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The process and outcomes of sharing emotions online

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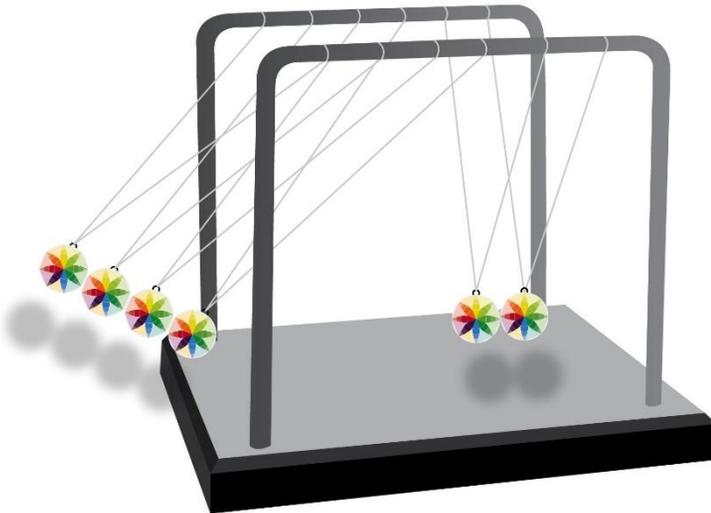
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Chapter 4

Do I feel better now?

Investigating the intra and interpersonal
regulation of sadness through Facebook



Abstract

Despite the potential of social network sites (SNSs) for emotional expression, experimental evidence of emotion regulation is lacking. Drawing on emotion regulation (Gross, 2007) and social sharing (Rimé, 2009) theories, this study investigated the emotional effect of posting Facebook status updates to share sadness. In two experiments, participants wrote a Facebook status update about a controlled sadness situation. Changes in participants' emotional intensity were analyzed before and after sharing, and before and after feedback. Further, the effect of two types of beneficial feedback types (affective, cognitive), from two relationally distant sources (acquaintances, close friends) was gauged. Results showed that sadness intensity decreased consecutively after sharing and after feedback. Cognitive feedback elicited higher reappraisal, or changed people's perspective of the sad situation, while users felt more emotionally stable after feedback from close friends. Results shed light on the factors that could potentially aid to downregulate sadness after sharing online.

The question of how sharing emotions through social network sites (SNSs) emotionally affects users has recently raised much scholarly interest. So far, studies have found short term, positive emotional effects of using SNS after a few minutes, up to half an hour later (Bayer et al., 2017), while other work has found that after online sharing, both positive and negative emotions were felt stronger or intensified up to three weeks later (Choi & Toma, 2014). In face-to-face (FtF) communication, socially sharing emotions can potentially alleviate people's negative emotions (Rimé, 2009). However, it still remains unclear what online sharing would do to users' negative emotions. Could sharing in SNSs possibly lead to feeling 'less bad'? If so, which elements could play a role in this process? Since it has been established that SNSs activity leads to immediate emotional effects (Bayer et al, 2017), there is a need to investigate possible beneficial outcomes of sharing negative emotions, while specifying the emotional mechanisms which may explain these effects. In other words, could sharing, by itself, be a cause of emotional effects, and could feedback, by itself, be a separate cause for these effects?

The present study aims to address these questions by investigating the effects of sharing, on the one hand, and feedback, on the other, adopting the lens of the established emotion regulation framework (Gross, 2007). This framework explains the mechanisms of how people can manage or regulate emotions to their benefit, which can be an essential tool for leading a successful life (Gross, 2007). On the sharing front, we ask how sharing, in itself, could propitiate emotion regulation. For this, we test the evidence that the mere fact of disclosing emotions may diminish their intensity (Pennebaker, 1997). On the feedback front, we examine the effect of beneficial feedback and of relational closeness to the feedback provider, two factors which have been found to affect emotional responses (Ramsey & Gentzler, 2015; Seo et al., 2016). Theoretically, this study conceives online social sharing as a process consisting of three basic phases: 1) initiation, in which the initiator shares an emotional story with others, 2) feedback, in which others respond to the shared emotion, and 3) response, in which the initiator reacts to feedback (Rodriguez-Hidalgo, Tan & Verlegh, 2015). We argue that this reaction can occur cognitively, emotionally, attitudinally and/or behaviourally. In the present paper, we capture this three-phased process in a step-to-step model of online sharing and regulation, which empirically tests how replies could help to alleviate sadness. This is a societally relevant endeavour, since although sadness is shared on Facebook (Moreno et al, 2011), the high negativity which may be communicated through sad updates may not usually trigger supportive answers from others (Forest & Wood, 2012). In spite of this, we focus on Facebook due to its worldwide popularity and because numerous

users disclose their emotions daily in this platform, even negative ones (Manago, Taylor, & Greenfield, 2012).

As to methodology, this work presents the results of two experimental vignette studies, which have three main methodological advantages. First, it allows observation of the emotional mechanisms at play while minimizing distractors, such as possibly effects of noises or the physical interference of others. Second, it avoids possible ethical issues of requesting participants to share real sadness experiences online. Third and importantly, vignettes allow to standardize the situation which elicits sadness, which is relevant, because different event types may elicit negative emotions of differing intensity (Ortony, Clore & Collins, 1990). In our design, respondents' base sadness is measured right after reading the vignette, that is right before sharing, then after sharing, and then after feedback, which presumably allows us to take a glimpse on the effect of sharing, and the effect of feedback. In so doing, we contribute with empirical evidence to recent theoretical approaches, which posit that social media may lead to both intra and interpersonal effects (Valkenburg, 2017). Intrapersonal effects occur from individuals themselves, apart from the social interactions (i.e. posting a certain photograph in social media may make a person feel 'beautiful,' regardless of replies), while interpersonal effects occur as a result of interactions (i.e. feeling beautiful after receiving many compliments on being beautiful online).

A second main contribution of this work is its focus on how and whether online replies could elicit reappraisal, a beneficial emotion regulation strategy. Reappraisal, or changing one's perspective of the situation, has been found to effectively reduce the intensity of felt emotions, while its counterpart, emotional suppression, has been found to lead to cognitive and social impairments (Gross, 2007). Apart from advancing knowledge of emotion regulation processes online, the present study contributes mainly by: (a) adopting an emotion regulation perspective to understand the emotional effects of SNSs; (b) providing experimental evidence which can be used to complement other research based on more naturalistic settings, (c) helping to determine the conditions of beneficial feedback, which could potentially benefit users in managing their negative affective states, and naturally aid feedback providers to post more emotionally effective replies.

Theoretical framework

Social sharing, regulation and intensity

Emotions are complex and synchronized multicomponent responses to threats or opportunities, which vary widely depending on individuals' situation and appraisal of events,

e.g. being physically assaulted, or passing an exam (Scherer, 2005). Social sharing of emotions is one common strategy to regulate or manage emotions. People share or narrate their feelings and emotional experiences to others in an effort to manage these states (Rimé, 2007). Emotion regulation is a process which may occur both intrapersonally (i.e., regardless of whether a social interaction has taken place), or interpersonally, by means of interacting with others and receiving beneficial feedback (Zaki & Williams, 2013).

Social sharing is closely linked with emotion intensity, as the higher emotion intensity one feels, the greater the need to socially share the emotional episode (Rimé, 2009). We understand emotion intensity as the strength of the subjective feeling, one major component of an emotional response and key to assess whether emotion regulation has occurred (Diener, Larsen, Levine & Emmons, 1985). Therefore, it is important to determine whether sharing would contribute to emotion regulation, in the sense that it would diminish individuals' emotional intensity, and consequently, alter both the intensity and duration of emotional responses. However, we first need to look more deeply at how social media affordances may affect the emotional consequences of sharing.

Sharing of emotions in social media

Recent theoretical approaches have posited that social media brings about intrapersonal and interpersonal effects, and that its affordances are especially suitable for the intensification of intrapersonal effects (Valkenburg, 2017). For instance, the expectation of replies after posting a photo which could be seen by many contacts may alter people's feelings. Building on this approach, we posit that two main characteristics of online communication would favor this intensification. The first characteristic is the asynchronous character of online communication (Walther, 1996), which allows users to craft, edit and re-edit messages before publishing. The greater time that users have for self-disclosing may well affect the expression of SSE compared to offline settings, since it allows for greater self-reflection and provides opportunity for a careful display of the emotional episode. Following on this, for the question of how sharing affects affect intensity, we may posit two distinct mechanisms. The first, and alike to what occurs in offline environments, we may argue that the action of sharing reactivates the original feeling, due to the recreation of existing memory schemas to remember what happened and the feelings elicited, which would intensify affect after sharing (Rimé, 2009). However, and at the same time, the longer period of time which passes after affective memory elicitation, writing, and the publishing of the update, may bring affect intensity down, in a mechanism similar to expressive writing (Pennebaker, 1997). Expressive writing is a technique by which people write as long as they can about their feelings, on

consecutive days, which has been found to improve well-being, and to diminish depressive symptoms. Following this paradigm, and due to the greater time for typing, we may posit that affect intensity would diminish.

The second relevant characteristic is the imagined audience factor. Before publishing a Facebook update, individuals already have an audience in mind (Litt & Hargittai, 2012), which may bring an expectation that others would listen and reply. This audience is ‘collapsed’ in social media (Marwick & boyd, 2011), or composed by various friend connections from dissimilar social circles, such as neighbors, coworkers, family members, close and distant friends. Therefore, it is plausible that engaging in online SSE on Facebook may already bring a sense of connection to users which may reduce negative affect intensity. In line with this, studies have found that posting status updates on Facebook reduces feelings of loneliness, because of greater perceptions of social connection with their friends (Deters & Mehl, 2013). Similarly, neurobiological studies have found that emotion regulation areas in the brain become less active in the presence of others, because others’ presence elicits comfort and relief (Coan & Sbarra, 2015). Together, these frameworks would favor a diminishing effect on emotional intensity when sharing on Facebook, due to increased feelings of social connection, regardless of feedback. However, before we propose hypotheses we review prior findings about Facebook and emotion.

Sharing on Facebook and emotion intensity

A number of studies have investigated the immediate emotional outcomes from SNSs activity using cross-sectional and longitudinal approaches. For instance, by means of a longitudinal media diary study involving 311 undergraduates, Choi & Toma (2014) found that both positive and negative affect increased after sharing publicly on Facebook (i.e. status updates, wall posts). Further, in a cross-sectional study among 339 adult participants, Oh, Ozkaya, & LaRose (2014) found that positive affect was positively associated with the amount of supportive interactions, while this relationship was not found for negative affect. In contrast, using a naturalistic sampling technique, Bayer et al (2017) found an immediate positive effect of active Facebook use on mood 10 minutes after posting.

The above-mentioned studies favor the view that sharing brings emotional outcomes, particularly affect intensification in case of positive emotions. However, they are less conclusive about the effects of sharing negative emotions. Added to this, to our knowledge, these studies did not intend to measure the effect of sharing and feedback separately. Considering this lack of empirical evidence with regards to negative emotions, and the

divergent expectations from frameworks, since sharing could bring both affect intensification (Rimé, 2009), or relief from negative emotion (Pennebaker, 1997), we posit our first research question related to intrapersonal effects:

RQ.1: To what extent does affect intensity change from before and after posting a Facebook status update?

Further, because this study's intensity measurement is based on a three-phased basic cycle of online SSE (SSE initiation, feedback to SSE, and initiator's reaction, Rodríguez-Hidalgo et al, 2015), we posit a second research question:

RQ.2: To what extent does the three-phased process of online SSE influence affect intensity in the initiator?

Online social sharing and interpersonal effects

Interpersonal emotion regulation involves the provision of messages which are able to alter the emotions of the sharer or initiator (Zaki & Williams, 2013). In line with this, SSE theory posits that feedback is paramount to achieve regulation (Rimé, 2007). In SNSs, recent approaches posit that message-reception affects individuals interpersonally (Valkenburg, 2017). SSE theory considers two types of beneficial feedback to emotion sharing: affective and cognitive (Rimé, 2009). For negative emotions, affective feedback is emotionally supportive, empathetic and comforting, and serves a function of 'buffering' the negative emotion in the initiator (Rimé, Philippot, Boca and Mesquita, 1992). In turn, cognitive support helps the sharer re-evaluate the situation, to reframe it on a more positive light (Gross, 2007). Although they could occur intertwined in FtF exchanges, both types of feedback have been reliably distinguished from one another in experimental research (Pauw, Sauter, Van Kleef, & Fischer, 2018).

Importantly, on FtF communication, both types of feedback have been found to vary with regards to time effects: affective replies would bring a more immediate alleviation of negative emotions, because it initially absorbs the shock of the negative experience. In turn, cognitive feedback, though more effective, would diminish the negative intensity with greater delay (Rimé, 2009), because its strategy-oriented approach may seem cold and insensitive and therefore not accepted at first. Two experimental studies by Pauw and colleagues (2018) supported this view, finding that people strongly disliked receiving cognitive comments at first, right after sharing sadness. Regarding emotion intensity and based on the framework above, it could be posited that receiving supportive feedback would reduce negative affect intensity

(Rimé, 2009). Further, since it has been found that affective feedback is preferred at first (Pauw et al. 2018), we could assume that this may make it more effective to reduce negative affect intensity. We therefore posit:

H1: The intensity of sadness will decrease more strongly after affective feedback compared to cognitive.

Online feedback and emotion regulation strategies

To study the elicitation of regulation strategies, we focus on the most prevalent strategies on the literature: cognitive reappraisal and affective suppression (Gross, 2007). On the one hand, affective suppression refers to the repression or inhibition of the feeling and/or expression of this emotion, such as that these would be unnoticeable to an outside observer. On the other hand, reappraisal entails the reassessment of the situation to focus on its positive aspects, diminishing the negative outlook of the negative emotional experience.

Importantly, while suppression has been linked with memory loss and greater physiological arousal, reappraisal effectively repairs the cognitive impairments commonly associated with emotionally stressful stimuli (Gross, 2007). Since reappraisal entails the construal of new world views and expectations, in our view, cognitive feedback is better suited to bring about reappraisal, since cognitive feedback provides strategies and rationales which allow the other to reassess the experience on a positive way. We hypothesize:

H2a: Cognitive reappraisal will elicit cognitive feedback more strongly compared to affective feedback.

Regarding emotional suppression, since in our design emotion intensity already has been elicited, our focus is on how emotions become stabilized, instead of looking at the full expressive suppression or inhibition of the feeling. This because it seems more natural to propose that emotion would gradually descend in its intensity, particularly after sharing. We term this process emotion stabilization. Here, we refer to SSE's theory concept of 'emotion buffering' or diminishing of the feeling for the effects of affective feedback (Nils & Rimé, 2012). We therefore propose:

H2b: Affective feedback would bring about higher decrease of sadness intensity, as opposed to cognitive feedback.

Interpersonal online emotion regulation and the role of relational closeness

Relational closeness is the degree of psychological bonding to another person (Heider, 2013). Previous research has found that relational closeness to whom provides feedback can affect emotional outcomes in SNSs communication. For instance, by means of a three-wave longitudinal study among 1,910 participants, Burke & Kraut (2016) found that receiving targeted communication from strong ties on Facebook was related to improvements on psychological well-being. Similarly, drawing on a survey study among 816 adolescents in the Netherlands, Valkenburg, Peter & Schouten (2006) found users reported higher well-being when they communicated with close friends. These findings on the SNS domain are aligned to studies of FtF SSE, which found that people commonly engage in SSE with close others, as closer relationships are allegedly more acquainted with the sharer, providing more effective means of emotional support (Rimé, 2009).

Moreover, relational closeness elicits greater feeling intensity. Research shows that close friends generally elicit more emotionally intense responses than acquaintances (Ramsey & Gentzer, 2015). Further, empathy is stronger when seeing a close friend or kin experience social rejection, compared to when this person is relationally distant (Beeney, Franklin, Levy & Adams, 2011). In line with these findings, we argue that feedback from close friends in SNS may better aid regulation than distant acquaintances, because the initiator's perception of enhanced emotional intimacy with the provider may render the feedback more effective in persuading the sharer, particularly when it comes to reappraisal. We posit:

H3a: The intensity of sadness would decrease more strongly in case of feedback from close friends, compared to feedback from acquaintances;

H3b: Feedback from close friends would elicit feeling more emotionally stable compared to feedback from acquaintances.

Method

Two experimental studies were conducted to provide greater empirical backing to results. The set up and procedure of both experiments are identical, with the only difference that study 1 was conducted in a university lab, while in study 2 participants could access the experiment at home or some other location via Amazon Mechanical Turks. The experiment was programmed using the online platform Qualtrics. The setup of the experiments follows the basic stages of online SSE (initiation, feedback and initiators' reaction, Rodriguez-Hidalgo,

Tan & Verleghe, 2015). Given the fluctuating nature of emotions, we posit that measuring emotion intensity quickly and directly after the stimulus is a prudent approach, as ecological momentary assessments are more accurate for assessing emotions than retrospective accounts (Schimmack, 2003).

Study 1

Design. The experiment is a 3 (emotion intensity: T1, T2, T3 within subjects) x 2 (feedback: affective, cognitive, between subjects) x 2 (relational closeness: close friend, acquaintance, between subjects) factorial mixed design². Participants were randomly assigned to all conditions.

Participants. A sample of 173 first year psychology students from a large university in Chile (64.7% female, 89% 18-23 years, 9.3% 24-30 years, 1.6% 31-35 years), participated in exchange for study credits. All consented to participate through an online form, had used Facebook at least once, and had an active Facebook account. The study was completed by 191 participants in 25 minutes on average. The answers of 15 were discarded due to incorrectly choosing the type of audience, or for writing incoherent status updates. Three cases failed the attention checks.

Procedure. First, participants signed for consent. Then, they answered demographic and Facebook usage questions. Next, they read an emotional story which describes a sad situation (a good friend emigrating) and were asked to imagine experiencing that situation. Afterwards the first intensity measure was taken (time 1). To increase the ecological validity of the experiment, the status update instruction was visually aided by an empty Facebook status update frame. Then, participants wrote a status update about the vignette situation and were asked to imagine that they would post this to their Facebook profile. After posting, intensity was again measured (time 2) and right after one of the two feedback messages, corresponding to one of the two relational closeness and feedback conditions were presented ('imagine a friend (whom you know very well) has replied the following:'). Afterwards, intensity was measured (time 3). Participants were asked to type a reply to this feedback. Dependent variables were then measured in this order: emotion intensity, emotion stabilization, cognitive reappraisal. Afterwards, manipulation and attention checks were asked.

² Note that this full design is valid for measurements of dependents at T2 and T3 only (see procedure), because T1 to T2 only measured changes in emotional intensity due to sharing.

Materials

Emotion elicitation. A vignette described a sad situation depicting the core relational themes and common appraisals for sadness, such as a sense of inevitable loss (Smith & Lazarus, 1993). These appraisals were brought about by the long-term departure of a good old friend. The vignette text read: 'You are at the airport, to bid farewell to one of your dearest friends, a friend with whom you practically spend your entire childhood together. This friend will be away for a couple of years living in another country. While you hug each other goodbye, you cannot help but feel sad about how much you will miss having this very dear friend in your life.'

Online SSE phase. In their role of SSE initiators, participants wrote a Facebook status update based on their feelings about the vignette story (first phase, sharing). Feedback provision was emulated in the design (second phase, feedback). Afterwards participants read and replied to the feedback providers' comment (third phase, initiators reaction).

Instructions online SSE phases. First phase: "After departing from your friend, you log on Facebook to share the sad/happy news. Please write a status update about this situation, thinking that you are sharing it with your Facebook friends." All the writings of status updates were checked for the presence of emotion and emotional stories by the principal investigator. Second phase: "now please imagine that (a) a good friend of yours whom you know very well, (b) a friend you do not know very well, has replied to your Facebook status by commenting:" Third phase: "please write a short reaction to the comment that you received below. We kindly ask you to write your comment as normally as you would do in your real Facebook page, and regardless of whether you would respond to it in your real Facebook or not."

Manipulation and attention check. The manipulation check assessed participants' awareness of the relational closeness condition. "To whom did you just reply?" Categories were: a) to a good friend I know very well, or b) to a distant acquaintance that I do not know very well. Attention check. "Please select a number between x and y from the list below".

Covariates. Age. Respondents could choose from the following options: 'under 18,' '18-23,' '24 - 30,' '31-35,' 'older than 35.' Gender. Options were 'male' (1) and 'female' (2). Facebook use. Respondents were asked 'please tell us how often you use Facebook'. Answer categories were: 'a few times per month or week,' 'every other day,' 'between 5 to 15 minutes daily,' 'about 30 minutes every day,' 'between 30 minutes and one hour daily,' '1 or 2 hours per day,' 'more than 3 hours per day.'

Measures

Independent Variables

Feedback type. Feedback replies followed the characteristics of affective and cognitive feedback as outlined by Rimé (2009). Socio-affective feedback expressed empathy and affection: “Oh that sounds sad, I’m sending you a big hug.” Cognitive feedback attempted to provide a more optimistic outlook on the situation by focusing what the departure would mean to the close friend, while minimizing the sense of loss by proposing a temporary solution for not seeing the friend. It read: “Your friend took advantage of a good opportunity. Perhaps you could visit each other often.”

Relational closeness. This factor was introduced right before presenting the feedback type condition, e.g.: ‘now imagine that a good friend of yours (whom you know very well) has replied to your Facebook status’ (close friend condition). The acquaintance condition read: “Now please imagine that someone (a distant acquaintance who you don’t know very well) has replied to your Facebook status:”

Dependent Variables

Measures were inspired by the SSE and emotion regulation literature (Gross, 2007; Rimé, 2009) and were answered on a 7-point Likert scale (1 = not at all, 7 = extremely). Study 1 reliabilities are followed by study 2. Given that emotion intensity can fluctuate rapidly, measures had to be as short as possible and directly after one another, to avoid confounding³.

Emotion intensity. Sadness intensity was measured by: ‘How sad do you feel, now that you have imagined this situation?’ (T1, before sharing); ‘how sad do you feel now after sharing this situation?’ (T2, after sharing); and ‘how sad do you feel now after receiving feedback from your close friend/from this distance acquaintance?’ (T3, after feedback). Note that the relational closeness condition changed accordingly to the respective closeness condition.

Emotion stabilization strategy. This variable was assessed by four items: ‘to what extent does this feedback: ‘moderate your feelings?’; ‘calm your feelings?’; ‘make your feelings less intense?’; ‘make you feel more stable?’ (Cronbach’s α : .95; .85).

³ Next to these dependent items, which were asked first, the questionnaire included the following measures: likelihood to respond, likelihood of giving a Facebook ‘like,’ liking the reply, and feeling grateful about the reply. The specific measures list can be obtained from the first author.

Cognitive reappraisal strategy. This variable was assessed by two items: 'To what extent does the feedback make you think differently about the event?'; 'see the event under a different perspective?' (Cronbach's α : .95, .93).

Data Analysis and Reporting

In the repeated measures analysis for both studies, degrees of freedom were corrected using the Greenhouse-Geisser or the Huyn-Felt estimates of sphericity when appropriate, according to epsilon values (Field, 2009). Means were compared using the Bonferroni adjustment. Due to space considerations, only significant main effects and interactions (two or three-way) are reported. Additional analyses with the covariates gender, age, and Facebook usage were conducted and reported when significant.

Study 1 results

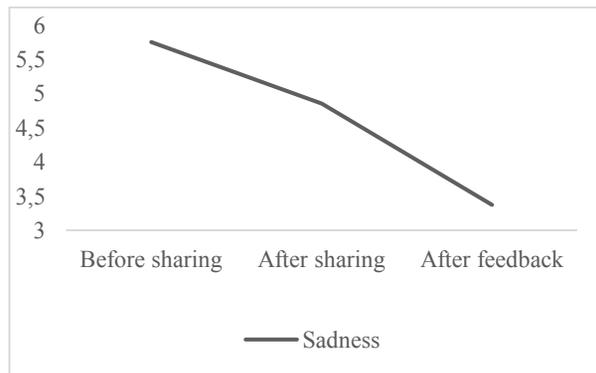
Table 1 shows detailed statistics for all time points. H1. RQ.1. A repeated measures ANOVA with T1 and T2 intensity scores as independent factors was significant, $F(1,173) = 101.948, p < .001, \eta^2p = .372$. Intensity decreased from before sharing to after sharing. RQ.2. A repeated measures ANOVA between T1, T2 and T3 was significant, $F(1,173) = 603.448, p < .001, \eta^2p = .778$, alike to a repeated measures ANOVA between T2 and T3, $F(1,173) = 425.824, p < .001, \eta^2p = .712$. As shown in figure 1, emotion intensity scores decreased from before sharing to after sharing, and before and after feedback.

Correlations between dependent variables appear in Table 2. H1. A repeated measures ANOVA between T2 and T3 intensity scores and feedback type and relational closeness as independent factors, showed no main effect of feedback and no support for this hypothesis, $F(1, 173) = .017, p = .896, \eta^2p = .001$. H2a. A univariate ANOVA with type of feedback and closeness as independent factors found a main effect of feedback, supporting this hypothesis, $F(1, 173) = 22.795, p < .001, \eta^2p = .119$. Reappraisal was higher for cognitive feedback than for affective, respectively: $M = 3.47, SE = .174$ (95% CI: 3.12, 3.81) and $M = 2.26, SE = .182$ (95% CI: 1.90, 2.61). H2b. A univariate ANOVA with type of feedback and closeness as independent factors and stabilization as dependent variable, rejected this hypothesis, $F(1, 173) = 3.515, p = .063, \eta^2p = .020$.

Table 1. Sadness intensity means, standard deviations, and mean differences between T1, T2, T3

Time point	Mean (SD)	SE	η^2p	Power	95% CI		SE diff.	95% CI difference		
					Lower	Upper		Lower	Upper	
Sadness study 1										
Before sharing	5.75 (.983)	.075	.37 2	1.0	5.60	5.89	.902	.089	.686	1.118
After sharing	4.85 (1.29)	.098			4.65	5.04	1.47 4	.059	1.329	1.619
After feedback k	3.37 (1.17)	.090			3.19	3.55	2.36 7	.093	2.601	2.150
Sadness study 2										
Before sharing	6.12 (.874)	.086	.16 0	.99	5.94	6.28	.394	.088	.180	.608
After sharing	5.72 (1.11)	.106			5.51	5.93	1.67 3	.125	1.368	1.978
After feedback k	4.04 (1.33)	.131			3.78	4.30	2.06 7	.138	2.403	1.732

Figure 1. Emotion intensity changes between T1, T2 and T3 (study 1)

Table 2. Correlations between dependent variables, study 1 ($n = 173$)

	M (SD)	1	2	3	4	5
T1 Before sharing	6.46 (.786)	1				
T2 After sharing	6.26 (.914)	.677**	1			
T3 After feedback	5.61 (1.02)	.368**	.520**	1		
Emotion stabilization	2.67 (1.36)	-0.56	.029	.056	1	
Cognitive reappraisal	2.08 (1.34)	-1.30	-.100	.089	.754**	1

** $p < .001$, * $p < .05$.

H3a. A repeated measures ANOVA between sadness intensity scores at T2 and T3 and feedback type and relational closeness as independent factors, did not support this hypothesis, as the main effect of closeness was not significant $F(1, 173) = .749$, $p = .388$, $\eta^2 p = .004$. H3b. A univariate ANOVA of stabilization scores and feedback type and relational closeness as independent factors confirmed a main effect of closeness, $F(1, 173) = 10.241$, $p = .002$, $\eta^2 p = .057$. Emotion stabilization, or feeling more stable after the reply, was higher for close friends, $M = 3.18$, $SE = .152$ (95% CI: 2.88, 3.48) than acquaintances, $M = 2.51$, $SE = .146$ (95% CI: 2.22, 2.79).

Discussion study 1

Sadness intensity changes were found in both the stages of SSE sharing and feedback. Emotion decreased after sharing, which contrasts with SSE's theory basic tenet that sharing increases feeling intensity (Rimé, 2009). Although this result suggests a decreasing effect of sharing in SNSs, it is necessary to analyze a possible influence of the time passed between intensity ratings. Further, contrary to our expectations, feedback type and relational closeness did not affect emotion intensity. However, in line with expectations, cognitive feedback elicited higher levels of reappraisal, while relational closeness was effective for emotion stabilization.

Study 2

As already stated, to add to the ecological validity of the results obtained in study 1 in a more naturalistic location, we conducted a second study with the same procedure and measures, with participants who answered from home or some other location. To control for a possible effect of time elapsed between emotion elicitation and the intensity measurement, the number of seconds before the last click on the intensity item was measured and added in all analyses as a covariate.

Participants. The eligibility criteria were the same as in study 1. The present study collected data on four hundred and fifty participants recruited through Amazon Mechanical Turk (MTurk), an online crowdsourcing platform. Although complete data on sharing of happiness and sadness was gathered (225 participants), we focus here on sadness (106 participants), which was a between subjects condition. Therefore, subjects were exposed to the sadness condition only once. At the start, participants were informed and accepted that their participation would be ended automatically in case of failing the manipulation and attention checks. After completion, two cases were discarded due to having written an incoherent status update, which left a total of 104 participants (50% male, 22.1% 18-23 years, 77.9% 24-30 years). Completed answers received U.S. \$5 as compensation. Average participation time was 15 minutes.

Design. The experiment is a 3 (emotion intensity: T1, T2, T3, within subjects), x 2 (feedback type: affective, cognitive, between subjects) x 2 (relational closeness: close friend, acquaintance, within subjects) factorial mixed design⁴. As explained above, the number of

⁴ As in study 1, please note that this full design is valid for measurements of dependents at T2 and T3 only, as T1 and T2 included only emotion intensity as factors (see procedure).

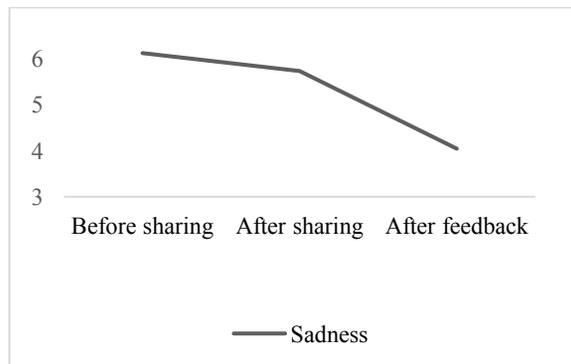
seconds before the last click on the intensity item was added as a covariate and reported in case of significance. Average times were respectively, 8.62 (T1), 6.10 (T2) and 5.20 seconds (T3).

Procedure and materials. Apart from participants accessing the experiment online from home or other location via the platform Mechanical Turks, the rest of the procedure and materials were identical as those in study 1.

Study 2 results

Table 1 shows detailed statistics for all time points. RQ.1. A repeated measures ANOVA with T1 and T2 intensity scores as independent factors was significant, $F(1, 104) = 19.624, p < .001, \eta^2p = .160$. Intensity decreased from before sharing to after sharing. RQ.2. A repeated measures ANOVA between T1, T2 and T3 was significant, $F(1, 104) = 171.972, p < .001, \eta^2p = .625$. Further, a repeated measures ANOVA between T2 and T3 was also significant, $F(1, 104) = 181.304, p < .001, \eta^2p = .638$. As shown in figure 2, emotion intensity scores decreased from before sharing to after sharing, and from before and after feedback.

Figure 2. Emotion intensity changes between T1, T2 and T3 (study 2)



Correlations between dependent variables appear on Table 3. H1. A repeated-measures ANOVA between T2 and T3 intensity scores, and feedback type as independent factors showed a main effect of feedback type, $F(1, 104) = 5.425, p = .022, \eta^2p = .050$. The greatest decrease occurred in case of cognitive feedback, $M = 3.75, SE = .189$ (95% CI: 3.37, 4.12), compared to affective, $M = 5.72, SE = .161$ (95% CI: 5.41, 6.04). As sadness decreased the most due to cognitive feedback, H1 is not supported. H2a. A univariate ANOVA with reappraisal as dependent variable with feedback type as independent factor revealed a main effect of feedback, $F(1, 104) = 12.991, p < .001, \eta^2p = .113$. Cognitive feedback scored higher

for reappraisal $M = 4.34$, $SD = .229$ (95% CI: 3.88, 4.79) than affective, $M = 3.21$, $SE = .212$ (95% CI: 2.79, 3.63). H2b. A univariate ANOVA with type of feedback as independent factors and emotion stabilization as dependent variable, did not support this hypothesis as no main effect of feedback was found, $F(1, 173) = .361$, $p = .549$, $\eta^2p = .090$.

H3a. A repeated measures ANOVA between sadness intensity scores for friends and acquaintances at T3 disconfirmed an effect of closeness and this hypothesis, $F(1, 104) = .814$, $p = .369$, $\eta^2p = .008$. H3b. A repeated measures ANOVA of stabilization scores at T3 with feedback as independent factor confirmed this hypothesis, $F(1, 104) = 48.064$, $p < .001$, $\eta^2p = .320$. Close friends scored higher in emotional stabilization or feeling more stable, $M = 4.77$, $SE = .128$ (95% CI: 4.51, 5.02) than acquaintances, $M = 3.93$, $SE = .151$ (95% CI: 3.63, 4.23).

Table 3. Correlations between dependent variables, sadness, study 2 ($n = 104$)

	M (SD)	1	2	3	4	5
T1 Before sharing	5.75 (.983)	1				
T2 After sharing	4.85 (1.29)	.493**	1			
T3 After feedback	3.38 (1.17)	.367**	.799**	1		
Emotion stabilization	2.84 (1.42)	-.116	-.150*	-.090	1	
Cognitive reappraisal	2.89 (1.74)	-.089	-.115	-.158*	.580**	1

* $p < .05$, ** $p < .001$.

Discussion study 2

Study 2 corroborated the downregulation effect for sadness after sharing, and after feedback from study 1, even when controlling for the time passed after clicking on the intensity item. Overall, results were more in line with our hypotheses. Notably, emotion intensity fluctuations at time 3 (after feedback) was affected by feedback type. Unexpectedly, sadness intensity decreased the most due to cognitive feedback. In addition, study 2 largely corroborated the emotion regulation strategies results of study 1. As expected, cognitive

feedback had a main effect on reappraisal, and sadness became more stabilized due to feedback from close friends.

General discussion

This study had as goal to investigate possible intra and interpersonal emotion regulation effects from the action of sharing Facebook statuses depicting a personal sad situation. In two experiments, we studied the role of sharing, type of feedback and relational closeness, with the dependent variables emotion intensity and emotion regulation strategies. To our knowledge, this study is one of the first to bring experimental evidence of emotion regulation processes in online social sharing of emotions (SSE). Though results must be seen in light of the obvious study limitations – such as using an artificial Facebook environment – we believe that the findings may highlight the particularities of SSE in online social network communication and have the potential to stimulate much further research around online emotion sharing. This study contributes by bringing initial empirical evidence of intra and interpersonal emotion regulation (Gross, 2007; Valkenburg, 2017; Zaki & Williams, 2013). We point out some main implications for social sharing theory (Rimé, 2009) and online sharing of emotion.

Social sharing theory. The findings suggest that the intensity of sadness decreased throughout an interactive episode of online SSE, and across a variety of feedback and relational closeness conditions. If we would understand emotional recovery as a decrease of the original intensity elicited by the episode (Rimé, 2009), then these studies provide initial evidence that both sharing, and receiving feedback in SNS, may aid recovery. Importantly, because respondents' affects were measured right after sadness elicitation, we consider any emotion regulation effects considering this initial affect as 'the baseline.'

This initial evidence may contrast with how SSE occurs in FtF situations, where instances of emotional recovery seem to be quite rare after feedback (Nils & Rimé, 2012). A recent study found no decrease (immediate or delayed) of sadness after sharing with others in FtF (Brans, Van Mechelen, Rimé, & Verduyn, 2014). In contrast, this study finds a downregulation effect of both sharing and feedback which may have been elicited, which warrants future research. In particular, we may argue that social media affordances, such as a greater time-lag and reduced cues in the feedback situation may allow users greater time to 'digest' feedback. Obviously, this study's lack of further post-measures allows for the possibility that this decreasing effect of online SSE may be quite short-lived. Future studies could consider combining longer time-lags to measure regulation from online SSE with control group measurements.

To our knowledge, the present work is also one of the first to explore the role of feedback type and relational closeness simultaneously in regulation effects from online interactions. Importantly, a main effect of cognitive feedback in sadness intensity reduction was found across studies. Though this result should be interpreted with caution, this finding suggests that cognitive feedback could be more effective in online environments as opposed to offline contexts, where feedback is subject to a number of social rules and has greater immediacy. This greater effect of cognitive feedback seems to differ from the tenets of SSE theory, in which affective feedback is posited to facilitate, at best, initial 'buffering' of the negative emotion. If it were the case that online environments could enable users to better digest more cognitive comments which could possibly lead to reappraisal, the results would highlight the beneficial potential of SNSs for emotional well-being.

Regarding the effect of closeness, our findings corroborate online SSE theory in that providers of effective feedback are often close to the initiator (Rimé, 2009). Interestingly, closeness did not seem to have a main effect on reported intensity after feedback but did however affect how users' felt more stable after feedback. This result may signal a discrepancy between people's intensity reports and their self-beliefs as to the regulation effects of feedback from close others. Here, we point out that emotion sharing behaviour is not exempt from discrepancies, for instance the paradox of wanting to share emotions even though this would increase emotion intensity (Rimé, 2009). Similarly, another contradiction is that people seem to prefer affective feedback on FtF communication, while cognitive feedback is better for recovery (Rimé, 2009; Pauw et al, 2018). This discrepancy could be meaningful to investigate further.

SNSs studies. This study's finding of sadness reduction after sharing suggests a different direction of intensity than previous SNS research findings, which found an amplification of negative affect after sharing (Choi & Toma, 2014). However, the results are in line with studies which found an immediate positive effect on emotions after posting (Bayer et al, 2017). We note that distinguishing sharing from feedback effects on intensity was not the original intent of these studies. In our view, at least two main affordances of CMC communication may explain this possible downregulation effect. The first, posited by hyperpersonal theory (Walther, 1996), is the chronemics aspect of crafting and editing messages due to CMC's asynchronicity, which may aid individuals' self-reflection before sharing, which may already bring emotion intensity down. This intrapersonal effect is in line with approaches suggesting intrapersonal effects from social media (Valkenburg, 2017).

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We further note that previous psychological approaches already posited a negative emotion reduction effect from emotional expression (Pennebaker, 1997). However, the SNS sharing situation is less mirrored in expressive writing, as the latter implies several daily consecutive writings, typically lasts much longer, and disclosures are commonly kept private. In contrast, status updates are written in lesser time, are published mostly once, and are written with a concept of 'collapsed audience' in mind (Marwick & Boyd, 2011). Future research may investigate how chronemic aspects affect other aspects of the emotion regulation process.

The second affordance that may explain this intensity decrease, is the sense of social connection enabled by SNS platforms, which has been found to predict communicating on Facebook in the first place (Ledbetter et al., 2011). This increased feeling of social connection may well have a calming effect, due to users' implicit knowledge of a listening audience, which may bring individuals at ease, alike to when the mere presence of someone can alleviate distress at a neurophysiological level (Coan & Sbarra, 2015). Future research to test this conjecture is encouraged.

With regards to interpersonal effects, we subscribe to the idea that online sharing does not only lead to self-reflection which may spur regulation, but also involves the recipients' attention, which could be dealt with in further research. That cognitive feedback was more effective in eliciting reappraisal, may illustrate SNS's communication potential to allow more instant access to cognitive appraisals than is usual in FtF. This greater effectivity may be explained by that in FtF, feedback is often given instantly and is subject to social expectations, while the asynchronous character of Facebook, and their lesser degree of cues (Walther, 2011), may enable receivers to better reflect on the feedback's content. This proposition is in line with 'the FtF fallacy' (Sundar, 2008), which posits that FtF communication need not be necessarily superior than online exchanges, nor result in greater well-being, despite common beliefs.

That relational closeness affected the intensity of sadness after feedback, and also impacted emotion stabilization in both studies, is in line with the positive social role of close friends in online relationships and well-being (Burke & Kraut, 2016; Seo et al., 2016; Valkenburg & Peter, 2007). This finding makes a novel contribution as to the importance of relational closeness in terms of emotion regulation, which could be useful to study other aspects of SNS communication, for instance, whether regulation may be affected by users' response expectancies in SNS (French & Bazarova, 2017).

Similarly, the effects of communicating through SNS are not to be underestimated for the feedback provider. The seemingly simple act of providing suitable emotional feedback, not always readily accessible in FtF situations, may be aided by the asynchronous character of SNS communication. Since active user participation is commonly highlighted as a predictor to obtain benefits from SNS activity (Seo et al., 2016), it may be worthwhile to investigate whether contributing with beneficial feedback may regulate the feelings in the feedback provider, for instance due to feeling helpful to others.

Limitations

We certainly are mindful of this study's limitations, which we hope would inspire future work which could further test and extend these findings. One relevant shortcoming is the use of an artificial Facebook environment, which may have affected users' emotional experiences and reports. However, we note that experimental vignette studies are amply used in psychological research to gain more controlled insight on respondents' emotional responses to social sharing (e.g. Pauw, Sauter, Van Cleef, & Fischer, 2018). To address this limitation, using more naturalistic scenarios is advisable, for instance employing experience sampling methods to measure users' reactions right after sharing emotions in 'real' Facebook. Moreover, the cumulative effect of several answers, or emotion regulation effects of receiving Facebook 'reactions' (e.g., Facebook likes, 'wow,' 'love') could be integrated.

A second major limitation is that, despite our efforts, respondents may have guessed the study's intentions and may have provided socially-desirable answers. It is to be noted here that if this were the case, virtually every hypothesis in this study would have found support, while this was not the case. Still, we acknowledge this possibility and call for further replication studies. Third, this study focused on measuring sadness, a measurement which refers to a concrete and singular object (degree of felt emotion), which warrants the use of one item (Rossiter, 2002). However, we hope that future studies consider studying a broader range of emotions, also in response to a single vignette. Fourth and lastly, our exploratory attempts to measure emotion intensity assume a fixed order of appraisal, response and regulation, a challenge given the complex and dynamic nature of emotions. However, we note that the process of emotion regulation has been established to occur in a fixed order of continued stages, according to the emotion regulation framework (Gross, 2007).

Conclusion

Our results provide preliminary evidence that socially sharing sadness on Facebook status updates, may seemingly affect emotion intensity by downregulating this emotion, which

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may occur at both the intrapersonal and interpersonal level. Relevantly, consistent evidence from two studies shows that cognitive replies may elicit reappraisal, a beneficial emotion regulation strategy. Regarding interpersonal regulation, this study increases our knowledge of beneficial feedback characteristics to regulate others' negative emotions online to help improve individuals' emotional well-being.