

Harder Than You Think: Misconceptions about Logging Food with Photos versus Text

JACKIE SILVERMAN, ALIXANDRA BARASCH, KRISTIN DIEHL, AND GAL ZAUBERMAN

ABSTRACT Consumers lose more weight when they log their food consumption more consistently, yet they face challenges in doing so. We investigate how the *modality* of food logging—whether people record what they eat by taking photos versus writing text—affects their anticipated and actual logging experience and behavior. We find that consumers are more likely to adopt and anticipate better experiences with photo-based food logging tools over text-based tools. However, in a weeklong field study, these expectations reveal themselves to be inaccurate; once participants start logging, they find taking photos (vs. writing text) to be more difficult, log less of what they eat, and are less likely to continue using the logging tool. These findings contribute to existing research on how people track goal progress, as well as persistence with and dis-adoption of products. Moreover, our findings provide insights into what might increase the use of products that encourage healthy eating.

Healthy eating is important to consumers, marketers, and policy makers. Accordingly, past research has examined the effectiveness of various strategies meant to improve individuals' diets (e.g., Bauer and Reisch 2019). One of the most common strategies is food logging, the deliberate recording of one's food intake. Food logging is associated with greater success in avoiding unhealthy foods (Baker and Kirschenbaum 1998) and improved recall of food consumed (Sharp and Allman-Farinelli 2014). Most notably, past work has demonstrated a positive association between food logging frequency and weight loss (e.g., Yon et al. 2006; Burke, Wang, and Sevick 2011).

Traditionally, food logging involved maintaining a handwritten diary listing everything one consumed, which dieters often found cumbersome (Stone et al. 2002). Technological advancements have made this process easier. Consumers now typically record what they eat by typing descriptions into one of many available smartphone apps that easily locate nutritional information in their databases. More recently, companies have started developing apps that allow consumers to

record what they eat using photos. Photo-based "See How You Eat" was named a top food-logging app in 2021 (Owens 2021), and a photo-logging option now exists in about a third of popular food-logging apps (see the appendix, available online, for details). Moreover, technological advances are continually making photo-based logging more effective (e.g., Lu et al. 2020).

Unfortunately, much like other tools that assist in goal pursuit, food logging can only be effective insofar as consumers persist in doing it. Many consumers report they eventually stop logging because it is effortful, annoying, and even questionably accurate (Cordeiro et al. 2015). Social stigmas can further discourage consumers from logging in public (Yon et al. 2006). Moreover, the quantification that occurs through logging can reduce enjoyment of the focal activity (Etkin 2016).

We investigate how the *modality* of food logging affects consumers' likelihood of adoption and persistence in logging what they eat. Specifically, we compare two modalities: text-based, which is currently more common, and photo-based,

Jackie Silverman (corresponding author: jasilv@udel.edu) is an assistant professor of marketing, Lerner College of Business, University of Delaware, Newark, DE, USA. Alixandra Barasch (alix.barasch@insead.edu) is a visiting associate professor of marketing, Institut Européen d'Administration des Affaires (INSEAD), Fontainebleau, France, and an associate professor of marketing, Leeds School of Business, University of Colorado at Boulder, Boulder, CO, USA. Kristin Diehl (kdiehl@marshall.usc.edu) is a professor of marketing, Marshall School of Business, University of Southern California, Los Angeles, CA, USA. Gal Zauberaman (gal.zauberaman@yale.edu) is the Joseph F. Cullman 3rd Professor of Marketing, Yale School of Management, Yale University, New Haven, CT, USA. The authors would like to thank Elina Hur for literature review assistance, and Keri Buchanan and Ronen Deitch for their collaboration on the field study. This research was financially supported by the Wharton Behavioral Lab and MSI research award (no. 4-1931) given to the third and fourth authors.

Issue Editors: Pierre Chandon, Kelly Haws, and Peggy Liu

Published online July 26, 2022.

Journal of the Association for Consumer Research, volume 7, number 4, October 2022. © 2022 Association for Consumer Research. All rights reserved. Published by The University of Chicago Press for the Association for Consumer Research. <https://doi.org/10.1086/720444>

which is becoming more widespread. We posit that what draws consumers to one modality in prospect may not be what fosters persistence over time, leading to systematic mispredictions. We find that during the adoption phase, consumers prefer photo-based logging tools over text-based tools. However, in a weeklong field study, we find that consumers are less likely to continue using photo-based logging, compared to text-based.

We provide novel insight into the substantive domain of food logging through theoretic constructs (Lynch et al. 2012). By connecting this real-world phenomenon to behavioral theory, our contribution straddles implicit consumer research boundaries (MacInnis et al. 2020). Our research extends past work on how people respond to tracked goal progress (e.g., Kivetz, Urminsky, and Zheng 2006) by examining when consumers will adopt progress-tracking tools in the context of food logging. Moreover, we investigate which modality provides not just the best user experience but also improves goal follow-through (e.g., Polivy and Herman 2002). Furthermore, our research reveals differences between synchronous (e.g., photos) versus potentially asynchronous modalities (e.g., text), previously examined in the context of interpersonal communication (Berger and Iyengar 2013; Moffett, Folse, and Palmatier 2021). We also add to understanding the drivers of product dis-adoption, an under-researched area (Lehmann and Parker 2017), by suggesting that focusing on easily imagined features at adoption, like taking photos, may clash with implementation realities. Substantively, we contribute to a better understanding of the role logging modality plays in consumer adoption versus continued use. We find that features that make adoption more likely (i.e., the logging modality) can result in lower persistence and ultimately may lead to dis-adoption and negative word of mouth. Thus, our findings can aid companies in developing more successful health-focused products that consumers find attractive both initially and in long-term usage.

THE CURRENT RESEARCH

This research focuses on food logging, a critical foundation of behavioral adjustments when working toward a food-related goal (e.g., Bauer and Reisch 2019). Specifically, we study logging *modality*—whether food intake is captured via photos or text descriptions. Prior research has shown that what consumers find attractive during acquisition (e.g., offering many features) is not always attractive during usage (Thompson, Hamilton, and Rust 2005; Meyer, Zhao, and Han 2008), and that consumers often fail to predict this misalignment (Goodman and Imrak 2013). In the context of food logging,

we are interested in any potential disconnect between what consumers prospectively think will be the best modality for logging food intake versus what consumers actually experience as the best modality. This intertemporal dynamic can be conceptualized as a manifestation of mispredictions observed in new product adoption (e.g., Meyer et al. 2008) and other domains (e.g., life events; Wilson et al. 2000). Such mispredictions often arise when people (1) decide between different options (joint evaluation) but later experience only their chosen option (i.e., separate evaluation; Hsee 1996) and (2) are insensitive to the situation (Yang, Hsee, and Li 2021) and underweight future usage costs (Zauberman 2003).

Adoption of Logging Tools

Which modality do consumers expect to use more? When deciding between food logging tools, consumers are likely to focus on the “how” of logging (Trope, Liberman, and Wakslak 2007). Different modalities vary in how users enter data and the required effort. Photo-based logging requires composing and taking a photo, while text-based logging requires typing names or descriptions of the food. In prospect, it may seem less difficult to take a picture than to take notes of one’s meal. Participants in diet-monitoring studies often admit to underreporting what they ate because it was inconvenient to write down every item (e.g., Macdiarmid and Blundell 1997). Taking a picture may seem simpler and quicker. Relatedly, as a single photo can contain everything one ate, people may expect photos to capture their food intake accurately and easily, whereas achieving the same level of completeness with writing may seem more difficult. Furthermore, smartphones and social media have made taking photos of what one eats ubiquitous. Thus, photo-based logging may seem a natural and easy extension of a common, enjoyable behavior (Diehl, Zauberman, and Barasch 2016).

Taken together, we predict that during adoption, photo-based logging will be perceived as more effective than text-based logging, manifesting in both (a) behavioral outcomes and (b) consumer evaluations. In particular:

H1a: Consumers will expect to be more likely to adopt and continue using a photo-based logging tool than a text-based logging tool.

H1b: Consumers will expect a photo-based logging tool to be (1) easier to use and (2) more helpful in adhering to their food related goals than a text-based logging tool.

Actual Use of Logging Tools

Whereas photo-based logging may be more appealing in prospect, we predict that actually logging one's food through photos may have unanticipated drawbacks, decreasing ongoing usage. Food logging modalities differ in terms of synchronicity (Berger and Iyengar 2013; Moffett et al. 2021). Capturing one's food intake via photo-based logging requires taking a picture synchronously, that is, before eating (or at least before finishing). In contrast, text-based logging allows for the frequent practice of asynchronous backlogging, that is, recording food intake post consumption (Burke et al. 2009). Additionally, even though photo-taking is very common, photo-based logging is likely not (yet) a habit for most people; rather, it requires effortful intentions (Wood, Quinn, and Kashy 2002). Thus, logging one's food synchronously via photos may be more difficult than asynchronously via text. Furthermore, other food-related routines and social interactions occurring around mealtime (e.g., picking up coffee on the way to work; passing plates to share) can distract from taking photos in the moment. Finally, while remembering to log food is generally difficult, having to do so synchronously, especially when hungry, may be particularly challenging. As a result, photo-based logs may contain a lower proportion of people's total food intake than text-based logs, making the log less comprehensive and ultimately less useful.

In sum, we predict that when actually logging food intake, photo-based logging will be less effective than text-based logging, manifesting in both (a) behavioral outcomes and (b) consumer evaluations. In particular:

H2a: Consumers will be less likely to persist in using a photo-based logging tool than a text-based logging tool.

H2b: When logging food intake, consumers will find a photo-based logging tool to be (1) more difficult to use and (2) less helpful in adhering to their food-related goals than a text-based logging tool.

Study Overview

Two studies examine how the modality of logging food consumption—via text or photo—impacts prospective preferences versus actual experiences. First, a lab study finds that a priori, consumers expect to be more likely to adopt a photo-based logging tool over a text-based logging tool, and that logging food via photos (vs. text) will be more effective (i.e., easier to use and more likely to help them reach their

goals). In contrast, a weeklong field study where consumers actually logged their food finds that these expectations are inaccurate: logging via photos (vs. text) is more difficult and does not have an effect on perceived goal adherence. Moreover, consumers who logged via photos were less likely to persist in logging throughout the week and less inclined to continue logging beyond the field study.

STUDY 1: CONSUMER EXPECTATIONS OF LOGGING TOOLS AND THEIR ADOPTION

Study 1 investigates how logging modality (text vs. photos) affects consumers' adoption intentions for food-logging services. Reflecting the joint-evaluation mode typical in adoption contexts (Hsee 1996), participants actively pursuing a food-related goal chose between two food-logging services—one text-based and one photo-based. They then indicated how well they expected these services to help them reach their healthy eating goals and how easy these services would be to use, as these beliefs are important when consumers consider, try, and adopt different services.

This study was preregistered (https://aspredicted.org/KMJ_8BK). For all studies, we report all procedures and measures. All study materials, data, and the appendix available on Open Science Framework (OSF; <https://osf.io/maktd/>).

Method

We recruited 425 undergraduates to participate in a multi-study research session conducted by behavioral labs at two US universities for course credit.

To ensure that food-logging services were relevant to them, participants first indicated which goals they were currently working toward from a list of 10 goals (see OSF for stimuli). As preregistered, only participants who identified the target goal (“monitor or alter your eating habits”) were included in our sample ($N = 289$, 68.00% of participants). They then elaborated on this goal in writing and provided demographic information. Four participants were excluded for not elaborating on their food-related goal (as preregistered), and six duplicate observations were removed. Our final sample consisted of 279 participants ($M_{\text{age}} = 20.14$, $SD = 1.69$; 58.42% female).

Participants were then asked to consider two food-logging services that were described as similarly accurate in their recommendations and responses, differing only in how users would log their food intake: company A required they “send a text description of every meal or snack you eat via your phone,” while company B required they “take and send

a picture of every meal or snack you eat via your phone.” We counterbalanced which company (A or B) offered the text- versus photo-based service. Participants then saw several screenshots with examples of the types of logging messages users would be expected to send for each service, and the responses they would receive (see the appendix). Screenshots illustrated that both services required users to log what they ate by sending the appropriate message type (either photos or texts) via their smartphone’s short message service (SMS) messaging app.¹

Then participants answered several questions on 1–7 scales, with 1 labeled as favoring company A, 7 labeled as favoring company B, and 4 labeled as equally favoring both companies. First, participants imagined that both companies offered a free weeklong trial, and answered: “How likely would you be to try these companies?” Next, they answered three questions about their expectations of the logging experience: “How difficult do you think logging all of the food you ate over that week would be?”; “How much would you enjoy the act of logging all of your food over the course of the week?”; and “How useful do you think the act of logging everything you ate for that week would be?”. Participants also answered three questions about their anticipated goal adherence: “How well do you think you would adhere to this goal while using these companies?”; “To what extent do you think you would feel motivated to work toward your goal while using these companies?”; and “How would you feel about all of the food you ate over the course of the week?” Participants also responded to: “If it were available to you after the weeklong trial, how likely would you be to continue logging your food in this way?” All items loaded on a single factor, possibly due to the use of similar response scales (see the appendix). As preregistered, we report results for each item separately below.²

Finally, we explored the reasons why participants anticipated preferring one service over another. To this end, we first classified responses to the question “How likely would you be to try these companies?” that fell below the midpoint as indicating a preference for company A and responses above the midpoint as indicating a preference for company B. Then we asked participants to elaborate

(open-ended) on the factors that led them to be more likely to try that company.³ Three hypothesis-blind research assistants coded responses for 12 reasons (e.g., easier, more accurate, less embarrassing to use; see the appendix for coding instructions and results). For commonly mentioned reasons, there was moderate to high intercoder agreement (all $\kappa > .45$). We excluded reasons with extremely poor intercoder agreement (all $\kappa < .15$) from our analyses.

Results

All items were recoded to account for counterbalancing, such that lower numbers indicated a relative preference for the text-based logging service and higher numbers indicated a relative preference for the photo-based logging service (a rating of 4 indicated indifference). Counterbalancing had no effect on any measures. We conducted separate one-sample *t*-tests for each of the eight items and compared the average response to the midpoint of the scale. For all measures, on average, participants favored photo-based logging (see appendix for graphical depiction).

Anticipated Adoption and Use. As predicted (hypothesis 1a), participants reported being more likely to try the photo-based relative to the text-based logging service ($M = 4.78$, $SD = 2.10$; $t(278) = 6.19$, $p < .001$). Additionally, participants anticipated they would be more likely to continue using the photo-based relative to the text-based logging service ($M = 4.70$, $SD = 1.66$; $t(278) = 6.99$, $p < .001$).

Anticipated Logging Experience. As predicted (hypothesis 1b), participants expected that using the photo-based logging service would be less difficult ($M = 3.28$, $SD = 1.91$; $t(278) = 6.33$, $p < .001$) and more enjoyable ($M = 4.87$, $SD = 1.73$; $t(278) = 8.37$, $p < .001$) than using the text-based service. Additionally, participants anticipated that logging via the photo-based service would be more useful ($M = 4.38$, $SD = 1.73$; $t(278) = 3.66$, $p < .001$). This effect also held for the composite measure averaging these three items (with the difficulty item reverse-coded: $M = 4.66$, $SD = 1.33$; $t(278) = 8.22$, $p < .001$).

1. Note that the information provided about these services, including the screenshots, was identical to what participants in study 2 received prior to participating in the field study.

2. Note that in study 2, items loaded on two separate factors (*logging experience* and *goal adherence*). For consistency between studies, we also report items within conceptual groupings, and report composite measures for each grouping.

3. Due to a survey design error, participants who indicated the midpoint on the preference question (i.e., no preference) also saw this open-ended question; we excluded their responses from our coding procedure and analyses.

Anticipated Goal Adherence. As predicted (hypothesis 1b), participants expected that using the photo-based logging service would help them adhere to their goal better ($M = 4.85$, $SD = 1.80$; $t(278) = 6.19$, $p < .001$), would better motivate them to work toward their goal ($M = 4.71$, $SD = 1.64$; $t(278) = 7.25$, $p < .001$), and would make them feel more positive about what they ate ($M = 4.48$, $SD = 1.72$, $t(278) = 4.66$, $p < .001$). This effect also held for the composite measure averaging these three items ($M = 4.69$, $SD = 1.43$; $t(278) = 7.92$, $p < .001$).

Reasons for Adoption (Open-Ended). The two most frequently mentioned reasons for adopting a tool referred to ease of use: 56% of participants stated their chosen modality would be easier, and 24% stated it would be faster. Consistent with our hypotheses, participants were significantly more likely to mention ease of use as a reason for choosing the photo-based logging tool than the text-based logging tool ($\chi^2 > 30$, $p < .001$). We report less frequent responses in the appendix and discuss those further in the General Discussion.

Discussion

As predicted, participants were more likely to select a photo-based logging service (vs. a text-based service) and anticipated that using it would be a relatively more positive experience (e.g., less difficult, more enjoyable). Additionally, participants expected that using a photo-based logging service would help them work toward their goals to a greater extent, and that they would be more likely to continue using a photo-based service over time. In an additional pre-registered study ($N = 238$), we replicated these findings in a different sample (Amazon Mechanical Turk [MTurk] participants: $M_{\text{age}} = 41.21$, $SD = 12.92$; 55.23% female; see appendix for details). The convergent findings suggest that, although studies 1 and 2 focus on undergraduates, the findings regarding predicted adoption generalize to other populations.

STUDY 2: CONSUMERS' ACTUAL LOGGING EXPERIENCE AND BEHAVIOR IN THE FIELD

How might the anticipated behaviors and experiences revealed in study 1 compare to how consumers behave once they start logging? We investigated actual experiences with the two different logging modalities in a field study, where hundreds of participants with a food-related goal logged their food intake for one week. To conduct this field study, we partnered with a start-up company developing a photo-

based app for food consumption monitoring and weight loss (unfortunately, this company is no longer in operation). Our primary focus in this field study was participants' persistence in using the logging tools. At the end of the study, we also measured perceived ease of logging and the extent to which participants felt the logging tool helped their goal pursuit. Thus, this field study allows us to compare how modality affects actual logging behavior and experiences (vs. anticipated preferences in study 1) across similar samples.

Method

Design. The field study followed a 2 (logging modality: text, photo) by 2 (daily summary: yes, no) between-subjects design. Participants logged their food intake by sending SMS messages containing either text descriptions or photos of what they ate. Those in the *daily summary* condition also received a recap of all the foods they had logged the day before in their respective modality (i.e., as a list of either written descriptions or photos).

Enrollment Process. One week before the study started, all undergraduates in a US university's laboratory pool who used a smartphone received a recruitment email that provided basic information about the study, including payment and a link to the enrollment survey (see OSF for materials and a study timeline). Prospective participants who opened this link first selected, from a list of 10 goals, those they were working toward or would like to work toward. Only participants who selected the target goal ("monitor or alter your eating habits") were allowed to enroll ($N = 536$, 71.66% of those who started). Next, participants provided basic demographics, including weight and height (for health reasons, we did not allow participants with a body mass index [BMI] under 18.5 to continue). Then, prospective participants learned they would be documenting everything they ate for 5 days via SMS messages, read the study requirements, and indicated whether they wanted to enroll. Those who enrolled described their food-related goal in writing. Participants finalized enrollment by sending an SMS message to the study phone number and entering a confirmation code into the survey.

Of the 536 participants who indicated having a food-related goal, 91 did not meet our BMI requirement, did not agree to participate, or did not finish the enrollment process, leaving a final sample of 445 participants ($N_{\text{text}} = 216$, $N_{\text{photo}} = 229$; $M_{\text{age}} = 20.09$, $SD = 1.34$, 76.91% female).

Logging Procedure. After enrolling, participants were instructed to log everything they ate for five consecutive days, and read detailed instructions about when, what, and how to log their food intake. Participants in the *photo logging* condition were instructed to log everything by sending photos using their phone's SMS app (e.g., "messages" on iPhone); participants in the *text logging* condition were instructed to log everything by sending text descriptions using the same SMS app. These instructions included the same screenshots used in study 1 (depending on *logging* condition) to convey how to log what they ate. Participants were instructed to only use that particular modality (e.g., participants in the *photo logging* condition should not send any text descriptions). Notably, having all participants log via SMS increased internal validity by stripping away any other features that companies might add to their logging services. Moreover, using their smartphone's SMS app ensured all participants were familiar and comfortable with the logging procedure.

Survey Procedures. On days 2, 3, and 4 of logging, participants completed short surveys to capture what percentage of their food intake they had logged on the previous day (on a sliding scale from 0 to 100) and answered a few questions about how they felt about the previous day's food intake. In addition, half of participants saw a recap of foods they had logged the previous day (either as texts or photos), while the other half did not. This manipulation was included to test whether reviewing their logged intake in different modalities might strengthen participants' goal adherence, since visuals are processed faster and evoke more intense emotional reactions than text (Paivio 1969). However, this manipulation did not have any effects on our focal variables and hence is not reported here (see appendix for results). Below, we report analyses accounting for this factor and the interaction. Analyses that simply examine the effect of logging modality yield similar conclusions.

After logging their food intake for five days, participants were required to complete an end-of-study survey to receive full compensation, which almost all participants completed ($N = 415$, 93.26%). Seven questions (on 1 = "not at all" to 7 = "extremely" or "a great deal" scales) aligned with the seven questions from study 1. Specifically, in terms of their actual logging experience, participants answered: "How difficult was logging all of the food you ate over the past week?"; "How much did you enjoy the act of logging all of your food over the past week?"; and "How useful do you think the act of logging everything you ate for the past week was?" With regards to perceived goal adherence, participants answered:

"How well do you think you adhered to this goal during this study?"; "During this study, to what extent did you feel motivated to work toward your goal?"; and "How do you feel about all of the food you ate over the past week?" Finally, regarding continued, long-term usage, they answered: "If it were available to you, how likely would you be to continue logging your food in this way (by texting in [photos/descriptions] of your food)?" A factor analysis revealed two factors: the enjoyment, difficulty, usefulness, and long-term usage items loaded on one factor, while the three items pertaining to goal adherence loaded on another factor. Participants also answered several additional questions (see OSF).

Results

Actual Logging Behavior. The number of participants who continued versus stopped sending SMS messages during the week served as our measure of logging persistence (H2a). The vast majority of participants (93.71%) continued logging during the entire field study. This overall high persistence is not surprising, given that logging was required for full compensation. Importantly, a binary logistic model revealed that participants were more likely to stop logging and drop out of the study if they were assigned to log via photos ($N = 20$, 8.73%) than via text descriptions ($N = 8$, 3.70%; $F(1, 441) = 4.81$, $p = .029$; see fig. 1 for this and other outcomes).

Further testing hypothesis 2a, we assessed how frequently participants actually logged their food. We found that participants sent fewer messages in the *photo logging* ($M = 17.02$, $SD = 8.85$) than the *text logging* condition ($M = 21.71$, $SD = 8.22$; $F(1, 441) = 33.44$, $p < .001$). This difference in messages sent was mirrored in participants' self-reports. Across all four daily surveys, participants in the *photo logging* condition reported logging a significantly smaller percentage of their total food intake on the previous day than participants in the *text logging* condition (all $F > 15.00$, $p < .001$; see the appendix).

These findings suggest that logging via photos (vs. text) leads to less complete records. However, one alternative account for these findings is that a single photo may capture more food items than a single text. To address this, we randomly sampled 250 text and 250 photo messages and asked three hypothesis-blind coders to identify the distinct food items captured (see the appendix for details). Coders exhibited strong inter-rater reliability regarding the number of items logged ($\alpha_{\text{text}} = .88$, $\alpha_{\text{photo}} = .94$). The average number of items logged did not differ significantly by modality (if anything, there was a small effect in the opposite direction:

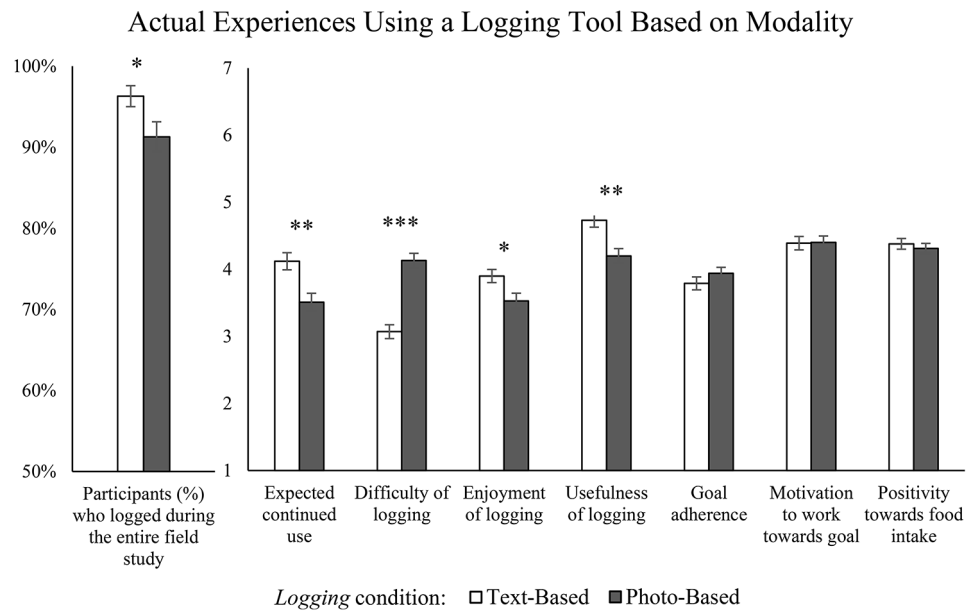


Figure 1. In study 2, participants were less likely to actually log their food intake via photos, less willing to continue using the logging tool long-term, and found logging via photos (vs. text) less enjoyable and useful. Error bars are ± 1 standard error, and significance levels are * $p < .05$; ** $p < .01$; *** $p < .001$.

$M_{\text{photo}} = 1.43$, $SD = 0.74$ vs. $M_{\text{text}} = 1.48$, $SD = 0.77$; $F(1, 497) = 2.01$, $p = .157$). This provides further confidence that photo-based logging indeed led to less complete records than text-based logging.

Continued Use. Furthermore, in contrast to the prediction results of study 1, at the end of the actual 1-week trial, participants stated they were less likely to continue logging via photos ($M = 3.51$, $SD = 2.01$) versus text descriptions ($M = 4.12$, $SD = 1.87$; $F(1, 411) = 9.49$, $p = .002$).

Actual Logging Experience. In contrast to the expectations expressed in study 1, and in line with hypothesis 2b, participants found logging via photos to be more difficult ($M_{\text{photo}} = 4.13$, $SD = 1.65$ vs. $M_{\text{text}} = 3.79$, $SD = 1.42$; $F(1, 411) = 45.80$, $p < .001$), less enjoyable ($M_{\text{photo}} = 3.53$, $SD = 1.72$ vs. $M_{\text{text}} = 3.90$, $SD = 1.44$; $F(1, 411) = 5.16$, $p = .024$), and less useful ($M_{\text{photo}} = 4.20$, $SD = 1.68$ vs. $M_{\text{text}} = 4.73$, $SD = 1.50$; $F(1, 411) = 10.43$, $p = .001$) than logging via text descriptions. This effect also held for the composite measure averaging these three items ($M_{\text{photo}} = 3.87$, $SD = 1.24$ vs. $M_{\text{text}} = 4.52$, $SD = 0.99$; $F(1, 411) = 33.76$, $p < .001$).

Perceived Goal Adherence. There were no significant effects of logging modality on how participants felt that log-

ging impacted their goal adherence, motivation, or positivity toward what they ate (all $F < 1.20$, $p > .25$; composite measure: $M_{\text{photo}} = 4.22$, $SD = 1.10$ vs. $M_{\text{text}} = 4.19$, $SD = 1.10$; $F(1, 411) = 0.08$, $p = .78$).

Discussion

In contrast to study 1, which revealed a clear preference for photo-based logging in expectation, study 2's findings indicate that the opposite holds in practice. That is, compared to those who logged via text descriptions, participants who logged via photos were less likely to persist: they were more likely to drop out of the study and logged less of their total food intake. Moreover, when logging was done via photos, participants found logging more difficult and less enjoyable, and were less inclined to continue logging. In addition, while participants found logging to be less useful when logging via photos (vs. text), logging modality had no effect on participants' perceived goal adherence.

GENERAL DISCUSSION

Consumers with healthy-eating goals are often encouraged to log their food intake to facilitate goal attainment. Yet the key to successful food-logging is to log continuously (e.g., Burke et al. 2011). We find a disconnect between what consumers anticipate versus what they actually experience as

their preferred logging modality. Specifically, study 1 demonstrated that participants reported being more likely to adopt a photo-based logging tool over a text-based logging tool. They expected that food logging would be better (i.e., easier and more likely to help them reach their goals) via photos than via text. In contrast, a field study where participants logged their food for a week revealed that logging via photos (vs. text) was actually harder. Notably, participants logged less of what they ate while using a photo-based (vs. text-based) logging tool and were less likely to continue logging throughout the field study.

These findings contribute to several different areas of research. Much prior work has studied consumer responses to portrayals of goal progress (Kivetz et al. 2006) and how quantification can influence attitudes toward goal-consistent behaviors (Etkin 2016). We add to this research by demonstrating how a critical aspect of logging tools—the modality of capturing goal progress—impacts actual logging behavior and intended long-term use.

In addition, previous research has studied myriad causes of goal pursuit failure (e.g., underestimating the allure of goal-inconsistent vices; Loewenstein and Schkade 1999). Our results suggest another cause of goal pursuit failure: consumers' misprediction of what tools most effectively support their goal pursuit (here, the modality of logging). Furthermore, we examine synchronous (photo-based) versus potentially asynchronous (text-based) logging modalities, expanding knowledge about this synchronicity-based distinction beyond interpersonal communication (e.g., Moffett et al. 2021) into a novel and important domain. In addition, by documenting an important context in which people fail to fully consider future costs (Zauberman 2003), our work contributes to research on focalism (e.g., Wilson et al. 2000) and adds to existing research on the dis-adoption of technological tools more broadly (e.g., Lehmann and Parker 2017).

Practical Implications

Our work has several implications for marketing and public policy. First, for a firm to succeed in this crowded market, it must maximize both consumer downloads (i.e., adoption) and user retention (i.e., continued use; Vang 2017). Our findings suggest that to draw consumers in, apps should highlight features that seem easy to use, like photo-based logging. However, to retain consumers, apps should allow consumers to switch to what is actually easier to use, such as text-based logging.

Surprisingly, while the 20 most popular food-logging apps currently available for Apple devices all allow consum-

ers to log their food via text, fewer than half (35%) have any photo-logging capabilities (see the appendix for details). Automated analysis of food photos is still limited in its efficacy; even the apps that do allow for photo-based logging are only able to identify some foods within the photos, without providing accurate nutritional or portion size information. Therefore, given the current state of technology, companies already providing text-based logging may want to carefully consider the costs and benefits of supplementing their apps with photo-based logging.

Relatedly, governmental agencies and tech companies have started to invest in making photo-based logging more viable (e.g., Lu et al. 2020). While these advancements will be critical for quantifying what people actually consume, our research indicates that the *usability* of photo-based logging (from consumers' perspectives) may be an underappreciated stumbling block preventing long-term photo-based logging. Even if artificial intelligence (AI) technology will eventually reliably quantify nutritional information from photos, consumers may not reap those benefits if they find the process of logging photos too cumbersome. As such, investing in behavioral interventions, for example, those that promote implementation intentions (Gollwitzer and Sheeran 2006) or establish habitual cues to engage in logging (Stawarz, Cox, and Blandford 2015) may be as critical as investing in AI technology.

Limitations and Future Research

In our field study, participants used basic SMS messaging to log their food intake, allowing us to isolate the effects of logging modality from those of other features. However, it is possible that our effects may not fully generalize to more sophisticated commercial apps, which typically offer special features that were unavailable to our participants. For instance, apps often allow users to save time by scanning barcodes of packaged foods or selecting commonly logged foods from a drop-down list. We expect these features would increase the appeal of text-based logging both during adoption and use. Furthermore, features facilitating implementation intentions (e.g., reminders sent during mealtimes) may improve logging adherence overall (Gollwitzer and Sheeran 2006) and may be especially helpful for photo-logging, where forgetting in the moment is particularly problematic. Future research may explore more complex tools and examine a wider range of food logging behaviors.

Furthermore, we focused mainly on the predicted and actual ease of logging as reasons for adoption and dis-adoption,

respectively, as ease has been identified as an important driver by prior research (e.g., Davis 1989), as well as by participants themselves (study 1). However, other factors could also affect adoption. For example, some participants who preferred text-based logging in study 1 did so because they believed photo-logging would be embarrassing or because of data privacy concerns. Future research may explore these and other factors that drive adoption versus usage in certain segments, or in specific situations. Relatedly, we captured anticipated and actual logging behavior in separate studies. While this has certain empirical advantages (e.g., minimizes demand effects), latent differences between the two study samples could have influenced our results. Future research may take different empirical approaches to studying adoption versus usage among the same consumers.

We primarily investigated attitudes and behaviors regarding food logging, which past work indicates is an important aspect of healthy eating. Yet the question of how logging modality would influence the healthiness of consumers' food consumption remains unanswered. We expect that it will eventually be possible to accurately evaluate photographed foods, benefitting consumers and allowing future research to study whether photo-based logging can lead to healthier eating than text-based logging. On the one hand, photo-based logging might encourage healthier choices because photos are more vivid than text, thus creating stronger memories of consuming unhealthy foods (Barasch et al. 2017) and possibly inducing greater consumption regret. Additionally, photo-based logging could improve portion control by creating a pause before consumption, which could allow consumers to rethink what they are about to eat (akin to a physical partition; Cheema and Soman 2008) or increase their enjoyment and mindfulness during consumption (Coary and Poor 2016). On the other hand, photo-based logging could have the opposite effect because delays brought on by photo-based logging may heighten the desire for certain foods (Bayliss and Wu 2022). Future research may examine these opposing forces.

Being able to assess actual consumption would also allow a deeper understanding of perceived goal adherence as a function of logging modality. While at the adoption stage (study 1) participants expected photo-logging to help them better adhere to their goals, during usage (study 2), participants reported similar adherence regardless of modality. It is unclear whether this discrepancy is due to motivated reasoning (i.e., users felt like they did their best, even if they consumed goal-inconsistent food), or whether perceptions align with objective measures. Future research might clarify these open questions.

In sum, our research provides insights about the tension between how consumers anticipate versus actually experience food logging with two modalities—text and photos—designed to boost healthier eating. As new food-logging tools continue to proliferate the health-focused market, our findings could help guide how these tools are developed and marketed to best aid consumers.

REFERENCES

- Baker, Raymond C., and Daniel S. Kirschenbaum (1998), "Weight Control during the Holidays: Highly Consistent Self-Monitoring as a Potentially Useful Coping Mechanism," *Health Psychology*, 17 (4), 367–70.
- Barasch, Alixandra, Kristin Diehl, Jackie Silverman, and Gal Zauberman (2017), "Photographic Memory: The Effects of Volitional Photo Taking on Memory for Visual and Auditory Aspects of an Experience," *Psychological Science*, 28 (8), 1056–66.
- Bauer, Jan Michael, and Lucia A. Reisch (2019), "Behavioural Insights and (Un) Healthy Dietary Choices: A Review of Current Evidence," *Journal of Consumer Policy*, 42 (1), 3–45.
- Bayliss, Lauren, and Linwan Wu (2022), "Should You 'Picture' This? Effects of Picture-Taking Features of Food Diary Apps on Memory, Liking, and Wanting," *Appetite*, 168, 105682.
- Berger, Jonah, and Raghuram Iyengar (2013), "Communication Channels and Word of Mouth: How the Medium Shapes the Message," *Journal of Consumer Research*, 40 (3), 567–79.
- Burke, Lora E., Mindi A. Styn, Karen Glanz, Linda J. Ewing, Okan U. Elci, Margaret B. Conroy, Susan M. Sereika, Sushama D. Acharya, Edwin Music, Alison L. Keating, and Mary Ann Sevick (2009), "SMART Trial: A Randomized Clinical Trial of Self-Monitoring in Behavioral Weight Management-Design and Baseline Findings," *Contemporary Clinical Trials*, 30 (6), 540–51.
- Burke Lora E., Jing Wang, and Mary Ann Sevick (2011), "Self-Monitoring in Weight Loss: A Systematic Review of the Literature," *Journal of the American Dietetic Association*, 111 (1), 92–102.
- Cheema, Amar, and Dilip Soman (2008), "The Effect of Partitions on Controlling Consumption," *Journal of Marketing Research*, 45 (6), 665–75.
- Coary, Sean, and Morgan Poor (2016), "How Consumer-Generated Images Shape Important Consumption Outcomes in the Food Domain," *Journal of Consumer Marketing* 33 (1), 1–8.
- Cordeiro, Felicia, Daniel A. Epstein, Edison Thomaz, Elizabeth Bales, Arvind K. Jagannathan, Gregory D. Abowd, and James Fogarty (2015), "Barriers and Negative Nudges: Exploring Challenges in Food Journaling," in *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, ed. B. Begone and J. Kim, New York: Association for Computing Machinery, 1159–62.
- Davis, Fred D. (1989), "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology," *MIS Quarterly*, 13 (3), 319–40.
- Diehl, Kristin, Gal Zauberman, and Alixandra Barasch (2016), "How Taking Photos Increases Enjoyment of Experiences," *Journal of Personality and Social Psychology*, 111 (2), 119–40.
- Etkin, Jordan (2016), "The Hidden Cost of Personal Quantification," *Journal of Consumer Research*, 42 (4), 967–84.
- Gollwitzer, Peter M., and Paschal Sheeran (2006), "Implementation Intentions and Goal Achievement: A Meta-Analysis of Effects and Processes," *Advances in Experimental Social Psychology*, 38, 69–119.

- Goodman, Joseph K., and Caglar Irmak (2013), "Having versus Consuming: Failure to Estimate Usage Frequency Makes Consumers Prefer Multifeature Products," *Journal of Marketing Research*, 50 (1), 44–54.
- Hsee, Christopher K. (1996), "The Evaluability Hypothesis: An Explanation for Preference Reversals between Joint and Separate Evaluations of Alternatives," *Organizational Behavior and Human Decision Processes*, 67 (3), 247–57.
- Kivetz, Ran, Oleg Urminsky, and Yuhuang Zheng (2006), "The Goal-Gradient Hypothesis Resurrected: Purchase Acceleration, Illusionary Goal Progress, and Customer Retention," *Journal of Marketing Research*, 43 (1), 39–58.
- Lehmann, Donald R., and Jeffrey R. Parker (2017), "Disadoption," *AMS Review*, 7 (1), 36–51.
- Loewenstein, George, and David Schkade (1999), "Wouldn't It Be Nice? Predicting Future Feelings," in *Well-Being: The Foundations of Hedonic Psychology*, ed. D. Kahneman, E. Diener, and N. Schwarz, New York: Russell Sage Foundation, 85–105.
- Lu, Ya, T. Stathopoulou, M. F. Vasiloglou, L. F. Pinault, C. Kiley, E. K. Spanakis, and S. Mougiakakou (2020), "goFOODTM: An Artificial Intelligence System for Dietary Assessment," *Sensors*, 20 (15), 4283.
- Lynch, John G., Jr., Joseph W. Alba, Aradhna Krishna, Vicki G. Morwitz, and Zeynep Gürhan-Canli (2012), "Knowledge Creation in Consumer Research: Multiple Routes, Multiple Criteria," *Journal of Consumer Psychology*, 22 (4), 473–85.
- Macdiarmid, Jennifer Isabel, and J. E. Blundell (1997), "Dietary Underreporting: What People Say about Recording Their Food Intake," *European Journal of Clinical Nutrition*, 51 (3), 199–200.
- MacInnis, Deborah J., Vicki G. Morwitz, Simona Botti, Donna L. Hoffman, Robert V. Kozinets, Donald R. Lehmann, John G. Lynch, Jr., and Cornelia Pechmann (2020), "Creating Boundary-Breaking, Marketing-Relevant Consumer Research," *Journal of Marketing*, 84 (2), 1–23.
- Meyer, Robert J., Shenghui Zhao, and Jin K. Han (2008), "Biases in Valuation vs. Usage of Innovative Product Features," *Marketing Science*, 27 (6), 1083–96.
- Moffett, Jordan W., Judith Anne Garretson Folse, and Robert W. Palmatier (2021), "A Theory of Multiformat Communication: Mechanisms, Dynamics, and Strategies," *Journal of the Academy of Marketing Science*, 49 (3), 441–61.
- Owens, Susan J. (2021), "The 9 Best Food Tracker Apps of 2021," *Lifewire*, <https://www.lifewire.com/best-food-tracker-apps-4172287>.
- Paivio, Allan (1969), "Mental Imagery in Associative Learning and Memory," *Psychological Review*, 76 (3), 241–63.
- Polivy, Janet, and C. Peter Herman (2002), "If at First You Don't Succeed: False Hopes of Self-Change," *American Psychologist*, 57 (9), 677.
- Sharp, Darren B., and Margaret Allman-Farinelli (2014), "Feasibility and Validity of Mobile Phones to Assess Dietary Intake," *Nutrition*, 30 (11–12), 1257–66.
- Stawarz, Katarzyna, Anna L. Cox, and Ann Blandford (2015), "Beyond Self-Tracking and Reminders: Designing Smartphone Apps That Support Habit Formation," in *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, ed. B. Begone and J. Kim, New York: Association for Computing Machinery, 2653–62.
- Stone, Arthur A., Saul Shiffman, Joseph E. Schwartz, Joan E. Broderick, and Micheal E. Hufford (2002), "Patient Non-compliance with Paper Diaries," *BMJ*, 324 (7347), 1193–94.
- Thompson, Deborah Viana, Rebecca W. Hamilton, and Roland T. Rust (2005), "Feature Fatigue: When Product Capabilities Become Too Much of a Good Thing," *Journal of Marketing Research*, 42 (4), 431–42.
- Trope, Yaacov, Nira Liberman, and Cheryl Wakslak (2007), "Construal Levels and Psychological Distance: Effects on Representation, Prediction, Evaluation, and Behavior," *Journal of Consumer Psychology*, 17 (2), 83–95.
- Vang, Wendy (2017), "Are You Sabotaging Your App Downloads? Read This before You Launch," *Amplitude*, <https://amplitude.com/blog/app-downloads>.
- Wilson, Timothy D., Thalia Wheatley, Jonathan M. Meyers, Daniel T. Gilbert, and Danny Axsom (2000), "Focalism: A Source of Durability Bias in Affective Forecasting," *Journal of Personality and Social Psychology*, 78 (5), 821–36.
- Wood, Wendy, Jeffrey M. Quinn, and Deborah A. Kashy (2002), "Habits in Everyday Life: Thought, Emotion, and Action," *Journal of Personality and Social Psychology*, 83 (6), 1281–97.
- Yang, Yang, Christopher K. Hsee, and Xilin Li (2021), "Prediction Biases: An Integrative Review," *Current Directions in Psychological Science*, 30 (3), 195–201.
- Yon, Bethany Ann, Rachel K. Johnson, Jean Harvey-Berino, and Beth Casey Gold (2006), "The Use of a Personal Digital Assistant for Dietary Self-Monitoring Does Not Improve the Validity of Self-Reports of Energy Intake," *Journal of the American Dietetic Association*, 106 (8), 1256–59.
- Zauberman, Gal (2003), "The Intertemporal Dynamics of Consumer Lock-In," *Journal of Consumer Research*, 30 (3), 405–19.