though they had never met them nor did they have any information about them other than what they said in their memories. For some, hearing memories left by people living in the same community made the information shared even more valuable. As P4 noted, *"So I like the ... fact that the people who were leaving the messages were living in my own community. I liked that idea because there's a common connection, and probably in most cases a common situation of trying to deal with some of the same issues."* Thus, in the absence of virtual community relationship building tools like profiles, usernames, or avatars, EatWell users still noted that they felt that they could identify with others using the system. P12 described the sense of community she felt with other EatWell users in this way: *"People calling in, sharing their experiences ... it felt kinda like a family. It felt like a family to me."*

Sharing Memories, Sharing Hope

In addition to being able to get health ideas from people they felt they could identify with, participants noted that it was useful to see that there were others like them who were interested in trying to eat well. For example, P4 said that, *"There are times where when you look at the predominance of unhealthy living and lifestyles, that you can become a little disenchanted...[But EatWell helped me see that there is] a little subgrouping of a few people who seem to also be genuinely looking for ways to become healthy."* Similarly, P12 said, *"I mean it definitely was a plus to hear that so many African Americans are moving into eating well. I mean it just gave me hope."* Thus it was encouraging to some of our participants just to see that while extreme health disparities do exist in the African American community, there are individuals in their neighborhoods who are trying to eat healthfully.

Participants were also excited to see that there was a sense of collective effort in terms of EatWell users having a desire to help one another eat more healthfully. For example, P4 said, *"I like the idea that we can collectively improve our health by having a means of exposing or exchanging [information]."* Some participants talked about their concern over the state of health in the African American community and shared their excitement at how EatWell could help address these issues. For example, P12 noted how she saw EatWell as a useful platform for,

“sharing ideas on how we as a [cultural group]... definitely showing how Black people can eat better and how we can share our ideas to help the next person with, you know their lifestyle... you know them having a problem with diabetes, high blood pressure, this that and the other.” P13 was also excited to see that people were interested in helping one another. He said, *“It stimulated me to know that there is other people out there that wanna share what they [eat] and what they do and share it with others that have problems ... and teach other people how to be healthier in their eating habits.”* Furthermore, some participants noted how they valued that individuals were sharing their experiences not out of obligation but rather out of a desire to help one another. For example, P8 appreciated the fact that EatWell users were probably busy yet they *“take out the time to say ‘hey I did this, and this really seems to be working for me.’”*

Thus, EatWell empowered community members to come together and take control of the health disparities that exist in their communities. Instead of simply supporting the transmission of knowledge from outside experts, EatWell leverages the experiential knowledge of community members. Furthermore, it provides a platform through which individuals can help their fellow neighborhood residents live more healthfully. In this way, EatWell supported the cultural construct of collectivism, that is, individuals placing a strong emphasis on community issues and needs. This is important because previous research on African American health practices has shown collectivism to be particularly important, and that accounting for it in health interventions may lead to more successful outcomes [13].

DISCUSSION

Our results highlight a number of themes pertaining to the benefits and challenges of a system that helps individuals share nutrition-related stories. Based on these findings, we present suggestions for future work in this area. In particular, we focus on the value of memories as a genre of experience sharing, the importance of conveying emotion and personal touch, and finally the value of designing deeply local health applications which take into account the particular needs and desires of individuals with a similar geographic and cultural frame of reference.

Memories: A Genre of Experience Sharing

EatWell allowed individuals to share what we called *memories*, that is, short stories relaying their experiences with trying to eat healthfully. In these intimate glimpses into their lives, people reflected on their past experiences and shared a small picture of their eating habits, their successes, and also described the role that loved ones played in their eating practices. Furthermore, our participants created these memories without much prompting or scaffolding from the EatWell system itself. As opposed to supporting a more traditional question and answer model of information seeking, EatWell acted more

as a repository for reflections that others could casually browse to gain insight into how people in their community have tried to eat healthfully. This type of system was valued because people saw it as a platform through which they could easily share the expertise that they had gained over the years and also the pride they felt in their accomplishments. In addition, the tone of these memories was not seen as ‘preachy’ or condescending, but rather as accessible, inviting and above all else positive. These things point to the value of designing future applications which support individuals in sharing memories with one another.

Our participants did face some challenges in creating content in this type of unstructured system, namely deciding how to create memories that would be useful to and well received by others. This suggests the importance of fine-tuning the level and nature of scaffolding for helping individuals to create memories while maintaining the benefits that come from an open-ended system. One approach would be to provide more support for capturing and sharing experiences at the moment that individuals have them. For example, after preparing a healthy new dish, it may be useful to help people share that experience in that moment, such that they are able to vividly capture and convey it to others. Previous research has examined how to support individuals in automatically capturing audio [8] and pictures [9] in their daily life, but what we advocate here is support for impromptu story creation and sharing. This type of support paired with greater feedback as to how community members are reacting to one’s memories may help assure individuals that they are creating useful and well-received content.

Designing for Emotion & Personal Touch

By listening to the memories, our participants felt it was easier to experience the emotion of the person speaking than if they had been reading them. Our participants told us about being able to hear the joy, excitement, and pride in the speakers’ voices as they described how they had been successful in trying to eat healthfully. Thus, actually being able to hear people speak about their memories brought these experiences to life for listeners. Participants felt that the vocal memories allowed them to gain a clearer glimpse into the personality of the person leaving the memory. This personal quality of the memories further facilitated the positive experience that participants had when listening to memories.

These findings speak to the value of conveying emotion and personal touch when individuals share reflections on how they have tried to eat healthfully. Previous research examining online health communities has described how these virtual groups help people feel more comfortable expressing their feelings and emotions [17]. Beyond the written comments facilitated by traditional online health communities, our study of the EatWell virtual community suggests that the medium of voice is an impactful way of expressing these emotions. One design implication that

results from our research then is the importance of supporting individuals in vividly conveying the ways in which they have tried to live a healthy lifestyle. It is not enough to simply convey factual information; the added dimension of emotion is part of what engages people as they listen to the experiences of others. Thus, we see opportunities for providing further support for helping individuals convey their emotion as they share their experiences. As we have discussed, our results suggest that the medium of voice is a promising way of doing this. In addition, future work in supporting experience sharing can leverage the growing body of research on affective design (e.g., [29]) to highlight other ways of designing systems that support people in conveying emotions.

Towards Deeply Local Health Applications

Another theme that arose from our study was the importance of sharing experiences with others in one's local community. Our participants valued having the opportunity to share their stories and hear the practical advice from other people who likely dealt with the same constraints and affordances that they did. Furthermore, they valued the sense of encouragement they felt by hearing that there were others in their community concerned with state of African American health and who were trying to live healthfully themselves. These sentiments point to the value of creating health-oriented experience sharing applications that are *deeply local*, that is, designed for users in a constrained geographic area. This is contrast to one of the benefits researchers note about online health communities, that they allow individuals from all over the world to come together and learn from one another [18,25]. While such systems are certainly useful, our study highlights the benefit of creating applications that facilitate experience sharing amongst people with a similar geographic and cultural frame of reference.

Future work might examine how deeply local systems can give individuals even greater control over how they share their experiences. For example, Srinivasan [26] developed an online community that allows Somali refugees living in Boston, MA, USA to create and share video stories relevant to their experience as refugees. Srinivasan emphasizes the importance of allowing community members to develop their own categorization for these stories, instead of having a pre-defined classification system. Allowing individuals to categorize content in this way is important because various cultures have different ways of conceiving of and classifying knowledge. Furthermore, in addition to differences in epistemology, groups have different priorities and these priorities become manifest in the ways in which they classify information. In EatWell, though they were arguably high level, we specified the categories in which users could create memories. Thus, future systems allowing individuals to share their health-related experiences could allow users to determine how these stories are classified. Thus, instead of using pre-defined categories such as the ones in EatWell (e.g., Fast Food and Cooking at Home),

users might feel that the memories should be categorized according to different topics that reflect community interests. For example, based on the memories that our participants created, they might have suggested the memories be classified according to categories such as 'Healthy Choices in Caribbean Restaurants' or 'Adapting Soul Food Recipes'. Giving users this type of control could allow them to more adequately forefront the issues that they see as important and feel an even stronger sense of empowerment as they seek to improve their dietary practices.

CONCLUSION

The results of our four-week study of the EatWell system show the promise of an application that supports individuals in sharing memories about eating healthfully with members of their community. Our study highlights the positive reactions to this type of system, and future work could include a longitudinal study to systematically measure its effect on individuals' health. While we did find that using EatWell compelled some of our participants to use tips that they heard in the system, a longitudinal study would test the system's long-term effect on behavior change. A longitudinal study would also highlight what usage model is most effective for this type of application: whether EatWell is more effective in the short term (e.g. by sparking a feeling of inspiration) or the long term (e.g. by serving as a resource for individuals attempting behavior change). Finally, the values of sharing experiences about trying to live healthfully, expressing emotion in these stories, and facilitating the sharing of these stories within a local context may prove to be applicable in areas of health beyond nutrition as well (e.g., in encouraging physical fitness or supporting individuals in managing chronic illnesses).

ACKNOWLEDGEMENTS

We thank our participants, the YMCA, the members of the Audiotree project and the Wesley Center for New Media. In addition, we thank our reviewers and the members of the GVU Center for their feedback on this paper.

REFERENCES

1. *Handheld Content: Measuring Usage and Subscription Service Opportunities*. 2005.
2. *Racial and Ethnic Approaches to Community Health 2010: Addressing Disparities in Health*. 2006. www.cdc.gov/nccdphp/publications/aag/reach.htm.
3. Anderson, I., Maitland, J., Sherwood, S., Barkhuus, L., Chalmers, M., Hall, M., Brown, B. and Muller, H. Shakra: tracking and sharing daily activity levels with unaugmented mobile phones. *Mob. Netw. Appl.*, 12, 2-3 (2007), 185-199.
4. Campbell, M.K., Honess-Morreale, L., Farrell, D., Carbone, E., Brasure, M. A tailored multimedia nutrition education pilot program for low-income

- women receiving food assistance. *Health Education Research*, 14, 2 (1999), 257-267.
5. Consolvo, S., Everitt, K., Landay, J.A., Design Requirements for Technologies that Encourage Physical Activity. *Proc. CHI'06*, ACM (2006), 457-466.
 6. Grimes, A. and Grinter, R.E., Designing Persuasion: Health Technology for Low-Income African American Communities. *Proc. PERSUASIVE'07*, Springer (2007), 24-35.
 7. Hampton, K. and Wellman, B. Neighboring in Netville: How the Internet Supports Community and Social Capital in a Wired Suburb. *City & Community*, 2, 4 (2003), 277-311.
 8. Hayes, G.R., Patel, S.N., Truong, K.N., Iachello, G., Kientz, J.A., Farmer, R. and Abowd, G.D. The Personal Audio Loop: Designing a Ubiquitous Audio-Based Memory Aid. *Proc. of MobileHCI'04*, Springer, 2004, 168-179.
 9. Hodges, S., Williams, L., Berry, E., Izadi, S., Srinivasan, J., Butler, A., Smyth, G., Kapur, N. and Wood, K. SenseCam: a Retrospective Memory Aid. *Proc. of Ubicomp'06*, Springer (2006), 177-193.
 10. Karanja, N., Stevens, V.J., Hollis, J.F., Kumanyika, S., K. Steps to Soulful Living (Steps): A Weight Loss Program for African-American Women. *Ethnicity & Disease*, 12 (2002), 363-371.
 11. Kavanaugh, A., Carroll, J.M., Rosson, M.B., Zin, T.T. and Reese, D.D. Community Networks: Where Offline Communities Meet Online *Journal of Computer-Mediated Communication*, 10, 4 (2005).
 12. Kientz, J.A., Hayes, G.R., Abowd, G.D. and Grinter, R.E. From the war room to the living room: decision support for home-based therapy teams. *Proc. of CSCW'06*, ACM (2006), 209-218.
 13. Kreuter, M.W. and Houghton, L.T. Integrating Culture Into Health Information for African American Women. *American Behavioral Scientist*, 49, 6 (2006), 794-811.
 14. Kummervold, P.E., Gammon, D., Bergvik, S., Johnsen, J.A., Hasvold, T. and Rosenvinge, J.H. Social support in a wired world: use of online mental health forums in Norway. *Nordic journal of psychiatry*, 56, 1 (2002), 59-65.
 15. Leimeister, J.M. and Krcmar, H. Evaluation of a Systematic Design for a Virtual Patient Community *Journal of Computer-Mediated Communication*, 10, 4 (2005).
 16. Lin, J.J., Mamykina, L., Lindtner, S., Delajoux, G. and Strub, H.B., Fish'n'Steps: Encouraging Physical Activity with an Interactive Computer Game *Proc. Ubicomp'06*, Springer (2006), 261-278.
 17. Maloney-Krichmar, D. and Preece, J. The Meaning of an Online Health Community in the Lives of Its Members: Roles, Relationships and Group Dynamics *ISTAS'02*, 2002, 20-27.
 18. Maloney-Krichmar, D. and Preece, J. A multilevel analysis of sociability, usability, and community dynamics in an online health community. *ACM Trans. Comput.-Hum. Interact.*, 12, 2 (2005), 201-232.
 19. Morland, K., Wing, S., Roux, A.D., Poole, C. Neighborhood characteristics associated with the location of food stores and food service places. *American Journal of Preventive Medicine*, 22, 1 (2001), 23-29.
 20. Mueller, F.F., O'Brien, S. and Thorogood, A. Jogging over a distance: supporting a "jogging together" experience although being apart. *Ext. Abstracts CHI'07*, ACM (2007), 2579-2584.
 21. Mynatt, E.D., Rowan, J., Craighill, S. and Jacobs, A. Digital family portraits: supporting peace of mind for extended family members. *Proc. of CHI'01*, ACM (2001), 333-340.
 22. Redhead, F. and Brereton, M. A qualitative analysis of local community communications. *Proc. of CHISIG*, ACM (2006), 361-364.
 23. Resnicow, K., Yaroch, A.L., Davis, A., Wang, D.T., Carter, S., Slaughter, L., Coleman, D., Baranowski, T. GO GIRLS!: Results From a Nutrition and Physical Activity Program for Low-Income Overweight African American Adolescent Females. *Health Education & Behavior*, 27, 5 (2000), 616-631.
 24. Rodgers, S. and Chen, Q. Internet community group participation: Psychosocial benefits for women with breast cancer. *Journal of Computer-Mediated Communication*, 10, 4 (2005).
 25. Salem, D.A., Bogat, G.A. and Reid, C. Mutual help goes on-line. *Journal of Community Psychology*, 25, 2 (1997), 189-207.
 26. Srinivasan, R. Reconstituting the urban through community-articulated digital environments *Journal of Urban Technology*, 11, 2 (2004), 93-111.
 27. Stolley, M.R., Fitzgibbon, M.L. Effects of an Obesity Prevention Program on the Eating Behavior of African American Mothers and Daughters. *Health Education & Behavior*, 24, 2 (1997), 152-164.
 28. Strauss, A. and Corbin, J. Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory. Sage Publications, 1998.
 29. Vetere, F., Gibbs, M., R., Kjeldskov, J., Howard, S., Mueller, F.F., Pedell, S., Mecoless, K. and Bunyan, M. Mediating intimacy: designing technologies to support strong-tie relationships. *Proc. of CHI'05*, ACM (2005), 471-480.