
Sharing Emotion on Facebook: Network Size, Density, and Individual Motivation

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Abstract

Social networking sites afford substantial affective self-expression and hybrid social connections. In this study, we collected 185 Facebook users' egocentric social network data and analyzed the words of positive emotion and negative emotion in their status updates. Preliminary results reveal that emotion sharing is associated with one's social network size and density, and this association is moderated by the motivation for relationship management. We also found a decreasing trend of emotion sharing with longer usage of Facebook. Follow-up studies and implications are discussed.

Keywords

Social Networking Sites, Facebook, Emotion, Sharing

ACM Classification Keywords

H.5.m [Information interfaces and presentation (e.g., HCI)]: Miscellaneous.

J.4 [Social and behavioral systems]: Psychology.

Introduction

Social networking sites (SNSs) such as Facebook are popular platforms for self-expression and social connections [2]. Individuals can easily share their

thoughts and feelings with their friends, and their self-disclosure enhances their social connections.

It has been shown that sharing emotional experiences through affective words is common on SNSs [4, 5, 11]. In fact, social sharing of emotion plays a central role in our daily lives. It improves individual moods and strengthens interpersonal bonds [13]. Meanwhile, SNSs promote social capital by allowing individuals to maintain many social connections [3]. This results in a complex social environment that includes both strong and weak social ties [2]. Although considerable research has addressed either emotion sharing or social connectedness on SNSs, it remains unclear how one's emotion sharing is related to his or her egocentric social network on SNSs.

Therefore, this study aims to examine the relation between social network property and self-disclosure, especially the sharing of emotion. We investigated affective words used in individuals' status updates and their egocentric network properties (i.e. size and density) on Facebook, and considered individuals' relationship management motivation as a moderator that affects the relation between network property and emotion sharing.

Social Network Properties

Network size and density are two of the mostly studied network properties. Network size refers to the number of nodes in a network. Network density is used to address the communal connections among these nodes. The denser the network is, the more connected the nodes in the network are. Network size and density tap into different attributes of a network. While size reflects the quantity of the connections, density addresses the

quality of interpersonal relations. The more mutual cross-linkages there are, the more likely a person can get resources and help.

It has been found that larger and sparser networks are correlated with more sharing of emotion in microblogging (e.g. Twitter) [9]. However, the relationship is not clearly explained. Furthermore, few conclusions were made with respect to other SNSs such as Facebook. We proposed that such the relation between network property and emotion sharing is contingent on psychological factors such as motivation. In particular, relationship management motivation is expected to affect the relation.

Methods

Data Collection

185 undergraduate students (63 males) participated in our study for course credits. Their average age is 22.1 ($SD = 1.67$). The participants were asked to complete a questionnaire about their motivation to disclose information about themselves on Facebook for the purpose of relationship management [10]. The questionnaire contains 4 items using a 5-point scale (1 = "strongly disagree", 5 = "strongly agree"). The items included, for example, "I disclose to keep a close relationship with others" and "Disclosures on Facebook is a meeting place for me and other friends". The Cronbach's α for this scale was 0.69 ($M = 3.55$, $SD = 0.65$).

Upon participants' consent, their status updates (from 2009 to present) were retrieved, and their friend lists and the connections among their friends were downloaded by the Facebook app NameWebGen [8].

On average, there were 117.69 updates ($SD = 150.60$) per participant.

Network analysis

We calculated the egocentric network size and density using the social network analysis software UCINET 6® [1]. The network size for each participant is the total number of friends in his or her friend list ($M = 507.49$, $SD = 241.79$). The network density is the ratio of existing connections among friends over all possible connections in the 1-step egocentric network ($M = 0.05$, $SD = 0.03$).

Linguistic analysis

We used the linguistics software Linguistic Inquiry and Word Count 2007 (LIWC2007) [12] to compute the frequency of positive and negative emotional words in participants' status updates. Common emoticons were replaced by corresponding emotional words before LIWC analysis.

Data validation

To validate the reliability of our data, we split each participant's status data into two random halves and correlated the word frequencies of the two halves. Results showed good correlations (positive emotion: $\beta = 0.47$, $p < 0.001$; negative emotion: $\beta = 0.31$, $p < 0.001$). This demonstrates that there is no significant variation within individuals, and our results are not dependent on the selection of status updates.

Results

Seventeen participants (9%) did not use any positive or negative emotion words in their status updates, and they were excluded from further analysis. Zero-order

correlation shows that the frequency of positive emotion words is positively associated with network size ($\beta = 0.21$, $p = 0.005$) and negatively correlated with density ($\beta = -0.17$, $p = 0.026$). The frequency of negative emotion is not related to either network size or density. This result is partially consistent with previous findings on Twitter [9], in that more emotion sharing in microblogging is associated with larger and sparser social network.

Considering the difference in word usage across individuals, we used the ratio of negative over positive emotion words to better depict the pattern of emotion sharing. Moreover, to investigate how the network properties simultaneously influence emotion sharing, we conducted a multiple regression with the ratio as the outcome variable, and size and density as the predictors. The motivation for relationship management was considered a moderator in the regression model. Thus, the product of motivation and size and the product of motivation and density were entered into the regression equation.

As Table 1 shows, network size is negatively correlated with the ratio of negative emotion over positive emotion [$\beta = -0.15$, $t(162) = 1.97$, $p = 0.05$]. Density does not play a role in this relation [$\beta = -0.05$, $t(162) = -0.67$, $p = 0.50$]. This indicates that when density is controlled, people with a smaller network are more likely to express negative emotions relative to positive emotions.

Table 1. Regression on the ratio of negative emotion words over positive emotion words

There is a significant interaction effect between density and motivation [$\beta = -0.05$, $t(162) = 6.31$, $p < 0.001$], suggesting that motivation moderates the relation between density and emotion sharing. Following Hayes and Matthes' [7] procedure (Figure 1), we found that

Predictor	β (Standardized)	t	p
density	0.05	0.67	0.50
size	-0.15	-1.97	0.05
motivation	-0.06	-0.82	0.41
density×motivation	-0.50	-6.31	0.00
size×motivation	-0.05	-0.67	0.51

people with a low level of relationship management motivation (2 SDs below the mean) share more negative relative to positive emotions in denser networks [$\beta = 16.40$, $t(162) = 6.69$, $p < 0.001$]. In contrast, people with a high level of relationship management motivation (2 SDs above the mean) are likely to express more negative relative to positive emotions in sparser networks [$\beta = -8.19$, $t(162) = 2.51$, $p = 0.013$].

Overall, the results suggest that people low in relationship management motivation are more likely to express negative emotions, suggesting that these people may use Facebook mainly as a platform for self-expression. They tend to express negative emotions when they might get attention and support from friends connected tightly, while they are likely to express relatively more positive emotions (vs. negative emotion) in a more open network where they can promote their social images. By contrast, people with high relationship management motivation are more concerned about their social relationships. They may avoid expressing negative emotions when people in

their network are highly connected to prevent the damage to their social image. This concern may be relieved when their social network is sparse and their friends do not know each other.

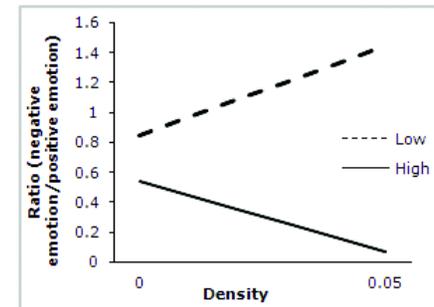


Figure 1. For individuals with high relationship management motivation, the ratio of negative over positive emotion is lower in denser network than in sparser one. This pattern is reversed for individuals with low relationship management motivation.

Since the status updates that we collected fall over a span of two years, the network property may have changed during this period. Though we have no direct evidence about the changes of networks, it is reasonable to assume that a person's network size usually increases over time with new friends being added and friendships being extended.

In an attempt to capture the change of network property and self-disclosure behaviors, we selected the latest 20 and earliest 20 pieces of status updates from each participant. Since some participants do not have sufficient number of status updates, this selection left us with 102 participants (male = 35). A 2 (positive emotion vs. negative emotion) \times 2 (earliest vs. latest)

repeated measures analysis shows that there are main effects for emotion types [$F(1, 101) = 17.20, p < 0.001, \eta^2 = 0.15$] and time stage [$F(1, 101) = 56.46, p < 0.001, \eta^2 = 0.36$]. No interaction effect was found [$F(1, 101) = 1.61, p = 0.21, \eta^2 = 0.016$]. This suggests that the emotion sharing does not change with time and our previous findings are robust.

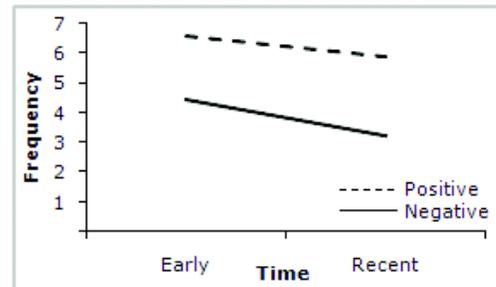


Figure 2. Emotion sharing over time.

It is not surprising that people express more positive than negative emotions on Facebook, as negative emotions are not socially favorable and people tend to suppress negative emotions in public [6]. However, it is interesting that people share less emotion, including positive and negative, when they use Facebook longer (Figure 2). It is possible that individuals are reluctant to express their negative emotions, as their networks grow larger.

Follow-up study

The current study offers preliminary finding on the relation between networks property and emotion sharing. It is necessary to use experimental studies to identify the casual relationship between network property and emotion sharing. We plan to create

scenarios to manipulate network size and density, and to measure how it will affect emotion sharing.

Meanwhile, a longitudinal study is needed to identify the dynamic interaction between social network and user behaviors. We also plan to investigate whether there is gender differences in emotion sharing, and extend the sample to professionals and older age groups whose networks might be more diverse than students'.

Implications

Theoretically, our study enriches the knowledge of the social sharing of emotion in the context of online social networking. It can also provide a better understanding of the psychological affordance of the network architecture. In terms of practical implications, our finding may help the design of personalized features to increase user engagement on SNSs. For example, for people with dense social network, pushing their emotional statuses to their friends and asking for feedback may increase their interest in sharing; for people with sparse networks, suggesting a customized audience may assist them in creating a sub-network that reduces the concern about negative emotion sharing. Although a definitive answer is beyond the scope of this study, our findings shed light on possible means to leverage SNSs to benefit users' emotional well-beings.

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