Social Sharing of Emotions on Facebook: Channel Differences, Satisfaction, and Replies

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ABSTRACT

People often share emotions with others in order to manage their emotional experiences. We investigate how social media properties such as visibility and directedness affect how people share emotions in Facebook, and their satisfaction after doing so. 141 participants rated 1,628 of their own recent status updates, posts they made on others' timelines, and private messages they sent for intensity, valence, personal relevance, and overall satisfaction felt after sharing each message. For network-visible channels—status updates and posts on others' timelines—they also rated their satisfaction with replies they received. People shared differently between channels, with more intense and negative emotions in private messages. People felt more satisfied after sharing more positive emotions in all channels and after sharing more personally relevant emotions in network-visible channels. Finally, people's overall satisfaction after sharing emotions in network-visible channels is strongly tied to their reply satisfaction. Quality of replies, not just quantity, matters, suggesting the need for designs that help people receive valuable responses to their shared emotions.

Author Keywords
Social sharing of emotions, emotion, Facebook, social media, interpersonal emotional regulation.

ACM Classification Keywords
H.5.2 [Information Interfaces and Presentation]: User Interfaces - Interaction styles.

General Terms
Human Factors

INTRODUCTION

Experiencing emotions is a fundamental part of human existence [4]. Although an emotional experience begins as an internal private process, it often leads to the social sharing of emotions with others [41, 42]. Social sharing of emotions refers to the verbal expression of an emotion to others by the person who experienced it [50]. Across age, gender, personality type, and culture, people share emotions with others in over 80% of all emotional episodes (see for review, [41, 42]).

A key reason for social sharing of emotions is that it allows for interpersonal emotion regulation, defined as attempts at managing emotions through social interaction [49]. Emotions often affect people well after the initial emotion-generating episode, leading people to share these emotions with others, particularly those which are stronger and more salient [42]. Such sharing supports both self-oriented (self-soothing, expression of feelings) and other-oriented (receiving support and validation) mechanisms that help people move back into emotional equilibrium [41].

Most research on social sharing of emotions has been limited to offline and dyadic contexts (see for review, [42]) because such sharing has typically involved a single and often relationally close target. However, people are increasingly sharing emotions with large and diverse groups on social networking sites (SNSs), including tweets on Twitter and network-visible Facebook channels such as status updates and posts on others' timelines [8, 26]. Motivations for this form of sharing are diverse [7]; one possible motivation that has so far received limited consideration is that SNSs are good tools for interpersonal emotion regulation, allowing people to reach both broad and targeted audiences depending on their needs around a particular emotional experience.

In this paper we examine how listeners' replies to social sharing of emotions on Facebook affect sharers' overall satisfaction, their sense that the overall goal for this

message has been achieved. We investigate overall satisfaction as a function of intensity, personal relevance, and valence of expressed emotions, as well as based on Facebook channel (i.e., status updates, posts on others' timelines, and private messages) in which emotions are shared. As Facebook offers several communication channels with different levels of network visibility and interaction directedness, we also explore whether the intensity, personal relevance, and valence of expressed emotions differ across these channels. In addition to type of channel and characteristics of expressed emotions, overall satisfaction may be affected by listeners' replies to emotional content and whether sharers find these replies to be gratifying and useful. In light of this, we also examine how quantity (number of comments and likes) and perceived quality (as measured by sharers' ratings of gratification and usefulness, henceforth called "reply satisfaction" and "reply usefulness", respectively) of replies affect overall satisfaction with sharing emotional experiences in network-visible channels on Facebook.

RELATED RESEARCH

Characteristics of Expressed Emotions in Different Facebook Channels

Understanding how people share emotions in social media has become an important research topic in CSCW and related venues. One stream of this research has focused on describing and predicting emotions by analyzing the language of social media posts (e.g., [11, 28, 29]) and how factors including individuals' emotional states [18], time of day and location [21], socio-economic events such as elections and holidays [9, 29], and the weather [37] relate to expressed emotions on Twitter and Facebook. These expressions, in turn, can affect others via emotional contagion, the spread of emotional expressions in a social network from one person to another in a sequence of similarly valenced social media posts [16, 30].

Properties of these networks can themselves influence social sharing of emotions. For instance, larger and sparser social networks are associated with increased expression of both positive and negative emotion on Twitter [26], while people with a high ratio of Twitter followers to followees tend to share more positive and fewer negative emotions than people with a lower ratio [17]. Different motivations such as relationship management and self-expression also moderate the relationship between network density and sharing of emotions in Facebook [33].

Social media affordances also affect how people express emotions. Although comparisons between platforms are rare, research has looked at how differences in channels available within the same platform may affect emotional expressions and their functions. For instance, Facebook channels differ in network publicness and interaction directedness, which, in turn, shape potential audiences and communication actions [7]. Status updates are broadcasts,

typically visible to a profile owner's entire network. They are not directed at any particular person and are more likely to be "author-centric," [36] that is, contain information pertaining to the author in some way [31]. Posts that people write on others' timelines are typically visible to those others' Facebook friends. They are also targeted at a particular person; this other-directedness leads them to be more concerned with the receiver than status updates are [7, 12]. Finally, private messages are typically sent to an individual in chat, so they are both directed and private, i.e., not visible to a network.

People express fewer negative emotions in network-visible communication (i.e., status updates and posts on others' timelines) than in private messages, while expression of positive emotions in status updates is often strategic, serving to manage a profile owner's self-presentation [8]. People also tend to share more intimate information in private messages than in network-visible Facebook communication, although this result was found in relation to self-disclosure overall, not just sharing of emotions [7]. This tendency may also be linked to Facebook social norms, as people regard intimate expression in network-visible communication as less appropriate than in private messages [5] and as a violation of social norms [35].

Thus, we predict that expressed emotions are less intense and more positive in network-visible channels (status updates and posts on others' timelines) than in private Facebook messages. Further, we predict that directedness affects sharing of emotions. In particular, we expect that people share more personally relevant emotions in author-centered status updates than in posts on others' timelines or in private messages [8, 31]:

H1: People share a) more intense and b) less positive emotions in private messages than in their status updates or posts on others' timelines.

H2: People share more personally relevant emotions in status updates compared to private messages or posts on others' timelines.

Overall Satisfaction After Sharing Emotions on Facebook

Social Sharing of Emotions Framework

We now turn to factors that influence the degree of overall satisfaction people experience after sharing emotions in different channels on Facebook. Social sharing of emotions is often driven by the goal of managing, or regulating, emotional responses [41, 42]. An emotional experience, whether positive or negative, can leave lasting social and cognitive traces. After experiencing an emotional event, it is common for people to cognitively replay and reassess the event in order to make sense of it. Cognitive reassessment of positive emotional episodes reactivates positive emotions, boosting feelings of self-esteem and self-efficacy [41, 50]. Cognitive reassessment of negative emotions can

reduce cognitive dissonance and promote understanding of how the emotion-causing event fits in to one's life narrative [42]. Social contact and conversations aid in sense-making through the opportunity to retell the story and make social comparisons; they can also lead to the provision of support and solidarity. Taken as a whole, this process can decrease stress and anxiety associated with negative emotions while enhancing positive affect through reliving positive emotional experiences in conversation.

Although developed in the context of face-to-face communication, the social sharing of emotions theory [42] has been recently applied to emotional communication in different media. A recent study compared affective outcomes of sharing "most important" personal events across multiple media, including Facebook, face-to-face, texting, and phone calls [14]. People reported feeling better after sharing positive emotions and feeling worse after sharing negative emotions in all media, with face-to-face providing the most positive and least negative affect. People were less likely to share significant emotional events in Facebook status updates, using Facebook more for "everyday habitual communication" [14, p. 539].

When emotions are expressed in network-visible Facebook channels, they are overwhelmingly positive [44]. This is likely due to impression management concerns typical for public interactions [8, 44], but there may be additional benefits in sharing positive events in network-visible compared to private Facebook interactions [44]. Interviews with participants who shared their memorable experiences on Facebook suggest that these benefits may be both intrapersonal (e.g., re-experiencing a positive event and enhancing the positive emotions associated with it) and interpersonal (e.g., strengthening relationships with others by entertaining and connecting with them). Further, feedback left on an individual's wall can enhance a positive experience by publicly validating the event [44].

Taken together, especially to the extent that people pursue different goals in different Facebook channels, these studies suggest that characteristics of Facebook channels may affect not just how people share emotions but the outcomes they experience after doing so. In particular, we look at how both the characteristics of shared content and the replies people receive interplay with Facebook channels to affect the overall satisfaction people experience from sharing emotions.

Effects of Emotional Valence, Intensity, and Personal Relevance on Overall Satisfaction in Private vs. Network-Visible Channels

Offline research shows that people share more intense emotions more widely. According to Rimé and colleagues, people experience a greater need to regulate intense emotions, leading to sharing them with more people and more frequently [41, 42, 43]. Network-visible Facebook channels offer an easy way to share with many people

compared to private channels, reducing the costs of communicating and the need for repeated interactions [45, 48]. Thus, people may feel more satisfied after sharing personally relevant and intense emotions in network-visible channels compared to a single receiver in Facebook private messaging. Furthermore, people generally feel happier after sharing positive versus negative emotions [14]. Therefore, we predict that positivity and interactions between intensity and personal relevance with Facebook communication channel affect overall satisfaction:

H3: People experience greater overall satisfaction after sharing more positive emotions on Facebook.

H4a: The effect of intensity is moderated by Facebook channel such that people feel more satisfied after expressing more intense emotions in network-visible than in private channels.

H4b: The effect of personal relevance is moderated by Facebook channel such that people feel more satisfied after expressing more personally relevant emotions in network-visible than in private channels.

Effects of Replies on Overall Satisfaction in Network-Visible Facebook Channels

While people can experience benefits from the mere act of sharing emotions socially, listeners' replies to emotional posts (i.e., likes and comments) may play an important role in overall satisfaction. One of the main functions of audience in emotional regulation is to signal that listeners share in a discloser's emotional experience [49]. For a positive emotional episode, listeners help maintain *capitalization*, in which sharing a positive emotional event with others enhances positive affect beyond the satisfaction received from the event itself [32]. For a negative episode, replies serve as a signal that the discloser is not alone [49]. By providing social support, attention, and empathy [42], listeners' replies can also buffer the negative feelings reactivated when sharing a negative experience. The role of replies may be especially important in network-visible channels where people seek social attention and validation [7] and replies can signal attention, co-presence, and partaking in the shared emotional experience [45].

H5: People experience greater overall satisfaction after receiving a) more likes and b) more replies to their Facebook status updates and posts on others' timelines.

However, not all replies are equal. Comments can be perceived as awkward, face-threatening, or challenging to one's desired self-presentation [34], while one reply from a trusted friend may be worth ten from distant acquaintances. Likes, on the other hand, generally carry a positive connotation and are often displayed as an aggregate number in the interface, making them less subject to issues of tone and tie strength. Thus, we predict that overall satisfaction is affected by the quality of replies (reply satisfaction and reply usefulness).

H6: People's overall satisfaction after sharing emotions in status updates and on others' timelines depends on both reply satisfaction and reply usefulness.

METHODS

Participants

Undergraduate and graduate students (*N*=141) from a northeastern United States university were compensated with either a $5 Amazon.com gift certificate or extra credit in communication, psychology, human development, or business courses. The data for this study were collected during May to December of 2013 as part of a larger study, which excluded a small proportion of the population with a history of mental illness (e.g., depression, psychological distress, and self-injury behaviors). The sample was 64.5% female (*N*=91) and 35.5% (*N*=50) male, ranging in age from 18 to 45 (*M*=21.16, *SD*=3.95). On average, participants had a Facebook account for close to six years (*SD*=1.57), spending over 80 minutes (*SD*=88) a day and having over 800 friends (*SD*=448) on Facebook.

Procedure

Our strategy was to ask participants retrospective questions about recent Facebook content in which they shared emotion. To do this, we created a Facebook application that collected relevant data. After giving consent, participants were asked to log on to their Facebook account and to explicitly give the application permission to access their Facebook communication data. The application then accessed the participant's own status updates, posts they wrote on others' timelines, and private messages they sent to another person (both in chat and asynchronously) within the past 60 days. Items less than three words long were eliminated to avoid messages such as "Happy Birthday". To increase the chance of selecting content that included expressed emotions, items were also filtered based on whether they contained any affect words from the LIWC 2007 dictionary (Linguistic Inquiry and Word Count [38]), which has been used in prior Facebook research (e.g., [8, 30]) to determine the presence of emotional content. This procedure did not guarantee all items retained had emotional content and might have excluded some items expressing emotions that failed to contain affect words, but it was a reasonable way to target posts of interest.

From this group of recent status updates, posts on others' timelines, and private messages that contained at least one affect word and were at least three words long, the most recent six items from each channel were displayed. For network-visible items (i.e., posts on others' timelines and status updates), comments and likes were displayed along with the original post. Since some participants use certain channels of Facebook infrequently, the application sometimes showed fewer than six items per channel. The items were displayed in the same order for all the participants: own status updates first, posts they wrote on others' timelines next, and private messages last. For each item, the application presented a set of questions described in the message-level variables below. Overall, we collected data for 754 private messages, 560 posts on others' timelines, and 314 status updates (total *N*=1628).

Message-Level Variables

Participants answered questions pertaining to the intensity and personal relevance of expressed emotions using 7-point scales (e.g., 1="Completely non-intimate", 7="Completely intimate"). Intensity[1] was operationalized by the extent of depth or intimacy of expressed emotions. The scale contained three bipolar items adapted from a prior study [5]: non-intimate/intimate, impersonal/personal, and public/private, *α*=.70. Personal relevance included three original items: not personally significant to me/personally significant to me, not important to me/important to me, not central to my core self/central to my core self, *α*=.88. For emotional valence, participants rated each message on a 7-point bipolar scale, with anchors of 1="Very Negative" and 7="Very Positive".

Overall satisfaction was operationalized with two original questions: "After sharing this message, to what extent do you feel satisfied with the outcome?" and "To what extent do you think your goal for this message has been achieved?", *α*=.84. For posts in network-visible channels (i.e., status updates and posts on others' timelines), participants were also asked about their reply satisfaction: "To what extent did you like the responses (comments and likes) to your post?" and "To what extent were you satisfied with the responses to your post?", *α*=.94. They also answered questions about reply usefulness: "To what extent did you find the responses to your post useful?" and "To what extent did you find the responses to your post valuable?", *α*=.92. These questions were all measured on a 5-point scale, with 1="Not at all" and 5="Very much."

To control for frequency, we used post timestamps to calculate the time span in hours of all retained posts within a channel (*M*=383.26, *SD*=361.36) for each participant and the time in hours since the previous message was posted within a channel (*M*=78.85, *SD*=154.29). The values for time variables were divided by a constant to make their variances comparable to other variables to reduce difficulties in achieving model convergence when large differences in variance exist across variables [27].

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[1] Note that emotional intensity can be measured in different ways, from intensity of impact the event had on individuals and their level of control of an emotional situation (e.g., [43]) to emotional valence (e.g., [14]). To avoid overlap with our measures of emotional valence and personal relevance, we chose to operationalize intensity by the extent of depth or intimacy of expressed emotions, similar to measurements of self-disclosure intensity (e.g., [20]).

Variable	1	2	3	4	5	6	*M*	*SD*
1) Emotional Intensity	-						4.06	1.56
2) Personal Relevance	.49**	-					4.19	1.45
3) Emotional Valence	-.008	.23**	-				5.52	1.55
4) Reply Satisfaction	.09**	.22**	.17**	-			3.44	1.09
5) Reply Usefulness	.21**	.29**	.04	.44**	-		2.45	1.15
6) Overall Satisfaction	.06*	.17**	.39**	.59**	.28**	-	3.92	.95

p<.05. ** *p*<.01.

Table 1. Pearson Correlation of Message-Level Variables.

For posts on others' timelines and status updates, information about the number of likes (*M*=4.26, *SD*=8.99) and comments (*M*=1.03, *SD*=2.37) were recorded. For private messages, the conversation thread for each message was recorded. 73.3% of private messages had other messages from the same thread, and participants had private messages from 1 to 6 different threads (*M*=2.92, *SD*=1.05).

RESULTS
Since there were multiple messages for each participant, the analyses were conducted with multi-level modeling to control for potential non-independence of residuals due to repeated observations clustered within each participant. Message-level characteristics were modeled as first-level factors, while participants' characteristics (age, gender, ethnicity) and Facebook use (number of friends, time spent on Facebook per day, number of years having an account) were modeled as second-level factors. We controlled for time effects using the per-channel time span and time since previous post measures described earlier. All of the above variables were included in each model; only those that had a significant effect are reported in the analyses. Independent variables were grand mean-centered. Table 1 reports correlations, means, and standard deviations for the message-level variables across all replies and channels.

Characteristics of Expressed Emotions
First, we ran Model 1 to examine differences in emotional intensity between network-visible and private channels. Based on the null model with no predictors, the intraclass correlation (ICC) was equal to .36, suggesting that 36% of the total variance in emotional intensity of messages was attributed to between-participant differences in how intense their sharing of emotions was on average. Consistent with H1a, there was an overall effect of Facebook channel, $F(2, 230)=73.02$, $p<.001$, effect size $\eta=.46$. Specifically, emotions expressed in private messages were more intense than those expressed in posts on others' timelines, $p<.001$, or status updates, $p<.001$. The difference in intensity

		Status Updates	*Posts on Others' Walls*	*Private Messages*
Intensity *(Model 1)*	*M*	3.17[a]	3.48[b]	4.73[c]
	SE	(.21)	(.21)	(.20)
Valence *(Model 2)*	*M*	5.44[a]	6.03[b]	4.89[c]
	SE	(.19)	(.19)	(.18)
Personal Relevance *(Model 3)*	*M*	4.30[a]	3.94[b]	4.16[ab]
	SE	(.21)	(.21)	(.20)

Note: Different superscripts indicate significant differences between mean values within rows.

Table 2. LS Means and SE for Emotional Intensity, Valence, and Personal Relevance for Each Facebook Channel.

between status updates and posts on others' timelines was also significant, $p=.03$ (Table 2).

Model 2 examined differences in emotional valence between the channels, with ICC equal to .16. Similar to H1a, we found a significant difference between channels, $F(2, 243)=50.63$, $p<.001$, effect size $\eta=.27$. Although expressed emotions were overall positive (*Median*=6), private messages expressed fewer positive emotions compared to posts on others' timelines, $p<.001$, or status updates, $p<.001$, consistent with H1b. The difference between posts on others' timelines and status updates was also significant, $p<.001$.

Model 3 tested differences in personal relevance of expressed emotions across the Facebook channels (H2), with ICC equal to .32. The effect of channel was significant, $F(2, 225)=3.46$, $p=.03$, effect size $\eta=.02$, with people sharing more personally relevant emotions in status updates than on posts on others' timelines, $p=.01$. There were no significant differences in personal relevance between the other channels, $p>.05$ (see Table 2). Age also had a significant effect, $F(1, 115)=4.77$, $p=.03$, with older people sharing more personally relevant emotions, $\beta=.05$, *SE*=.02.

The above analyses show that, consistent with H1a and H1b, emotions expressed in private messages are generally more intense and less positive than those expressed in network-visible posts. However, although people share more personally relevant emotions in status updates than in posts on others' timelines, there is no difference in personal relevance of shared emotions between status updates and private messages, so H2 was only partially supported.

Characteristics of Emotions and Overall Satisfaction
To test hypotheses about the effect of characteristics of emotional expression on overall satisfaction (H3, H4a, H4b), we ran a model with the following predictors: Facebook communication channel, characteristics of emotional expression (emotional intensity, personal

Predictor	DF	F	p
Facebook channel	(2, 245)	1.57	.21
Emotional intensity	(1, 1417)	.82	.37
Valence	(1, 1452)	86.04	<.01
Personal Relevance	(1, 1460)	21.72	<.01
FB channel*Personal Relevance	(2, 1255)	4.57	.01
Gender	(1, 126)	4.08	.05

Table 3. Predictors of Overall Satisfaction for Emotions Shared on Facebook (Model 4).

relevance, and valence), and controls for time effects and individual-level characteristics (gender, ethnicity, age, Facebook network size, time spent on Facebook per day, number of years having a Facebook account). Since H4a and H4b predicted interaction effects between message characteristics and Facebook channel, all two-term interactions between message characteristics and communication channel were also included.

After eliminating non-significant interactions and individual-level controls, Model 4 retained Facebook channel, gender, message characteristics (emotional intensity, valence, personal relevance), interaction between personal relevance and Facebook channel, and gender (Table 3). The ICC for this model was .30. Including fixed predictors reduced residual variance by 9% of the variance remaining after partialing out between-individual differences in how satisfied people felt.

As predicted by H3, people experience more overall satisfaction after sharing more positive messages, β=.14, SE=.01. Emotional intensity did not have a significant effect on overall satisfaction, β=.02, SE=.02, p=.37, nor did the interaction between intensity and Facebook channel, p>.05. Thus, H4a was not supported.

As predicted by H4b, the effect of personal relevance was moderated by Facebook channel, indicating that people felt more satisfied after sharing more personally relevant content in network-visible status updates, β=.15, SE=.03, p<.001 and posts on others' timelines, β=.08, SE=.03, p<.01, but not in private messages, β=.04, SE=.03, p=.17.

Finally, gender also had a significant effect on overall satisfaction, with females (M=4.00, SE=.06) being more satisfied than males (M=3.80, SE=.08) after sharing emotions on Facebook (see Table 3).

Overall Satisfaction and Replies in Network-Visible Communication

Our final two hypotheses examined the role of reply quantity (number of comments and likes) and quality (reply satisfaction and reply usefulness) in predicting overall satisfaction after sharing emotions on Facebook (H5, H6). To test H5 about the effect of the number of comments and

Predictors	Model 5 β (SE)	Model 6 β (SE)
Facebook channel	-.35*** (.09)	-.33***
Emotional intensity	.04	.01
Valence	.14***	.11***
Personal Relevance	.08**	.03
Comments	.05***	.02[†]
Likes	.02***	.01**
Reply Satisfaction	-	.35***
Reply Usefulness	-	.05[†]
Gender	-.21[†]	-.18[†]
Deviance	.40	.33

[†] p<.10. * p<.05. ** p<.01. ***p<.001.

Table 4. Effects of Replies on Overall Satisfaction in Network-Visible Facebook Channels (Status Updates and Posts on Others' Walls).

number of likes, we first ran a model that included the number of likes and comments received for status updates and posts on others' timelines,[2] characteristics of emotional messages, and individual-level and time controls. After eliminating non-significant individual-level and time controls, Model 5 retained Facebook channel, message characteristics, number of comments, number of likes, and gender (Table 4). The ICC was .27 based on the null model with no fixed predictors.

As seen from Table 4, the results of Model 5 suggest that overall satisfaction is linked to both the number of comments and the number of likes received for emotional content, as well as personal relevance and valence of this content. To untangle the effect of the number of replies from their quality (reply satisfaction and reply usefulness) and to test H6, we next ran Model 6, which added sharers' reply satisfaction and reply usefulness to the predictors in Model 5. Valence was still positively associated with overall satisfaction, suggesting that people felt more satisfied after sharing more positive emotions regardless of the replies they received and their reply satisfaction.

However, when controlling for reply quality as measured by reply satisfaction and reply usefulness, the number of comments and the effect of personal relevance were no longer significant on overall satisfaction. Reply satisfaction and number of likes were important to overall satisfaction;

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[2] Here we focus on network-visible communication to untangle the effect of quantity of responses (since more than one response or like can be received for a network-visible comment) from their perceived quality; comments and likes are not meaningful for private messages.

reply usefulness was not. Finally, people felt generally more satisfied after sharing emotions in posts on other people's walls (M=4.10, SE=.05) than in status updates (M=3.77, SE=.06). The inclusion of the fixed predictors in Model 6 reduced the residual variance by 31% of the variance compared to the null model with no fixed predictors and by 17.5% compared to deviance in Model 5.

One explanation for the number of comments and personal relevance becoming non-significant after controlling for reply quality is that they have an indirect effect on overall satisfaction through the mediator of reply satisfaction. Full mediation is established when four conditions are met [3]: A predicts B, A predicts C, C predicts B, and A's predicting B disappears when C is included. Here, personal relevance and number of comments are A, overall satisfaction is B, and reply satisfaction is C, and Models 4 and 6 have already shown that the conditions are met except for A predicts C. An additional analysis shows that both personal relevance, $ß$=.13, SE=.03, p<.001, and number of comments, $ß$=.08, SE=.01, p<.001, do predict reply satisfaction, showing that they are important for overall satisfaction insofar as they increase reply satisfaction.

DISCUSSION
This study presents an analysis of how people share emotions via Facebook and how the emotional content of communication and listeners' replies are associated with sharers' overall satisfaction. The results show that people share more intense and less positive emotional content in private than in network-visible communication, while non-directed status updates display more personally relevant emotions than directed posts on others' timelines. The emotional content, in turn, is associated with the level of overall satisfaction people experience after sharing it with others: they feel more satisfied after sharing positive content in all channels, as well as after sharing personally relevant content in network-visible status updates and posts on others' timelines. Listeners' replies to network-visible emotional content are very important, with people feeling more satisfied overall when they receive more likes and gratifying comments (i.e., reply satisfaction), while number of comments influences overall satisfaction indirectly by enhancing reply satisfaction. Below we discuss theoretical contributions of these findings and their implications for understanding sharing of emotions in social media, as well as for designing systems that support social sharing of emotions.

Theoretical Contributions and Implications
Our results help understand why people share emotions on Facebook. Prior research has suggested that people who use the Internet and especially Facebook receive more social and emotional support from others [22], but have not detailed the mechanisms through which this phenomenon occurs. Our findings suggest that one such mechanism is

that expressing emotions and receiving feedback may serve emotional regulation needs of Facebook users.

Social Media Affordances and Emotional Content
The results about how people share different emotional content in different Facebook channels contributes to the understanding of how people adapt their communication behaviors, including emotional expressions, to media affordances and potential audiences [8]. Consistent with other research (e.g., [7, 10, 31]), our findings show that people express less intense and more positive information in network-visible than private channels. This could be due to higher self-presentational concerns in public exchanges [24], norms for positivity and less intimate information in Facebook public communication [5, 35], or less control over the spread of information [10] when sharing with broad audiences.

People may compensate for the lack of audience control in public Facebook channels by exercising tighter message control, i.e., sharing less intimate and less private information in status updates and on others' timelines compared to Facebook private messages. It is not clear, however, to what extent this process is driven by conscious attempts to shape emotional expression or by a more situated, spontaneous process where social media affordances and the audience representations embedded within them elicit different types of emotional expressions. Future studies that focus on the mechanisms that cause these differences between channels would help clarify the theoretical picture and might give guidance into designing affordances that improve choices and outcomes around social sharing of emotions.

Furthermore, these studies would need to take into account differences between users, including age, gender, and personality factors, as these factors might influence both experiences with social media and people's expectations and outcomes around sharing emotions online. For example, although not the focus of the current study, we found that older people shared more personally relevant information, which is consistent with other research showing that as people get older, they also seek more meaningful social connections on Facebook [6] as part of their adaptive response to changing social motivations [13].

Emotional Content and Overall Satisfaction
People derive intrinsic value from sharing personal information and emotions with others [41, 42, 43, 46], but different types of emotional content are associated with different levels of satisfaction. As our findings show, people derive more value from sharing positive emotional content regardless of communication channel, number of likes or replies they receive, or the quality of responses. This is consistent with the phenomenon of capitalization, in which sharing positive emotions serves to re-experience and enhance positive affect for the sharer. Since emotions that people share on Facebook are predominantly positive,

capitalization may explain the self-affirmation value of Facebook communication [47] and the fact that posting on Facebook is associated with a higher level of well-being independent of listeners' feedback [19].

We also found that the personal relevance of emotions is associated with increased satisfaction in network-visible Facebook communication. This is an interesting finding given that communication in network-visible Facebook posts is mostly described as being mundane in nature [14], but is consistent with offline studies of social sharing of emotions showing that people have a greater need to share more personally important and salient emotional events with others [41, 42]. However, personal relevance was only associated with satisfaction in network-visible Facebook channels, not in private messages. This may be because people derive meaning and social value from the private context of communication itself [5, 8]. Meanwhile, in network-visible channels, the influence of personal relevance on overall satisfaction works by increasing sharers' reply satisfaction, that is, sharers find responses to personally relevant content more gratifying.

The Importance of Replies for Overall Satisfaction
Finally, our study contributes to understanding the role of feedback in how people derive satisfaction from sharing emotions in network-visible Facebook communication. We investigate whether others' replies matter or whether people derive satisfaction from the act of sharing emotions itself, regardless of the feedback they receive. In other words, what is the role of "social" in social sharing on Facebook?

Our results indicate that replies do matter both in terms of quantity (number of likes) and quality (reply satisfaction): satisfying replies are more important for overall satisfaction than their number or their perceived usefulness, although the number of replies also increases posters' reply satisfaction. This might be because one of the salient goals for sharing in network-visible Facebook communication is obtaining validation and approval from others [7]; gratifying comments appear to provide such validation to posters' emotional experiences. Even more than useful responses, they may be particularly instrumental for satisfying sharers' socio-affective needs, which, in turn, enhances their overall satisfaction. The number of likes was important even after controlling for reply satisfaction, suggesting that likes, often displayed as an aggregate number in the interface, also serve as a signal of validation and legitimization of a sharer's emotional experience.

This shows the importance of listeners' feedback to social sharing emotions. Most work on sharing personal information, including emotions, focuses on the production side—sharers' characteristics and motivations or properties of the disclosed content. However, both the main effects of reply satisfaction and our mediation analysis of the relationship between content, responses, and outcomes show that accounting for respondents is important for

understanding effects of sharing emotions in social media (which in turn will affect future decisions around social sharing of emotions [39]).

The value of responses may also help explain the mismatch between dyadic models of disclosure that predict restricted, intimate sharing of emotions to close ties and observed sharing behavior in SNSs with larger networks. Such broadcasting of personal information is often derided as over-sharing, but sharing emotional episodes with a larger audience likely increases the chances of receiving empathy, social validation, and support from others [42] while reducing costs.

Designing to Improve Social Sharing of Emotions
More generally, the high-level story of Models 5 and 6 is that responses are key drivers of how satisfied people are when sharing emotions. Thus, design features that improve the likelihood, quantity, and value of responses are one path to improving people's outcomes from sharing emotions with others.

Algorithms to Increase the Chance of Receiving Responses
The filtering algorithms services use when distributing activity to network members often have a "rich get richer" effect around attention. Content that receives initial positive responses is promoted both in public lists (as with upvotes in reddit) and by filtering algorithms, while content that doesn't receive early attention may languish. This would lead to worse outcomes from sharing emotions with others, especially to the extent that negatively valenced items receive fewer responses.

Although these filtering algorithms are subject to practical, financial, and ethical constraints, they could be made sensitive to content indicating emotional needs. Work around detecting emotion in social media (e.g., [11, 28, 29]) could be used to identify content that is likely to contain expressed emotions and that would benefit from a response. Then, information about tie strength and responsiveness of people in their networks could be used to route such content to the people who are likely to respond (c.f. intelligent task routing [15]).

Sharing Hints for Algorithms
People could help these algorithms out by suggesting the right audiences for sharing of particular kinds of emotional content. This idea is inspired by Twitter @-mentions, which route public messages to specific individuals, Google+ circles, which route messages to particular audiences, and the tagging of people in Facebook, which leads to notifications for the tagged recipients. Each has flaws for supporting social sharing of emotions: Twitter, although often author-centric, is more about activity than emotion; circles require predefined groups that are often not suited to the social nuances of sharing [1]; publicly directing emotional content at specific individuals through tags may impose awkward obligations to respond.

Instead of explicit instructions for distribution, as in the above channels, it might be useful to allow people to give "hints" to the algorithms. Facebook's mobile client has a new feature that renders privacy settings in the form of a "To:" field similar to that of an email client. A "Feed:" field that lets people specify names they would like to share a particular item with might help people flexibly and precisely target audiences that they believe will support their goals. This would in turn provide algorithms useful information about social relationships they could use for other purposes. Further, unlike @-mentions, circles, and tagging, these are just suggestions; the algorithm could ignore the request (if it deemed other things more important for those recipients), providing plausible deniability for those who do not respond [2].

Lightweight Interfaces for Providing Support
A final idea is to explore lightweight interfaces for providing support. It can be hard to respond to negatively valenced emotional expressions: people may find it awkward or uncomfortable to comment on it, or if it indicates specific needs such as mental health concerns, they may not have the knowledge needed to say something helpful. Meanwhile, it would be odd to "like" the news that someone was fired, became ill, or lost a loved one.

Interface elements that support lightweight emotional connection and support—such as the like button, but with different semantics—is worth exploring. In Kaye et al.'s Virtual Intimate Objects, people can click a button that lights up a partner's button to provide a feeling of connection [25]. The "Yo" app (http://www.justyo.co/), for all its apparent silliness in letting people only send the message "Yo" to each other, performs a similar function. It's unclear what the right abstractions are for lightweight responses to expressed emotions—Hearts? Hugs? I Empathize?—but it is a direction that might have real impact on both social sharing of emotions and its outcomes in SNSs.

Limitations
A key limitation of this study comes from the fact that we have a relatively narrow sample in terms of age and Facebook experience. We also have the standard "WEIRD" (Western, educated, industrialized, rich, and democratic) biases articulated in [23] and skew young because of our subject population. In our sample, older people shared more personally relevant content; factors such as age, experience with Facebook, or cultural background may be important in understanding sharing of emotions and responses to it and should be further studied.

Our study also focused on likes and comments as the measure of replies, meaning we were unable to say much about the effects of replies in private messages. Private messages are also often part of a longer-term exchange between people. Thus, we see the need for further studies with designs that target the role of response and sequence in sharing emotions in private channels.

Our design also collected self-ratings of both content characteristics and outcomes after the fact. We focused on recent posts to minimize the effects of time on people's ratings, but experience sampling-based designs that capture responses closer to the actual sharing of the emotional experience might give more ecologically valid results. Our analysis was also correlational, and though it is hard to picture ethical designs where we could control the responses people saw, this, too, should be kept in mind when interpreting the results.

CONCLUSION
This study adds to the growing body of literature on how people use social media to share and manage emotions in both network-visible and private communication channels. Variations in emotional valence, intensity, personal relevance, and outcomes by channel suggest that individuals selectively use SNS channels to support specific interpersonal emotion regulation goals. Further, the key role of replies and satisfaction with those replies warrants more attention to the role of recipients in understanding social sharing of emotions. Our findings substantiate the value of research on the role SNSs play in the context of larger individual emotion regulation strategies and how design elements of SNSs might better facilitate that role.

REFERENCES
1. Ackerman, M. S. The intellectual challenge of CSCW: the gap between social requirements and technical feasibility. *Human-Computer Interaction, 15,* 2–3 (2000), 179–203.

2. Aoki, P. M., and Woodruff, A. Making space for stories: Ambiguity in the design of personal communication systems. In *Proc. CHI 2005,* ACM Press (2005), 181–190.

3. Baron, R. M., and Kenny, D. A. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51* (1986), 1173-1182.

4. Barrett, L. F. Solving the emotion paradox: Categorization and the experience of emotion. *Personality and Social Psychology Review, 10,* 1 (2006), 20–46.

5. Bazarova, N. N. Public intimacy: Disclosure interpretation and social judgments on Facebook. *Journal of Communication, 62* (2012), 815–832.

6. Bazarova, N. N., Chang, P. F., Choi, Y. H., and Loeckenhoff, C. Online social networking across the life span: Extending socioemotional selectivity theory to social network sites. *Presented at 7th ICWSM.*

7. Bazarova, N. N. and Choi, Y. H. Self-disclosure in social media: Extending the functional approach to disclosure motivations and characteristics on social network sites. *Journal of Communication, 64* (2014), 635-657.

8. Bazarova, N. N., Taft, J. G., Choi, Y. H., and Cosley, D. Managing impressions and relationships on Facebook: Self-presentational and relational concerns revealed through an analysis of language style. *Journal of Language and Social Psychology, 32* (2013), 121–141.

9. Bollen, J., Mao, H., and Pepe, A. Modeling public mood and emotion: Twitter sentiment and socio-economic phenomena. In *Proc. 5th ICWSM* (2011), 450–452.

10. Brandimarte, L., Acquisti, A., and Loewenstein, G. Misplaced confidences privacy and the control paradox. *Social Psychological and Personality Science, 4* (2013), 340–347.

11. Brubaker, J. R., Kivran-Swaine, F., Taber, L., and Hayes, G. R. Grief-stricken in a crowd: The language of bereavement and distress in social media. In *Proc. 6th ICWSM* (2012). 42–49.

12. Burke, M., Marlow, C., and Lento, T. Social network activity and social well-being. In *Proc. CHI 2010,* ACM Press (2010), 1909–1912.

13. Carstensen, L. L. The influence of a sense of time on human development. *Science, 312* (2006)*,* 1913–1915.

14. Choi, M., and Toma, C. Social sharing through interpersonal media: Patterns and effects on emotional well-being. *Computers in Human Behavior, 36* (2014), 530-541.

15. Cosley, D., Frankowski, D., Terveen, L., and Riedl, J. SuggestBot: Using intelligent task routing to help people find work in Wikipedia. In *Proc. 12th IUI,* ACM Press (2007), 32–41.

16. Coviello, L., Sohn, Y., Kramer, A. D. I., Marlow, C., Franceschetti, M., Christakis, N. A., and Fowler, J. H. Detecting emotional contagion in massive social networks. *PLoS ONE 9,* 3 (2014).

17. De Choudhury, M., Counts, S., and Gamon, M. Not all moods are created equal! Exploring human emotional states in social media. In *Proc. 6th ICWSM,* (2012), 66–73.

18. De Choudhury, M., Gamon, M., Counts, S., and Horvitz, E. Predicting depression via social media. In *Proc. 7th ICWSM,* (2013), 128–137.

19. Deters, G. F., and Mehl, M. R. Does posting Facebook status updates increase or decrease loneliness? An online social networking experiment. *Social Psychological and Personality Science, 4* (2013)*,* 579–586.

20. Durcharme, J., Doyle, A. B., and Markiewicz, D. Attachment security with mother and father: Associations with adolescents' reports of interpersonal behavior with parents and peers. *Journal of Social and Personal Relationships, 19* (2002), 203–231.

21. Golder, S. A., and Macy, M. W. Diurnal and seasonal mood vary with work, sleep, and daylength across diverse cultures. *Science, 333* (2011), 1878–1881.

22. Hampton, K., Goulet, L. S., Rainie, L., and Purcell, K. Social networking sites and our lives. Report, Pew Internet & American Life Project (2011).

23. Henrich, J., Heine, S. J., and Norenzayan, A. The weirdest people in the world? *Behavioral and Brain Sciences*, *33,* 2–3 (2010), 61–83.

24. Goffman, E. (1967). *On face-work: An analysis of ritual elements in social interaction.* Garden City, NY: Anchor Books.

25. Kaye, J. J., Levitt, M. K., Nevins, J., Golden, J., and Schmidt, V. Communicating intimacy one bit at a time. In *CHI Extended Abstracts 2005,* ACM Press (2005), 1529–1532.

26. Kivran-Swaine, F., and Naaman, M. Network properties and social sharing of emotions in social awareness streams. In *Proc. CSCW 2011*, ACM Press (2011), 379–382.

27. Kline, R. B. (2010). Principles and practices of structural equation modeling (3rd ed.).

28. Kouloumpis, E., Wilson, T., and Moore, J. Twitter sentiment analysis: The good the bad and the OMG! In *Proc. 5th ICWSM,* (2011), 538–541.

29. Kramer, A. D. I. An unobtrusive behavioral model of "gross national happiness." In *Proc. CHI 2010,* ACM Press (2010), 287–290.

30. Kramer, A. D. I. The spread of emotion via facebook. In *Proc. CHI 2012,* ACM Press (2014).

31. Kramer, A. D. I., and Chung, K. Dimensions of self-expression in Facebook status updates. In *Proc. 5th ICWSM,* (2011), 169–176.

32. Langston, C. A. Capitalizing on and coping with daily-life events: Expressive responses to positive events. *Journal of Personality and Social Psychology, 67* (1994), 1112–1125.

33. Lin, H., and Qiu, L. Sharing emotions on Facebook: Network size, density, and individual motivation. *Ext.*

Work-in-Progress CHI 2012, ACM Press (2012). 2573–2578.

34. Litt, E., Spottswood, E., Birnholitz, J., Hancock, J., Smith, M. E., and Reynolds, L. Awkward encounters of an "other" kind: Collective self-presentation and face threat on Facebook. In *Proc. CSCW 2014,* ACM Press (2014), 449–460.

35. McLaughlin, C., and Vitak, J. Norm evolution and violation on Facebook. *New Media & Society 14,* 2 (2012), 299–315.

36. Naaman, M., Boase, J., and Lai C. Is it really about me? Message content in social awareness streams. *In Proc. CSCW 2010*, ACM Press (2010), 189–192.

37. Park, K., Lee, S., Kim, E., Park, M., Park, J., and Cha, M. Mood and weather: Feeling the heat? In *Proc. 7th ICWSM,* (2013), 709–712.

38. Pennebaker, J. W., Booth, R. J., and Francis, M. E. (2007). Linguistic Inquiry and Word Count (LIWC 2007). Austin, TX: http://www.liwc.net.

39. Petronio, S. (2002). Boundaries of privacy: Dialectics of disclosure. New York, NY: State University of New York Press.

40. Radovanovic, D., and Ragnedda, M. Small talk in the digital age: Making sense of phatic posts. *In Proc. 2nd #MSM Workshop*, (2012), 10–13.

41. Rimé, B. Interpersonal emotion regulation. *Handbook of Emotion Regulation,* (2007), 466–485.

42. Rimé, B. Emotion elicits the social sharing of emotion: Theory and empirical review. *Emotion Review, 1* (2009), 60–85.

43. Rimé, B., Mesquita, B., Philippot, P., and Boca, S. Beyond the emotional event: Six studies on the social sharing of emotion. *Cognition and Emotion, 5* (1991), 435–466.

44. Sas, C., Dix, A., Hart, J., and Su, R. Dramaturgical capitalization of positive emotions: The answer for Facebook success? In *Proc. 23rd BCS-HCI* (2009), 120–129.

45. Sosik, V. S., and Bazarova, N. N. Relational maintenance on social network sites: How Facebook communication predicts relational escalation. *Computers in Human Behavior, 35* (2014), 124–131.

46. Tamir, D. I., and Mitchell, J. P. Disclosing information about the self is intrinsically rewarding. *Proceedings of the National Academy of Sciences*, *109*, 21 (2012), 8038–8043.

47. Toma, C. L., and Hancock, J. T. (2013). Self-affirmation underlies Facebook use. *Personality and Social Psychology Bulletin, 39,* 321–331.

48. Tong, S. T., and Walther, J. B. Relational maintenance and computer-mediated communication. In K. B. Wright & L. M. Webb (Eds), *Computer-mediated communication in personal relationships* (pp. 98–118). New York: Peter Lang Publishing (2011).

49. Zaki, J., and Williams, W. C. Interpersonal emotion regulation, *Emotion, 13* (2013), 803–810.

50. Zech, E., Rimé, B., and Nils, F. Social sharing of emotion, emotional recovery, and interpersonal aspects. *The Regulation of Emotion* (2004), 157–185.