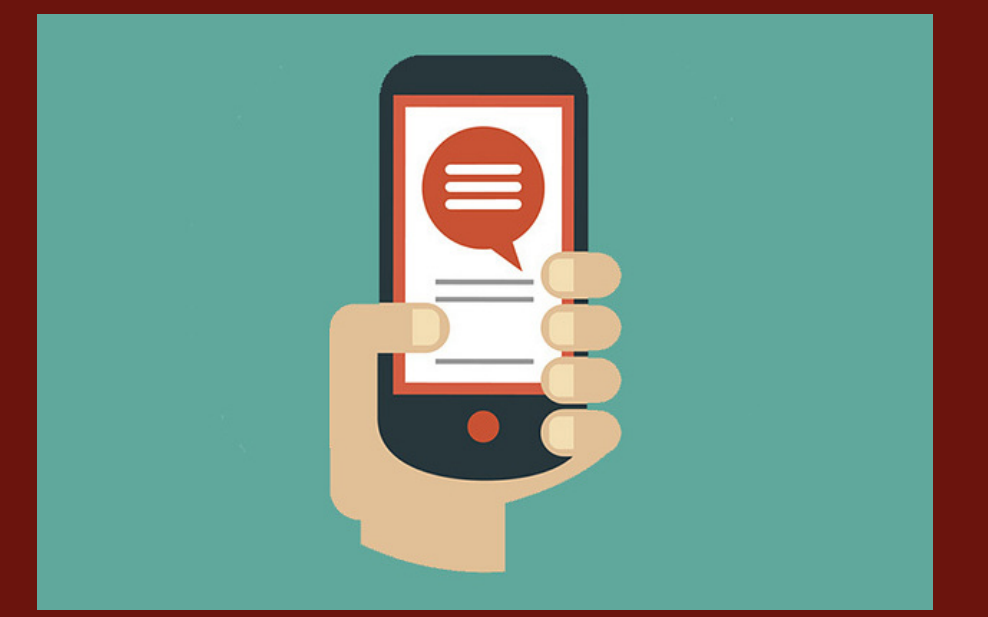




Psychological Consequences of Application-Based Calorie Tracking

Alena F. Oxenham, Erin C. Standen, Alexander J. Rothman
University of Minnesota



Background

- Mobile health apps are very popular among smartphone users and are widely recommended by healthcare professionals.^{1,2}
- There are health apps designed for many different behavioral domains (e.g., eating, activity, symptom management), and these different types of apps provide different kinds of feedback.
- These forms of feedback may be helpful in different ways and users may interact with them differently.

Calorie-Tracking App	Activity-Tracking App
Avoidance Goal	Approach Goal
Success = Neutral Failure = Punitive	Success = Rewarding Failure = Neutral
Red/green visual themes	Varied/gamified visual themes
Can't decrease calories eaten at end of day	Can increase steps taken at end of day

- Preliminary data from another study in this program of research found that users experienced **higher negative affect** and **lower positive affect** when exposed to feedback from calorie-tracking apps (compared to feedback from activity-tracking apps).
- It is unclear whether these differences are a result of the type of evaluative feedback that these apps provide (i.e., the varied responses they give for success and failure) or whether it is simply that the domain of calorie feedback is inherently perceived more negatively.
- To address these knowledge gaps, we conducted an online study to test whether the negative effects of calorie-tracking feedback were still prevalent once evaluative feedback was removed.

Hypotheses

- 1: Main Effect of Feedback Source:** Participants who receive calorie-tracking feedback will report **lower levels of positive affect** and **higher levels of negative affect** than participants who receive activity-tracking. (This hypothesis represents a replication of our findings from our prior work.)
- 2: Main Effect of Feedback Type:** Participants who receive evaluative feedback will report **lower levels of positive affect** and **higher levels of negative affect** than participants who receive non-evaluative feedback.
- 3: Interaction Effect:** The main effects will be qualified by an interaction, such that participants in the calorie-tracking + evaluative feedback condition will report the especially **low levels of positive affect** and the especially **high levels of negative affect**.

Sample & Procedure

- $N = 698$ participants were randomly assigned to condition, which was one of four app feedback scenarios.
- Participants then reviewed 7 days' worth of simulated feedback from either a calorie-tracking app or an activity-tracking app, and the feedback was either presented in evaluative form or in a non-evaluative form (see Figure 1).
- After being presented with the feedback, participants were asked to respond to positive and negative affect measures.

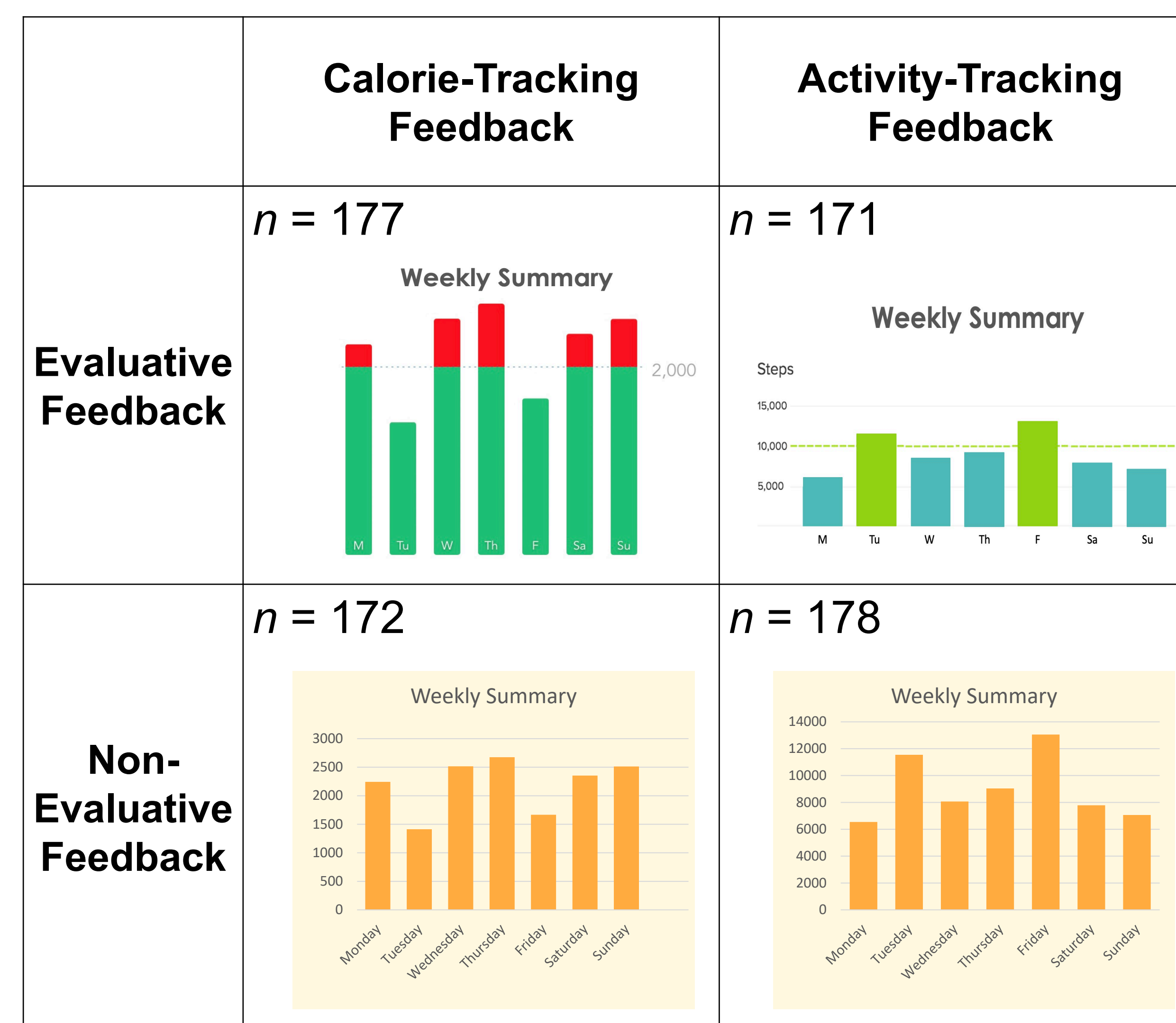


Figure 1. Study design summary and example stimuli.

Results

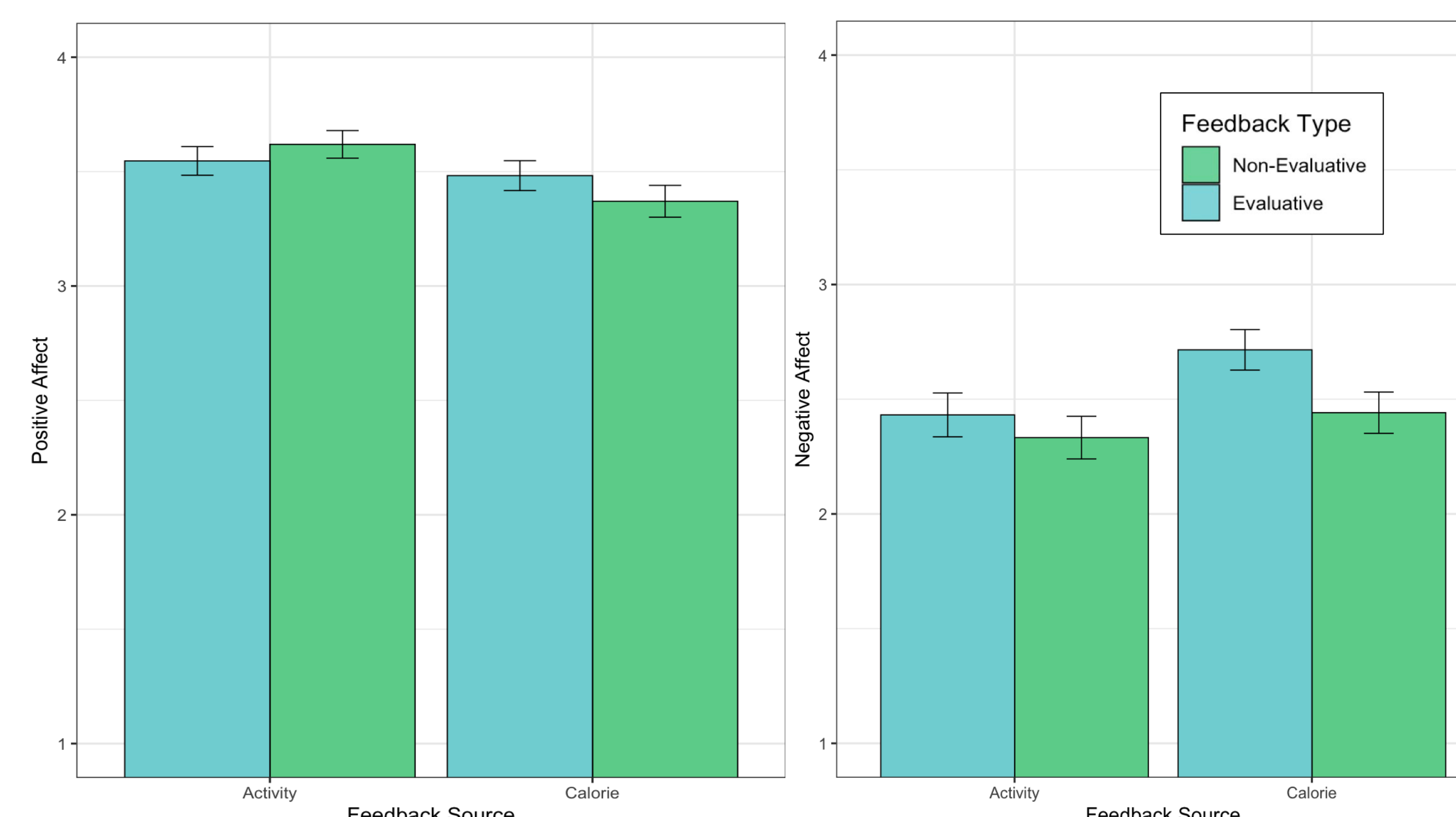


Figure 2. Mean ratings of positive and negative affect by app feedback source and type. Error bars represent standard errors.

Results

- H1: Main Effect of Feedback Source: **Supported** ✓
 - H2: Main Effect of Feedback Type: **Partially Supported** ⚡
 - H3: Interaction Effect: **Not Supported** ✗
- A two-way ANOVA revealed a main effect of feedback **source** on positive affect ($F_{1,694} = 13.58, p < 0.001$) and on negative affect ($F_{1,694} = 4.56, p < 0.05$) such that people who received calorie-app feedback reported lower levels of positive affect and higher levels of negative affect.
- There was no significant effect of feedback **type** on levels of positive affect, but there was a significant effect of feedback **type** of levels of negative affect ($F_{1,694} = 4.29, p < 0.05$).
- We did not find evidence for our hypothesized interaction effects for positive or negative affect.
- For a visual summary of these findings, see Figure 2.

Implications

- Our findings replicated the findings from our previous study, and suggest that people experience feedback that comes from a calorie-tracking app as more negative than they experience feedback that comes from an activity-tracking app.
- Moreover, we found some evidence that suggests that people experience evaluative feedback as particularly negative.
- Future research should investigate other strategies that lessen the “sting” of calorie-tracking feedback while maintaining apps’ effectiveness for behavior change.

Contact Information

Alena Oxenham: oxenh006@umn.edu
Erin Standen: stand104@umn.edu
Alexander Rothman: rothm001@umn.edu

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