Barriers and Negative Nudges: Exploring Challenges in Food Journaling

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ABSTRACT

Although food journaling is understood to be both important and difficult, little work has empirically documented the specific challenges people experience with food journals. We identify key challenges in a qualitative study combining a survey of 141 current and lapsed food journalers with analysis of 5,526 posts in community forums for three mobile food journals. Analyzing themes in this data, we find and discuss barriers to reliable food entry, negative nudges caused by current techniques, and challenges with social features. Our results motivate research exploring a wider range of approaches to food journal design and technology.

Author Keywords

Personal Informatics; Food Journals; Barriers; Negative Nudges.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI).

INTRODUCTION

Food journals are an important method for tracking food consumption and can support a variety of goals, including weight loss, healthier food choices, detecting deficiencies, identifying allergies, and determining foods that trigger other symptoms. Although food journaling is widely considered difficult and has motivated research on easing or even automating entry, little work has empirically documented why it is difficult. As a result, the field is currently missing opportunities for design and technology to improve journaling.

Our work explores key challenges people encounter in food journaling. We conduct a qualitative study combining a survey of 141 current and lapsed food journalers with analysis of 5,526 posts from community forums for three mobile food journals. Analyzing themes in this data, we find and discuss barriers to reliable food entry, negative nudges caused by current techniques, and challenges with social features. Our results support continued research in food journaling, identify specific challenges in current journals, and highlight opportunities to consider a wider range of opportunities in food journal design and technology.

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CHI 2015, April 18 - 23 2015, Seoul, Republic of Korea

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http://dx.doi.org/10.1145/2702123.2702155

RELATED WORK

Recent years have seen significant research in mobile food journals, which aim to improve entry or feedback relative to traditional paper methods. An early example is PmEB, which demonstrated daily calorie budget feedback computed from a mobile food journal [9]. Siek et al. studied journals for patients with chronic kidney disease, who found barcode and audio-based journals overwhelming [7]. Mamykina et al. developed MAHI, a mobile food journal to aid people with newly diagnosed diabetes in developing reflective analysis skills, essential to successful diabetes management [4].

Given the effectiveness of such systems, additional research has considered the adoption, difficulty, and everyday use of food journals. Helander et al. analyze logs from The Eatery, finding only 3% of 190,000 downloads resulted in a person using the mobile food journal for more than one week [3]. PlateMate examines minimizing burden of entry by using crowdsourcing to obtain nutritional summaries from food photos [5]. Rooksby et al. discuss challenges of personal informatics and argue for considering how tracking is intertwined with everyday life [6]. Grimes and Harper suggest that research should consider the variety of relationships people have with food [2]. Despite such interest in how food journals integrate in everyday life, relatively little is known about specific challenges people experience with food journals. We explore current challenges to inform future contributions in food journal design and technology.

DATA COLLECTION

We surveyed 141 food journalers (47 active, 94 lapsed, 105 female, 36 male, age 19 to 70, mean 34, median 30), recruited from university mailing lists, MyFitnessPal Facebook groups, and FitBit forums, randomly raffling three $20 Amazon gift cards. 117 reported journaling with mobile apps, 23 desktop / website, and 47 using paper (some using multiple methods). We also examined 5,526 posts in 627 threads in community forums for three mobile food journals (MyFitnessPal, FatSecret, CalorieCount). We quote survey respondents as P## and attribute forum posts by community.

Survey respondents answered open response questions about what made journaling difficult and what aspects of journaling they disliked. They next used a seven-point Likert scale to rate the difficulty of journaling meal types (buffet meals, ethnic food, fast food, foods served by friends, foods consumed at parties, home-cooked meals, packaged food, restaurant meals). Lapsed journalers additionally provided open responses explaining why they stopped. Responses were analyzed in an affinity diagram exercise by two members of the team, yielding themes later coded by a third.

We gathered community forum data using provided search interfaces, which allow keyword filtering of threads and posts. We initiated analysis with a set of keyword phrases targeting causes of attrition (e.g., "*stop logging*", "*no fun logging*", "*not working*", "*tired of logging*"). With these initial search phrases, we found posts such as "*It is such a slow and tedious process"* (FatSecret), which gave insight into additional keywords to use in searches (e.g., "*tedious*"). We examined posts using summative content analysis, yielding themes we had not originally specified that were consistent with our survey analysis, as well as an additional theme on challenges in social features of food journals.

RESULTS AND THEMES

Goals Drive Journaling

Journaling can end with a perceived success or at a defined endpoint. Successes included a "*goal weight*" (P46, P52, P53), understanding eating habits "*I had developed a good sense of how many calories are in the different foods I eat and in what proportions I was eating them*" (P68), or learning to make healthier food choices "*I got a grasp on what to eat and how to eat to maintain optimal health*" (P126). Endpoints included identifying a recurring problem "*I was trying to track down migraine triggers. Once we identified several triggers, I stopped*" (P50) and the end of a pregnancy "*I stopped being pregnant.* :)" (P82). Of 94 lapsed journalers, only 22 indicated they no longer needed to journal because they received enough benefit. An additional 12 reported periodic journaling: "*to audit my consumption*" (P85), "*whenever I wanted to lose weight*" (P51). A few reported journaling with no clear goal: "*I wasn't really trying to lose weight or anything but was simply curious about what I ate. Once I got a decent idea of my eating habits, I didn't really feel like continuing to journal*" (P14).

Although some journalers reach their goals or do not have a specific goal, this is a definite minority. The majority report significant challenges, sometimes leading them to abandon journaling altogether. We discuss these challenges in terms of barriers to reliable food entry, negative nudges in current journals, and challenges with social features.

Barriers to Reliable Food Entry

Our forum analysis found the effort required to journal is a major barrier: *"if I hit a rough spot or start regaining some weight I will go back to counting calories. I hate counting it's tedious but yet very important*" (FatSecret). Survey respondents also expressed this, describing food journaling as "*too much effort*", "*time-consuming*", or "*tedious*" (31, 27, 16 respondents). Looking more closely, we unpacked this theme into four barriers to reliable food entry.

What and How Much: Journalers report challenges knowing what and how much to enter in journals designed around detailed entry. P98 summarizes: "*I cook most of my own meals, so it was difficult to estimate the amounts of each ingredient (first, I loosely follow recipes, then I only eat some of what I make at a time), then find the calories (which weren't available for many of the foods I ate)*". Barriers include ingredients (e.g., "*Not knowing the exact ingredients and portions make the logging difficult*" P126, 75 others), their proportions (e.g., *"spaghetti: How much meat? How much oil? Etc…"* P107, 10 others), preparation (e.g., *"It is also difficult to know how things are cooked sometimes, did they use oil? Does that affect the calories?"* P128, 27 others), and then the portion consumed (e.g., "*I have a hard time figuring out portions*" P23, 39 others). Uncertainty regarding any undermines reliability of an entry.

Database Reliability: Many journals use a database to convert entries into calories, other components, or points. These often allow community contribution, with journalers able to publish nutritional entries themselves. Although this can enable a diverse food database, it raises concerns regarding reliability: "*the food database is put together by users, so not all entries can be considered accurate*" (P32), "*sometimes hard to find certain foods, or to know enough about the listing to know if it will be accurate*" (P129).

Databases are quite large, but journalers find categories of food missing. From our forum analysis: "*Hey all. Any tips on how to record foods not found in database? IE made from scratch, bought at a locally owned restaurant, etc. I'm finding it difficult sometimes to find something close and match it up, or to make a guess*" (FatSecret). P2 reported it harder to find healthy foods "*They don't have some of the foods I'd like to enter - like more of the healthy and organic foods.*" P40 found common foods missing "*there are large gaps particularly with foods that are only found in Canada*."

However, continuing to grow the database presents its own barriers. Journalers report that obtaining many results from a query creates concerns for reliability "*sometimes it was even incorrect or multiple postings with all different information"* (P101), difficulty choosing *"there were too many choices and it was difficult to determine which option was the closest to reality"* (P105), and frustration with apparently irrelevant entries *"I ate some oatmeal and my options for logging it were weird. Oh, was it McDonald's oatmeal? Quaker Instant apple cinnamon oatmeal in a pouch? No. It was normal oatmeal!"* (P1). Food journal databases face a tension between providing desired foods versus overwhelming journalers.

Eating Context: Journalers report barriers entering food from restaurants, prepared by friends, from buffets, and at parties. Part of the challenge is that knowledge barriers are magnified because the journaler did not prepare the food: "*Meals at a restaurant are very difficult because you do not*

know the ingredients" (P99), "*Foods eaten out were tricky due to the ingredients not being clear*" (P50), "*Calorie databases have some entries for chain restaurants, but finding something that might be similar to a dish at a local restaurant is difficult, if not impossible*" (P137).

Another critical challenge in these contexts is people often consume a variety of food over an extended time. P69 felt it was unreasonable to journal: "*You're simply not going to sit there with each thing you grab and log it*". This leads to delay, which leads to difficulty remembering: "*when I'm eating at a party, or at a buffet I usually eat small amounts of lots of different things. Then when I get back to my apartment and go to log it, I've often forgotten already exactly what I ate, and I'm sure I often miss things.*" (P130) and "*It was hard to log when I wasn't at home because I had to remember to when I got home*" (P112). Despite the always-available nature of mobile devices, contexts in which people eat present significant barriers to in-the-moment journaling practices that mobile journals aim to promote.

Losing the Habit: Simply forgetting to journal is a major barrier to reliable journals, and was the most-cited reason why survey respondents had missed at least one entry. But journalers further report that missed entries can lead them to abandon journaling altogether. In journals that emphasize calories or other summaries of food components, missing an entry means feedback is inaccurate: "*Half of the time, I would just log foods for half the day, so the calories totals were completely off.*" (P137). This can in turn create a feedback cycle that undermines the journaling habit: "*Every time I start I forget one meal or another so it becomes less accurate. Then I just forget completely*." (P128). P42 noted other factors can lead to breakdowns in her journaling habit "*e.g., due to a hard deadline, travel, holiday season*", and reported "*once the habit is broken…it's hard to start again*." Journals cannot assume continuous and complete compliance, and should instead support the journaling habit.

Negative Nudges in Current Food Journals

Nudges are features of systems that alter behavior [8]. They are typically designed to promote a desired behavior, but we found examples of unintentional negative nudges in current food journals. Journalers report the design of current journals can encourage behaviors contrary to their goals.

Contrasting Difficulty of Meal Entry: When asked to rate difficulty by meal type, respondents rated packaged food (average: 6.5) and fast food (6.3) as significantly easier to journal than home-cooked meals (4.6), buffet meals (3.7), ethnic food (3.7), restaurant meals (3.6), foods served by friends (3.2), and foods consumed at parties (2.9) (using a mixed-model analysis of variance, with participant as a random effect, applying Tukey's HSD at $p < .05$).

Journalers report databases make packaged and fast food easiest to log, with barcodes further simplifying their entry: *"It was easy to search specific brands"* (P67), "*Fast foods and prepackaged foods have calorie counts readily available*" (P86). In contrast, journalers report difficulty entering homemade food: "*took too much time, hard to track meals that aren't pre-packaged*" (P43), "*a lot of foods are difficult to track without an ingredient list or barcode*" (P45).

Many journals provide recipe builders intended to ease the difficulty of entering homemade food. Journalers were aware of this, but still considered it burdensome to enter homemade food: "*recipe builders took a long time*" (P78), "*If a particular item isn't in my app's database, I would have to deconstruct it into its constituent ingredients and then add those individually.*" (P3), "*I often had to search for lots of individual components, and I wasn't sure of the measurements*" (P47). An additional challenge with recipes is that journalers report they do not support variation in preparation: "*Even with options to create a meal and save it for later. Most of my cooking isn't that consistent.*" (P101).

This difficulty contrast creates a dilemma: "*Prepackaged meals were the easiest because of bar codes but those aren't healthy*" (P123). This can undermine the journaling habit: "*I usually stop [journaling] shortly after I made a wrap or some other type of sandwich that has a significant number of components that it would be difficult to measure and manually add*" (P105). Journalers also reported it can nudge them to eat contrary to their goals, including eating less variety "*I could make life easier by eating the same things regularly*" (P97), limiting food choice "*I just avoided eating things that were hard to log*" (P132), and avoiding healthier foods "*the time it took entering it manually made eating fresh and healthy less appealing. Easier to scan a code on some processed stuff and be done with it*" (P101). Although the mindfulness created by journaling can lead to healthier choices, the difficulty of food entry in current designs is also negatively impacting journaler food choices.

Judgment and Choosing Not to Journal: Food journalers report feelings of shame, judgment, or obsession associated with current designs. P6 reported journaling *"made me feel guilty sometimes"*, while P27 noted a lack of positive feedback: *"I always felt guilty when I ate too much, and there wasn't that much pride when I was under my goal."* Others described not wanting to journal foods they considered unhealthy or that may put them over a calorie goal: "*Sometimes I feel like not logging things because I know it's really unhealthy. =(*" (P117). Journalers report abandoning journaling due to these feelings: "*I stopped because I didn't feel a need to keep it up. I did not want to obsess about food*" (P13), "*it made me too focused and obsessive about what I was eating*" (P70), "*I think I'm obsessing about every calorie and I'm either not eating enough or eating too much"* (MyFitnessPal). P113 was especially concerned: "*it was more of an on the way to an eating disorder thing than anything else (tried to keep calories extremely low)*". Although in-the-moment feedback can be powerful, designs that create feelings of judgment can be self-defeating.

Stigma and Journaling: Journaling often takes place in the presence of others, and P37 noted "*it's not always that discreet*". Many did not want friends and colleagues to

know they were tracking food "*I think I was hesitant to do the logging if not alone*" (P30) and were afraid to ask the ingredients in food "*I had more of a problem with eating out at a friend's house because I didn't want to ask for ingredients or mention that I was logging calories*" (P11). This can lead people to abandon journaling: "*I also felt embarrassed to do it in front of friends so I stopped*" (P27). Journalers also report being nudged to avoid social situations: "*It discourages you from eating out or at a friend's, even if it is healthy*" (P42). Journalers can struggle with a perceived stigma around tracking, undermining not only the reliability of their journal but also their goals and motivation.

Challenges in Social Features

The previous challenges emerged in both datasets, but our community forum analysis additionally surfaced challenges in provided social features. Journalers turn to these for social support "*please if you want to motivate me and help me out with comments and suggestions, add me as a friend*" (MyFitnessPal), and some find that support "*I have found that having friends on MFP has helped me, just having someone say good job when I do my exercise or finish under my calorie goals*" (MyFitnessPal). But others find support never materializes "*I have seen lately that I will post my diary or my progress or even some troubles and no one will comment back. How is that going to encourage me to keep going when I have no support*" (MyFitnessPal), that their motivation is undermined as friends stop journaling "*Although I used to log frequently in the past, most of my connections have stopped logging in or are no longer members, so I recently emptied my 'buddy list'*" (FatSecret), or they are discouraged by the success of others "*I hate coming on to forums and seeing how much people have lost and I have made barely any progress at all.*" (FatSecret). Embarrassment leads people to omit entries or disable sharing: "*I have logged food on here before but I get embarrassed so I made it private so only I can see and told myself be honest with yourself"* (MyFitnessPal). Social features can both support or undermine journalers, and need to be carefully considered.

DISCUSSION AND CONCLUSION

We have contributed a qualitative analysis of two datasets to empirically document specific challenges people encounter in food journaling. By unpacking "*too much effort*" into specific challenges, our findings suggest opportunities to improve food journaling design and technology.

One important opportunity is to consider journaler goals and how they relate to these challenges. For example, detailed nutritional data may be important to a journaler pursuing weight loss. But the challenges in obtaining that data might be inappropriate for a journaler looking to identify a food trigger or gain a higher-level understanding of food habits (e.g., for whom "oatmeal" is sufficient). Conversely, details of preparation might be irrelevant to a journaler interested only in calories but critical to identifying a food trigger. Instead of attempting to capture the elusive "everything", these findings suggest a diversity of journal designs to support specific goals.

Challenges with food databases suggest several opportunities. A reputation system might address reliability of community entries, and could consider goals (e.g., a journaler tracking sodium intake may find an entry more reliable if created by another journaler with a similar goal). Further, a community could vote on the accuracy of a contributed entry (e.g. "6 of 8 journalers agree with this assessment of calories"). The tension between databases providing desired foods but overwhelming journalers might be addressed using context (e.g., surface likely food at a particular restaurant), personal diets (e.g., a vegetarian's journal), routines (e.g., a person may always have the same espresso drink), or designs for lower-fidelity journals (e.g., using nutritional information from a generic "oatmeal" entry instead of strictly requiring greater disambiguation for a minor nutritional difference).

One initial promising opportunity we have pursued is a photo-based food journal, which can level the challenge of journaling different meal types, provide value in spite of missing entries, and avoid creating judgment by not emphasizing nutritional details [1]. But our findings point out a variety of challenges in food journaling and motivate future research exploring how new designs and technology can support journalers in their food-related goals.

ACKNOWLEDGMENTS

We thank Ravi Karkar, Julie Kientz, and Sean Munson for feedback and analysis. This work was funded in part by the Intel Science and Technology Center for Pervasive Computing, by the National Science Foundation under awards OAI-1028195 and SCH-1344613, and by the National Institutes of Health under award 1U54EB020404-01.

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