

Leveraging Social Media Content to Support Engagement in Positive Interventions

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Abstract

A key challenge for positive psychology interventions is promoting sustained engagement to improve long-term outcomes. One way to increase engagement is to introduce variety to reduce hedonic adaptation. Here, we propose supplementing intervention prompts with items from a person's social media archive to add variety. Through a one-week pilot study of six positive psychology activities via a Facebook application, we explore whether Facebook content is useful to keep people engaged in activities and what attributes of content make it most useful. A total of 260 participants used our application, and analysis of usage showed that displaying content is engaging. By looking at which content was marked as useful by participants, we find that useful content is in itself meaningful and engaging (photos, longer texts, and content about close friends). We also find that certain intervention activities are more engaging and better suited for making use of Facebook content than others.

Keywords: happiness interventions, engagement, intervention technologies, social media

Introduction

Being happy is a goal for most people worldwide (Diener, 2000), with such happiness supporting better social relationships, work performance, and physical health (Lyubomirsky, King, & Diener, 2005a). The good news for those who are not happy is that theory suggests people can increase their happiness by engaging in intentional, happiness-building activities (Lyubomirsky, Sheldon, & Schkade, 2005b) and several empirical studies support this theory (e.g., Seligman, Steen, Park, & Peterson, 2005; Sin & Lyubomirsky, 2009).

However, less is known about how these activities work in the field, where challenges such as incorporating happiness-building activities into people's daily lives and sustaining them over time must be addressed (Parks, Della Porta, Pierce, Zilca, & Lyubomirsky, 2012). Sustained practice improves outcomes (Seligman et al., 2005; Sin & Lyubomirsky, 2009; Cohn & Fredrickson, 2010), but repetition of the activities risks hedonic adaptation, or activities becoming stale and losing their effectiveness (Lyubomirsky et al., 2005b, Sheldon & Lyubomirsky, 2012). Thus, a key question is how to keep activities novel and interesting (Parks, Schueller, & Tasimi, 2013).

Technologies to Support Psychological Well-Being

Technologies such as smartphones and social network sites may be useful for addressing these challenges (Parks et al., 2013; Coyle, Doherty, Matthews, & Sharry, 2007). However, compared with the recent surge in use of technology for physical health, relatively few technologies support mental health (Isaacs et al., 2013). Of those, most deploy some type of problem-focused therapy such as Cognitive-Behavioral Therapy, with very few focusing on supporting well-being (Mitchell, Stanimirovic, Klein, & Vella-Brodrick, 2009).

One example of a technology to support well-being is the Live Happy iPhone application. Using a device that is already integrated into many people's lives, it offers eight different interventions and leverages phone features like the camera to encourage people to take pictures of moments they want to savor and the contact list to encourage people to communicate with others (Parks et al., 2012). Live Happy users experience increases in happiness, particularly when they use the application more and practice a greater variety of exercises (Parks et al., 2012). Another example is Munson et al.'s integration of the Three Good Things exercise (Seligman et al., 2005) into Facebook, allowing people to share their entries with their friends (Munson, Lauterbach, Newman, & Resnick, 2010). While this intervention was not evaluated for effectiveness, adherence rates were on par with or better than other online wellness interventions, and though not everyone shared every post, people did find interacting with friends around their three good things posts compelling (Munson et al., 2010). These studies demonstrate the potential for technologies to support positive interventions and enhance existing interventions.

Social Media Content to Support Positive Intervention Activities

The current study is an initial exploration of another way of using technology to support positive interventions, displaying previously created social media content as a prompt for completing these activities in order to increase variety and reduce hedonic adaptation. Our approach is grounded in *personal informatics*, which studies how people can use technologies to collect data about themselves “for the purpose of self-reflection and gaining self-knowledge” (Li, Dey, & Forlizzi, 2010, p. 558). One research example of a personal informatics system is Fish'n'Steps, which records people's daily step count and presents visualizations of these data to increase users' awareness of their physical activity levels (Lin, Mamykina, Lindtner, Delajoux,

& Strub, 2006). Personal informatics technologies such as FitBit and Nike FuelBand have also become popular commercially.

Our first research question is whether social media content posted to sites such as Facebook can keep people engaged with positive intervention activities. Many people generate large volumes of photos, status updates, private messages, and comments that capture both meaningful and mundane aspects of their lives. Such content can be useful in supporting reminiscence (Cosley, Sosik, Schultz, Peesapati, & Lee, 2012) and reflection on interpersonal relationships (Sosik, Zhao, & Cosley, 2012), activities that are less structured than but closely related to positive intervention activities. Further, social media content tends to express positive over negative emotions (Cosley et al., 2012), which makes it well-suited for positive interventions. We expect that presenting different content to inspire positive intervention activities can introduce variety even when the instructions remain the same, keeping the activities novel and increasing engagement.

However, not all social media content is useful for reflection (Cosley et al., 2012; Sosik et al., 2012). Thus, our second research question is which attributes of social media content make it useful for positive intervention activities. Social media content can vary in many ways, such as being text or image based, including positive or negative emotion, and referring to more or less important aspects of life. Learning more about which types of content are useful for specific activities is an important step in developing technologies that enhance them.

Methods

To address these questions we developed and conducted a one-week pilot study of a Facebook application that uses social media content to support six positive psychology interventions. The study was conducted in a natural setting; participants were given a link to the

study app to use on their own devices, in their own environment, and at times chosen by them throughout the study period. In this evaluation, we focus on measures of engagement instead of whether or not participants experience changes in happiness, because given this technology's early stage of development, we are more interested in *how* people use it so we can improve future iterations of the design (Klasnja, Consolvo, & Pratt, 2011). We recruited 260 participants (ages 18-63, *Mdn* = 21; 74% female) between April and August 2013 through a study recruitment system at a large Northeastern US university ($n = 149$), snowball sampling ($n = 12$), and Craigslist ($n = 99$). Participants who completed the study had a one in ten chance of winning a 25 dollar Amazon gift card.

Facebook Application

The application has four main components: surveys, automatic Facebook data collection, positive intervention activities, and notifications (see Figure 1). New participants first consent to participate, then complete a pre survey while the app collects their Facebook content, including sent and received messages and wall posts, status updates, owned photos, and photos they are tagged in. We refer to this as a user's *personal Facebook archive*. The app also collected metadata about the content such as when it was posted, friends who were tagged in it, and likes and comments. This data enables us to model attributes of content that make it more or less useful for intervention activities.¹

During the one-week study period, the app instructs users to complete a particular positive intervention activity between one and six times. The app notifies participants via both email and Facebook notification when it is time to complete an activity because such

¹ Participants were notified of this data collection both in the experimental consent process and through Facebook's permissions system for applications; this was approved by our IRB.

notifications increase the usage of well-being technologies (Bentley & Tollmar, 2013). When completing an activity, participants were presented with 15 randomly selected pieces of Facebook content and instructed to use this content as inspiration to complete the activity. When submitting their activity to the app, participants also explicitly marked which of the 15 pieces of content they found useful; on average participants selected 2.6 pieces of content as useful per activity ($SD = 2.2$). At the end of the week, users were reminded to return to the app to complete a post survey.

Intervention Activities

Each participant was randomly assigned to one of six positive interventions or a control activity, described in Table 1. Frequencies were selected based on prior research, and for some activities multiple frequencies were tested; in these cases participants were randomly assigned a frequency. Most activities showed randomly selected content from a user's entire personal Facebook archive. For the Acts of Kindness activity, the app showed content created by others from the current day's News Feed, with the thought that this would increase people's awareness of opportunities to perform acts of kindness. The Three Good Things activity also selected only content from the current day, since it focuses on the current day's experiences. When possible it presented content from that day's personal Facebook archive; when there were less than 15 such items it added News Feed posts from friends. Control participants were not shown any Facebook content and completed a control activity, writing five things they did today, instead of a positive intervention.

Surveys

Participants completed two surveys, one at the beginning and one at the end of the week. The pre survey included questions regarding the participant's psychiatric history, the Facebook

Intensity Scale, which is measured on a 5-point scale with five indicating most intense Facebook use (FBI; Bryant & Brody (2010); Cronbach's $\alpha = .91$; $M = 3.55$, $SD = 0.94$), and demographic questions. The post survey asked Likert scale questions about the experience of completing the exercises, including whether the participant enjoyed them and whether the participant looked forward to completing them over the week. Three of these questions, which were rated on a 5-point scale, were combined to create a measure of overall enjoyment (Cronbach's $\alpha = .73$; $M = 3.29$, $SD = 0.70$). The post survey also included an open-ended question asking participants for "additional feedback about [their] experience" such as "Did you like that the exercise was provided to you in a Facebook app?" and "Would you be interested in continuing to do the exercise or other similar exercises?". Finally, participants completed an item measuring how close they felt (1 = Not at all close; 7 = Extremely close) to each of their Facebook friends that appeared in the content displayed (i.e., people who liked, commented on, sent, received, or were tagged). A total of 4,614 friendships were rated between 260 participants ($M = 3.57$, $SD = 1.97$).

Results

Engagement

To measure engagement, we looked at the proportion of activities participants completed over the week, considering participants who completed a higher proportion of activities to be more engaged than those who completed a lower proportion of activities (on average, participants completed 62% of study activities). After verifying that data did not exhibit heteroscedasticity problems and that residuals were normally distributed, we calculated a regression equation predicting engagement using participants' sex and age, type and frequency of activity completed, overall enjoyment, the number of pieces of content marked as useful, and FBI. The model was significant, $F(7, 133) = 10.70$, $p = .00$, $R^2 = .36$ (Table 2), with engagement

higher for people who marked more content as useful and lower for people assigned to higher frequencies of completion. Activity type also significantly predicted engagement; the Gratitude Journal activity had the highest engagement, while the Gratitude Letter had the lowest (see Table 1).

Open-ended feedback also suggests that online delivery of positive interventions can be engaging. The majority of participants who completed the post survey were explicitly positive (58%), saying they ‘really enjoyed the exercise,’ ‘thought it was fun,’ and ‘would love to continue this or similar exercises.’ Delivering the intervention on Facebook worked well because they are “on Facebook very often... it was very convenient!” and this along with the notifications ‘helped a lot because I would remember to do the exercise.’ However, 13% were explicitly negative, in part because “‘t intruded on my privacy’ by displaying Facebook content. Participants also varied on the utility of Facebook content. Some ‘really liked going over some of the old posts’ and ‘liked the use of past Facebook content to spur reflection,’ but a common reaction was that ‘some of the content wasn’t useful’ or that ‘not a lot of [the content pulled out] was significant to me.’

Types of Content

That reaction highlights the need to understand which attributes of content predict usefulness. Because each participant evaluated multiple pieces of content, specifically selecting which pieces of content they found useful for the intervention activity, we employed multilevel modeling for ordinal outcomes in SPSS Generalized Estimating Equations. This procedure allows a user-specifiable cumulative logit model that we used to model the predicted odds of a piece of content being useful rather than not (Heck, Thomas, & Tabata, 2012). We included the following attributes: type of content (message, wall post, status update, news feed post, or

photo), the percentage of positive emotion in text or photo captions as measured by LIWC (Pennebaker, Booth, & Francis, 2007), the number of words, whether the content was generated by self or others, how long ago the content was posted, the number of people associated with the content (where associated refers to being a sender or recipient, being tagged, or liking or commenting on the content), and the average self-reported relational closeness between the participant and these people. We also included the following individual control variables: participant sex, age, intensity of Facebook use, and activity condition.

Type of content, relational closeness, content length, and activity condition significantly predicted usefulness of content. Interpretation of the odds ratios (see Table 3) shows that a 1-*SD* increase in relational closeness and the number of words in the content are associated with a 19% and 1% increase, respectively, in the predicted odds of the content being useful. Compared to wall posts, photos were 2.91 times and status updates were 1.05 times *more* likely to be useful, while messages were 2.78 times and news feed posts were 2.04 times *less* likely to be useful. Compared to the Three Good Things activity, content was 1.96 times *more* likely to be useful in completing the Gratitude Journal activity and 1.36 times *more* likely to be useful in completing the Acts of Kindness activity. However content was *less* likely to be useful if participants were completing the You at Your Best (1.82 times), Reminiscing (1.92 times), and Gratitude Letter (2.17 times) activities.

Discussion and Future Work

In summary, participants who marked more content as useful and who were assigned to lower frequency activities had higher levels of engagement; the type of activity that they were assigned to also predicted how engaged they would be. Further, not all content is created equal; content with more words and content that is associated with people who the participant is closer

with is more useful. Photos and status updates are also more useful, while messages and news feed posts are less useful. Finally, participants tended to find more content useful for the Gratitude Journal and Acts of Kindness activities, and less content useful for the You at Your Best, Reminiscing, and Gratitude Letter activities.

We believe the use of Facebook content and reminders is a promising approach to support engagement with online positive interventions. Participants completed 62% of activities and 75% of participants completed the study through the post survey. This demonstrates higher engagement than in other online interventions, such as a diabetes self-management study where 34% of users were active (Wangberg, Bergmo, & Johnsen, 2008) and Munson et al.'s implementation of Three Good Things on Facebook, where 29% of users were active (2010). Through open-ended feedback, participants also responded positively to the interventions and their delivery via Facebook.

However, because this initial study did not have a control group where participants completed positive interventions without Facebook content, we cannot conclude that it was the content (versus simply delivering positive interventions via Facebook) that led to participant engagement. Further, the current study sample was mostly college-aged females and lasted only a week. Future studies should address these limitations as well as whether using social media content to support positive interventions has direct effects on well-being outcomes.

When incorporating interventions into an existing technology like Facebook, it is important to consider the fit between activity and the norms around the platform. Here, the Gratitude Letter activity had the lowest completion rate, while the similar Gratitude Journal activity had the highest completion rate. The main difference is that the Gratitude Journal is self-directed, while the Gratitude Letter is intended to be shared with others. Privacy concerns and

norms around writing messages to others on Facebook (in particular, most messages are short, and the Gratitude Letter is not) might have inhibited people from actually sharing the letter, in turn rendering the exercise ineffective. Effectively using technologies in deploying positive intervention activities will require considering these usage, technical, and social issues.

Our findings also suggest that although using social media content is promising for supporting these activities, it too requires careful thought. Survey responses showed that people often received meaningless content and to some extent, our findings can help with that. Photos, status updates, longer text content, and content with closer friends were more likely to be useful for exercises. This is in line with prior work showing that reflection often centers on people and that context is important in making social media content useful for reflection (Cosley et al., 2012). However, we also found that content was more useful for some exercises than others. This suggests that while content engages people, it may not always serve the underlying mechanisms of the activities. Previous work showed that content can be useful for reflection but also narrow its scope (Sosik et al., 2012), which could impact the efficacy of exercises. As research makes strides in understanding the mechanisms that underlie positive interventions (e.g. Lyubomirsky & Layous, 2013), we can try to match attributes of content with activity mechanisms to better support both engagement and happiness outcomes.

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Table 1

Intervention Activities

Activity	Instructions	Frequencies	Social Media Content	N	Proportion Completed		# Content Items Useful	
					<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Gratitude Journal (Emmons & McCullough, 2003)	<i>Using the content below as inspiration make a list of things for which you are grateful.</i>	1, 3	Personal archive	47	.78	.36	9.54	7.76
Reminiscing (Zauszniewski et al., 2004)	<i>Using the content below as inspiration reminisce about a past positive experience. Take a few minutes to write about this experience and what made it positive.</i>	1, 3	Personal archive	52	.61	.45	3.89	3.13
Acts of Kindness (Lyubomirsky et al., 2005b)	<i>Using the content below as inspiration perform between three and five acts of kindness. Acts of kindness are behaviors that benefit others or make them happy, usually at some cost to yourself. Document the acts of kindness that you performed below.</i>	1, 3	News Feed posts from previous day	42	.52	.46	4.13	2.94
You at Your Best (Seligman et al., 2005)	<i>Using the content below as inspiration write a story below about a time you were at your best, and take a few minutes to reflect on the personal strengths displayed in this story.</i>	3	Personal archive	30	.64	.38	5.21	3.28
Gratitude Letter (Seligman et al., 2005)	<i>Using the content below as inspiration think about one of your Facebook friends who has been kind to you, but that you have not thanked. Write a note in the field below expressing your gratitude to this person, and consider delivering it to them through either a wall post or private message.</i>	1	Personal archive	29	.48	.50	1.86	1.29
Three Good Things (Seligman et al., 2005)	<i>Using the content below as inspiration list three things that went well today. For each of these three things, write an explanation for what caused it.</i>	6	Personal archive & News Feed posts from current day	30	.54	.32	8.33	3.73
Control	<i>Write about five things that you did today.</i>	3	--	30	.71	.31	--	--

Table 2

Regression Coefficients Predicting the Proportion of Activities Completed

Variable	Proportion Completed		
	β	t	p
Sex	0.02	0.64	.52
Age	-0.00	-0.79	.43
Activity	0.03	2.19	.03
Frequency	-0.10	-7.43	.00
Activity Enjoyment	0.02	0.63	.53
Num. Pieces of Content Useful	0.01	3.95	.00
Facebook Intensity	0.00	-0.01	.99

Table 3

Exponentiated Coefficients Representing the Predicted Odds of Content Being Useful

Content Attribute	β	p
Sex	1.03	.90
Age	0.99	.34
Facebook Intensity	1.04	.59
Time Since Content Creation	1.00	.35
Number of Friends in Content	0.98	.35
Relational Closeness	1.19	.00
Self-Generated	1.09	.52
Positive Emotion	1.00	.81
Number of Words in Content	1.01	.00
Content Type		.00
Message	0.36	
News Feed Post	0.49	
Photo	2.91	
Status Update	1.05	
Wall Post	1.00	
Activity		.00
Gratitude Journal	1.96	
Reminiscing	0.52	
Acts of Kindness	1.36	
You at Your Best	0.55	
Gratitude Letter	0.46	
Three Good Things	1.00	

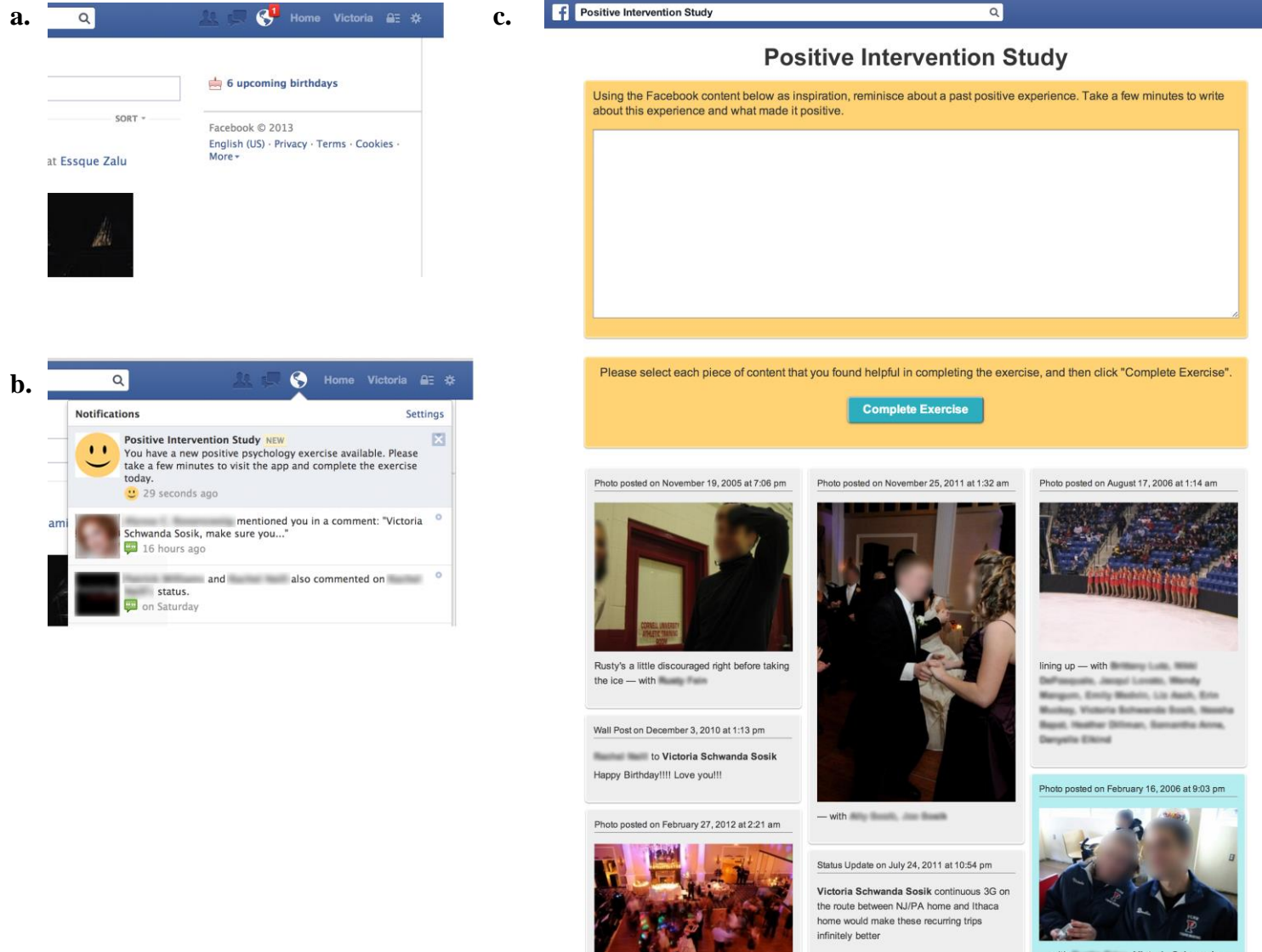


Figure 1. *a.* A Facebook page showing one new study notification. *b.* The Facebook notification sent by the study app. *c.* The study app’s activity page with instructions at the top, followed by a response box, and 15 pieces of Facebook content. Here one piece of content was selected as useful for the exercise (highlighted in teal).