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10 **Social sharing of emotion, post-traumatic growth, and emotional climate:**
11 **Follow-up of Spanish citizen's response to the collective trauma of**
12 **March 11th terrorist attacks in Madrid**
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14
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23 *Abstract*

24
25 *A questionnaire measuring social sharing of emotion, coping, intensity of emotions and rumination related to March 11th*
26 *(2004) terrorist attacks in Madrid, emotional climate, social integration, and post-traumatic growth was completed by*
27 *644 students and their relatives (38%) in 5 Spanish regions and 8 universities 1 week, 3 weeks, and 8 weeks after the*
28 *terrorist act. Results supported a two-sided model of the effects of social sharing of emotion derived from [Durkheim](#)^{Q2}'s*
29 *(1912) model of the social functional effects of collective remembering. Higher levels of sharing initially predicted*
30 *(1) higher event-related emotional arousal and mental rumination and (2) superior social integration and well-being*
31 *assessed in later weeks. Structural equation modeling showed that higher levels of initial sharing and coping by search for*
32 *social support predicted directly or indirectly (1) higher social integration (2) higher perceived post-traumatic growth,*
33 *and (3) higher perceived contentment, hope, solidarity, and confidence in the emotional climate. Copyright © 2009 John*
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38 When individuals experience an emotion, they generally tell about it in the next hours and days. Most often, they report
39 their emotional experience several times and they address several successive targets of their social network. Data showed
40 that such a process of social sharing of emotion occurs in 80–95% of emotional episodes (for reviews, see Rimé, 2005,
41 2007, 2009; Rimé, Finkenauer, Luminet, Zech, & Philippot, 1998). Such figures regarded both positive and negative
42 emotional episodes and were observed independently of age, gender, or culture. In a majority of cases, the social sharing of
43 an emotion develops shortly after the emotion was felt (Martínez-Sánchez, Páez, Pennebaker, & Rimé, 2001). A positive
44 linear relationship is usually observed between emotional intensity and extent of sharing. Thus, more intense emotional
45 experiences are shared more repetitively, with a larger number of targets, and for a longer period (Rimé et al., 1998). In a
46 similar manner, collective traumatic events such as those of September 11th, 2001, in New York or of March 11th, 2004, in
47 Madrid elicited emotional arousal and social sharing of emotions in an overwhelming majority of inhabitants. Both in New
48 York and in Madrid, most respondents reported isolated symptoms of stress reaction and more than 80% of them spoke
49 about the events and shared with others what they felt (Miguel-Tobal & Martínez-Sánchez, 2004; Schuster et al., 2001;
50 Silver, Holman, McIntosh, Poulin, & Gil-Rivas, 2002).
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Temporal Evolution of the Social Sharing of Emotion

Pennebaker and Harber (1993) had observations suggesting that the social sharing of a collective trauma manifests a typical temporal evolution which seemed to foster important relations with variables such as mental rumination, collective mood, manifestations of solidarity, and levels of anxiety and depression in the concerned population. A collective traumatic event generally causes a temporary rise in the national mean of anxiety and depressive symptoms. This was observed for instance one month after September 11th in the United States (Knudsen, Roman, Johnson, & Ducharme, 2005) and 1–2 months after the Lebanon war massacres in Israel (Hobfoll, Lomranz, Eval, Bridges, & Tzemach, 1989). In both cases, the mean values of these variables decreased progressively thereafter and a return to baseline was usually recorded some two months after the date of the traumatic event. In parallel, studies of responses to a collective trauma evidenced high levels of social sharing, of mental rumination and of expressions of solidarity during a period of 2–3 weeks after the traumatic event (Penner, Brannick, Webb, & Cornell, 2005; Pennebaker & Harber, 1993). As was the case for levels of anxiety and depression, a sharp drop of these various manifestations was recorded after this initial period. Relying upon such observations, a tentative model of psychological and social responses to a collective traumatic event can be sketched (Pennebaker & Harber, 1993). An initial period involving intense emotional reactions and intensive social manifestations characterizes an emergency stage which lasts for about 1 month. Thereafter, a plateau occurs. At this stage, mental rumination is maintained at high levels for another month whereas the social sharing of emotions vanishes progressively. Finally, some 2 months after the event, manifestations of solidarity go into a slow decline, spontaneous bonding decreases (Collins, 2004; Steinert, 2003), rumination about the collective trauma diminishes to a low level, and an adaptation stage appears (Gortner & Pennebaker, 2003).

Two-sided Consequences of Sharing Emotions

The question then arises of the emotional and cognitive effects of sharing emotions. In line with a functionalist perspective on social activities of symbolic communication inspired by Freud (1917) in psychiatry, by Malinowski (1948/1985) in anthropology, and by Schachter (1959) in social psychology, a good deal of hypotheses can be proposed in this regard. Sharing persons would very likely meet comforting behaviors and emotional support in their social surroundings and would consequently experience a reduction of their negative affects and an enhancement of their positive ones. The social sharing process can also provide people with informational and appraisal support which may help them in their attempts at understanding the episode and in their effort to find a meaning in their experience. In addition, sharing may be functional to post-traumatic cognitive adaptation and to the completion of an episodic memory of the traumatic experience, which can contribute to a reduction of event-related mental ruminations. Yet, empirical studies generally led to conclude that neither emotional sharing nor participation in ceremonies or social rituals helped participants to alleviate their event-related negative affects. Thus, studies on effects of talking about emotional events (for a review, see Rimé et al., 1998) revealed that: (a) the higher the emotional impact of an event was, the more people talked about it; (b) talking does not reduce, and may even sustain, the residual emotional arousal associated with the memory of the event, due to a vicious circle in which social sharing reactivates event-related emotions and residual event-related emotions elicit sharing; (c) talking about the event, rather than reducing the event-related thoughts and rumination, actually enhances them; (d) when intensive social sharing is still manifested some weeks after the event, it generally ends up in enhancing event-related mental ruminations and emotional arousal. Altogether, such observations do not support the view that emotional sharing would contribute to emotional relief. In addition, sharing emotions a long time after the eliciting event appeared more a symptom of emotional arousal than a positive process conducive to emotional recovery. Empirical studies on the effects of social rituals led to conclusions that paralleled those from studies on the sharing of emotion: Participation does not reduce and can even reinforce negative affect. Thus, for instance, a review conducted by Pargament (1997) concluded that participation in religious rituals was in majority related to positive affect, but also either unrelated or positively related to negative affect. Two longitudinal studies of the consequences of social rituals failed to find effects of rituals on negative affect and on grief symptoms (Lasker et al., 1989, quoted in Pargament, 1997; Weiss & Richards, 1997). In a study conducted in Rwanda, participation in the “Gacaca” transitional justice rituals was found to enhance rather than decrease negative emotions both among the victims and the accused (Kanyangara, Rimé, Philippot, & Yzerbyt, 2007).

However, contrasting with the negative conclusions just reached, the social sharing of emotions can also be expected to entail positive personal, interpersonal, and collective effects. Rimé et al. (Rimé, 2009; 1998) argued that sharing an emotional experience often leads to the completion of a variety of social needs such as need for relatedness, for enhancement of interpersonal relationships and for social integration. In particular, it was stressed that sharing emotions has the power to bring interactants closer to one another (Collins & Miller, 1994; Laurenceau, Feldman-Barret, & Pietromonaco, 1998; Reis & Patrick, 1996; Rimé, 2009). As social support is negatively related to social loneliness and as social activities reinforce positive affect (Argyle, 1987; Shaver & Brennan, 1991), when granted a strong social support in the sharing process, a person should feel more socially integrated. De Rivera and Paez (2007) argued that talking about helping behaviors, about positive reactions and about communal forms of coping (memorials, demonstrations, and good actions) enhances the awareness of positive collective feelings such as solidarity, hope, and trust. Studies confirmed that interpersonal communication as well as participation in collective ceremonies with symbolic meaning strengthened well-being and positive affect, and increased interpersonal attraction, empathy, and pro-social behavior, as well as positive emotional climate (Páez, Basabe, Ubillos, & González, 2007).

In sum, the effects of sharing an emotional episode seem well to be at odds with classic cathartic, or discharge views of emotional expression (for a discussion, see Kennedy-Moore & Watson, 1999; Scheff, 1979). Predictions in this regard are indeed two-sided. On the one hand, sharing emotions would not alleviate event-related negative affects among those who shared. Sharing emotion a long time after the eliciting event would be more a symptom of emotional arousal than a positive process conducive to emotional recovery. On the other hand, there are theoretical and empirical arguments in support of the view that sharing emotion would entail positive interpersonal and collective consequences. They lead to expect that the more emotions are shared, the more those who shared would experience a feeling of social integration and would perceive positive collective feelings in the emotional climate (solidarity, hope, and trust, i.e., positive emotional climate, see De Rivera & Paez, 2007).

Social Sharing of Emotion and Post-traumatic Growth

In recent years, a concept of major practical importance emerged in the study of the aftermath of negative life events. Whereas negative effects of stressful and traumatic events are widely acknowledged by those who experienced them, some two-thirds of these victims also described post-traumatic growth, or positive personal and social life changes resulting from the traumatic experience (Nolen-Hoeksema & Davis, 2005). Post-traumatic growth was defined as the experience of positive change that occurs as a result of the struggle with highly challenging life crises (Tedeschi & Calhoun, 2004). It is manifested in a variety of ways, including increased appreciation of life, more meaningful interpersonal relationships, increased sense of personal strength, changed priorities, and a richer existential and spiritual life. Among the factors contributing to such a positive evolution, social benefits of life crises seem playing a major role. To illustrate, victims often felt that their family was brought together by the unfortunate circumstances, they generally witnessed unusual manifestations of social support, of empathy, and of pro-social behavior, and they experienced by and large a sharp enhancement of their community's cohesion (Tennen & Affleck, 2005). In sum, contrasting with the destructions and sufferings that catastrophes and other traumatic situations usually entail, such situations can also trigger substantial manifestations of the brighter side of social life. The dark side of crises can shatter victims and witnesses' assumptions and worldviews (Janoff-Bulman, 1992), and yet the positive social response that such crises elicit offers a considerable potential for the reconstruction and consolidation what was shattered. Data confirmed that when the positive aspects of traumatic events are stressed, it is predictive of a better adjustment to these events (Helgeson, Reynolds, & Tomich, 2006; Nolen-Hoeksema & Davis, 2005).

As far as the social sharing of emotions generally involves manifestations of social support, of empathy, of pro-social behavior, together with an enhanced perceived social integration (for a review, see Rimé, 2009), it should thus count among the significant predictors of post-traumatic growth. In their theoretical model of factors feeding up the process of post-traumatic growth, Tedeschi and Calhoun (2004) made explicit mention of emotional disclosure. According to their view, narratives of trauma and survival are always important in post-traumatic growth, because the development of these narratives forces survivors to confront questions of meaning and how it can be reconstructed (McAdams, 1993; Neimeyer, 2001). Thus, the social sharing of emotion can contribute to the reconstruction and reorganization of positive socially shared beliefs about the self and the world, thus fulfilling major needs such as needs for positive meaning, needs for

collective and personal self-esteem enhancement (Epstein, 1993), and needs for management of mortality salience (Pyszczynski, Solomon, & Greenberg, 2002). Informal social communication emphasizing collective positive reactions such as altruistic and pro-social behaviors can restore basic assumptions about the benevolence and controllability of the social world when they are shattered by traumatic events such as September 11, 2001 in New York, or March 11, 2004 in Madrid (Janoff-Bulman, 1992).

Despite the importance of this question, to our knowledge no study to date has verified empirically how far the social sharing of emotion actually contributes to the process of post-traumatic growth. Yet a good number of variables conducive to post-traumatic growth have been identified. Two recent meta-analysis (Helgeson, Reynolds, & Tomich, 2006; Prati & Pietrantonio, 2007) led to conclude that variables which are positively related to post-traumatic growth comprised severity of the event, coping by seeking social support and positive reappraisal, perceived social support, as well as anxiety and rumination. Positive reappraisal of the experience related to a trauma is thus a clear cognitive antecedent of growth. Seeking for social support and actual social support afford positive attitude changes in others to be perceived, thus supporting interpersonal growth (Armeli, Gunthert, & Cohen, 2001). Finally, intense affective and cognitive reaction (i.e., anxiety, rumination) seem well to be preconditions of post-traumatic growth, as people who fail to be distressed by an event and whose socially shared beliefs fail to be shattered by it will also fail to perceive positive social responses (Janoff-Bulman, 2004).

Overview of the Study

The present study intended to test in a real life setting a set of hypotheses on the social sharing of emotion after a major collective emotional episode. We examined longitudinally a large sample of respondents who were recently exposed to the collective traumatic experience which resulted from the terrorist attacks perpetrated on March 11th 2004 in Madrid, Spain. The investigation followed three major purposes. First, we intended to test the stage model of social sharing. To this aim, data were collected from respondents first 1 week after the terrorist attacks, or in the emergency stage of collective response to trauma (time 1), then 3 weeks after the events, or in the transition between the emergency and plateau stages (time 2), and finally 8 weeks after the events, or in the transition to the adaptation stage (time 3).

A second main objective of the reported study was to test the two-sided view on the consequences of sharing emotions. On the one hand, we hypothesized that (1) repeated verbal emotional expression about the critical event would not reduce and might even sustain the intensity of the critical event-related emotional arousal and mental rumination, and (2) when intensive social sharing is still manifested some weeks after the critical event, it would end up in enhancing event-related mental ruminations and emotional arousal. On the other hand, we expected verbal emotional expression about the critical event to be associated with (1) at the personal and interpersonal level, enhanced social integration (i.e., higher positive affect, lower perceived loneliness, and higher perceived social support), (2) at the collective level, enhanced perception of a positive emotional climate (perceived climate of solidarity, of hope, of trust...).

Third, we wanted to verify Tedeschi and Calhoun's (2004) proposition according to which emotional disclosure, or the social sharing of emotion, counted among the antecedents of benefits finding in the aftermath of a crisis. In this perspective, the social sharing of emotion was assessed in parallel with demonstrated antecedents of post-traumatic growth: (1) social integration, (2) coping by seeking social support and positive reappraisal, (3) intensity of cognitive and affective responding to the event (Helgeson, Reynolds, & Tomich, 2006; Prati & Pietrantonio, 2007). These variables will be examined together in a structural analysis testing their predictive value with regard to post-traumatic growth and positive emotional climate.

METHODS

Participants

A total of 644 people predominantly female (30% men) with an age range of 17–90 years (Mean = 27.53) participated in all three successive data collection phases of the study.

Attrition rate was of 12% and no differences were found on age, sex, and main variables comparing first wave participants that continue with participants that abandon the study. They belonged to five important regions of Spain, including Madrid, and were either students enrolled in one out of nine Spanish universities, or family members of students who recruited them as participants. Overall, 63% of respondents in the sample were university students and 38% were non-student adults, predominantly full-time employees. Of the total sample, 28% worry about someone who was affected in some way when hearing about the bomb attack on M-11. However, not actual direct victims were included in the sample and only 5% knew someone that was really affected to some extent—not necessarily injured.

Procedure

The study scales were answered by participants either during lectures at their university or at home in the case of students' parents and family members. Scales were proposed to the same respondents in three successive occasions with the purpose to assess effects of the social sharing event-related emotions and to contrast the social stage model of response to a collective trauma. Thus participants completed scales first 1 week after March 11th (around March 18th), then 3 weeks after the event, and finally 8 weeks after the event.

Variables and Instruments

In order to make possible such a large scale study on recently occurred dramatic events, lengthy questionnaires are to be banned. Therefore, most of the instruments which were used in the present study consisted of abridged versions of existing scales. A first group of scales measured frequency of social sharing and coping by seeking social support and positive reappraisal. The first scale in this group was an indicator of spontaneous social sharing and the second one assessed deliberate coping with the trauma by seeking social support, emotional expression and reappraisal. The social sharing scale was presented on all three measurement times and the coping scale at time 1, 1 week after the event. A second group of scale assessed on each three occasions the affective and cognitive impact of the event through (1) a measure of intensity of primary emotions experienced and (2) a scale assessing mental rumination. A third group of scales assessed social integration through (1) perceived social support, (2) loneliness and (3) Positive Affect. These scales were proposed both at 3 weeks and at 8 weeks after the event. A fourth and final group of measures considered perceived positive individual and perceived positive collective responses to the traumatic event with respectively a measure of post-traumatic growth, which was assessed at 3 weeks and an emotional climate scale which was proposed at 1 week and at 8 weeks.

Social Sharing and Coping by Seeking Social Support and Positive Reappraisal

As regarded social sharing of emotions, the two following questions were used in order to assess frequency of event-related social sharing of emotions: "In the last week, how frequently have you spoken about M-11 events?" and "In the last week, how frequently have you heard people talking about M-11 events?" Responses were collected on 7-point Likert-type scales anchored with "Not at all" (1) and "A great deal" (7). In order to assess the convergent validity of these questions, two open-answer questions were added: "With how many people? (indicate approximate number)"; and "How often? (indicate number of times)." The 2-items social sharing scale evidenced a moderate internal consistency ($\alpha = .60$). Responses collected on this scale at the first week measured the extent of social sharing elicited by the March 11 experience (initial sharing) whereas responses collected at 3 and at 8 weeks measured the residual social sharing (Rimé et al., 1998).

In order to assess coping by seeking social support and positive reappraisal, the Ways of Coping scale was adapted to the March 11th, 2004 events. Participants were asked "How do you cope with the March 11th terrorist attack." Proposed responses were, for seeking social support, "Talked to someone to find out more about the situation," for seeking emotional support, "Accepted sympathy and understanding from someone," for emotional expression, "Expressed and discharged emotions," for positive reappraisal, "Changed or grew as a person in a good way" (Folkman & Lazarus, 1985; Penley, Tomaka, & Wiebe, 2002). Responses were collected on Likert-type response scales with four points, ranging from

“Never” (1), “Sometimes” (2), “Frequently or a lot of times” (3) to “Always” (4). The four items loaded on a single factor and yielded a satisfactory Cronbach’s α of .71.

Cognitive and Affective Response

The intensity of the cognitive response to the events was assessed through the extent of events-related mental ruminations experienced by the respondent. The intensity of the affective response was assessed through primary emotions felt with respect to the events.

As regarded mental rumination, repeated voluntary and involuntary thoughts about the emotional event were assessed using four items, each to be rated on 7-point scales (1 = “Not at all,” and 7 “A great deal”): “How frequently do images and thoughts related to March 11th events come involuntarily to your mind?”, “How unpleasant were these images and thoughts?”, “How uncontrollable were these images and thoughts?” and “How often have you tried in your thoughts to understand March 11th events?” ($\alpha = .61$).

In order to assess the emotional arousal or intensity with which respondents experienced the various primary emotions in response to March 11th events, a modified version (Echebarría & Páez, 1989) of Izard’s Differential Emotions Scale (DES, Izard, Dougherty, Bloxom, & Kotsch, 1974 quoted in Echebarría & Páez, 1989) was used. Respondents had to rate nine primary emotions (Joy/Happiness, Sadness/Grief, Disgust, Guilt, Anger, Contempt, Fear/Anxiety, Shame, and Pride), each on 7-point scales (1 = “Not at all,” and 7 “A great deal”), with reference to the question: “In relation to the March 11th events in Madrid to what extent did *you* feel the following emotions?” As all the emotion items had high loadings (with negative signs for negative emotions and positive signs for positive emotions) on the first factor extracted by a factor analysis conducted on DES answers, the total of this factor was used as an indicator of intensity of emotional arousal (Cronbach’s $\alpha = .69$). Data collected on the first week measured the intensity of emotions felt at the time March 11th events were experienced, whereas those collected at 3 and 8 weeks measured residual emotional intensity (Rimé et al., 1998).

Social Integration

This variable was assessed through three different scales: The Subjective Social Support scale, the Loneliness scale, and PANAS Positive Affect scale. In general, factor analyses involving such indicators yield a principal factor involving positive loadings for social support items and for positive affect items, and negative loadings for loneliness items (Exposito & Moya, 1999).

The Subjective Social Support scale was constructed after the Social Support Appraisals Scale (AA-S) developed by Vaux, Philipp, Holly, Thompson, Williams, and Stewart (1986) which assesses the perception of satisfactory social support. A short 3-item form was made up by including the three statements of the AA-S showing the highest loadings on the sole factor evidenced by a factor analysis performed on data collected with a Spanish translation of the scale (Basabe, 2003): “I have strong emotional bonds with my friends,” “My friends and I are really important to one another,” “I feel integrated within a group of people.” Responses were collected on Likert-type response scales with four points, ranging from “Totally disagree with the statement” = 1, to “Totally agree” = 4. This short subjective social support scale evidenced a satisfactory Cronbach’s α of .86.

The UCLA Loneliness Scale is the most commonly used self-report loneliness instrument (Cramer & Barry, 1999; Shaver & Brennan, 1991). The short 4-item form used in the present study assessed individual differences in the experience of subjective social isolation, tapping essentially social loneliness (Exposito & Moya, 1999). Respondents were requested to indicate on a scale of 1 “Never” to 4 “Always,” how frequently they experienced the following feelings: “How often do you feel you there is no one to turn to?”, “How often do you feel there is nobody close to you?”, “How often do you feel isolated from others?”, and “How often do you feel there are people around you can talk to?”, the scoring of the latter item being reversed in the scoring. The loneliness scale has a satisfactory Cronbach’s α of .78.

Positive affect was measured by the Positive Affect dimension of the PANAS (Watson, Clark, & Tellegen, 1988) which evaluates by means of 10 adjectives the extent to which respondents have experienced positive emotions in the previous month. Participants indicated on 4-point scales (1 = “Slightly or not at all,” 2 = “A little,” 3 = “Moderately,” 4 = “Quite a lot,” and 5 = “A lot”) and “In relation to what happened in the last month,” the extent to which they had felt “active,”

“excited” etc. The scale thus included in total 10 mood descriptors constituting relatively pure markers of positive affectivity, $\alpha = .81$.

Reliability of the global index of social integration including the various social support, loneliness (reversed), and positive affect items was satisfactory (Cronbach’s $\alpha = .78$).

Post-traumatic Growth

Positive changes in self and others in reaction to trauma were assessed by means of scales developed after the Post-traumatic Growth Inventory (PTGI, Tedeschi & Calhoun, 1996) and Park, Cohen, and Murch’s Stress Related Growth Scale (SRGS, Park, Cohen, & Murch, 1996). The Spanish adaptation of these scales (Pérez & Vázquez, 2004) assesses positive outcomes or benefits reported by persons who have experienced traumatic events. The first six items regard intrapersonal benefits such as personal growth and strength, appreciation of life, as well as ideological, spiritual, and wisdom improvement. The next four items of the scale assess positive interpersonal effects such as improved relationships with others, improved belongingness, and empathy. Finally, three items examine benefits of a more macro-social or collective nature. Respondents were asked “As a conclusion to be drawn from the events of March 11th, indicate the extent to which there have been positive consequences for you and others.” For instance sample items related to collective growth: “Reinforced political participation and engagement,” “reinforced sensibility towards human rights violations in this country,” “reinforced awareness of human rights violations in the world.” These items are relevant because they are indexes of a peace culture as proposed by UNESCO: Rejection of human rights violations, and political participation. Responses were collected on 7-point Likert-type scales anchored with “Not at all” (1) and “A great deal” (7). Altogether, these various items constituted a scale of post-traumatic growth with a very satisfactory reliability, $\alpha = .92$. Sub-dimension reliabilities were also satisfactory, all above .70.

Positive Emotional Climate

The 10-item Emotional Climate Scale (Páez, Ruiz, Gailly, Kornblit, & Wiesenfeld, 1996) assesses people’s perception of their society’s current emotional climate. It involves two dimensions, with negative emotional climate on the one hand and positive emotional climate and social cohesion on the other hand. In the version used in the present study, participants were asked to “Assess the current state of your country. . .” indicating their degree of agreement with a series of statements on a 5-point scale where 1 = “Not at all,” 2 = “Little,” 3 = “Moderately,” 4 = “Reasonably strongly” and 5 = “Very strongly.” The statements to be rated comprised “joy/contentment,” “hope,” as well as “solidarity,” “confidence,” and “impression of freedom of speech/freedom to discuss issues.” A factor analysis of this scale evidenced two dimensions (Páez et al., 1996), the first one involving negative emotions (fear, anger, and sadness), $\alpha = .70$, and the second one, positive emotions (joy/contentment, hope) together with perception of solidarity, confidence and impressions of freedom of speech/freedom to discuss issues, $\alpha = .64$. This second factor was used as an index of positive emotional climate.

Personal Subjective Involvement on March-11 Bombing

The study sample did not include direct victims of the events. However, respondents were likely to count relatives among the victims. In order to obtain an index of the level of their personal involvement, respondents were asked “Do you have a personal concern for someone who was directly affected by Madrid’s bombing,” 1 = No, 2 = Yes.

RESULTS

Emotion and Social Sharing after the Terrorist Attack

Our DES evaluation of the emotional impact of the terrorist attacks perpetrated in Madrid on March 11th revealed that this impact was considerable. One week after the event, participants reported an average DES impact of 6.02 ($SD = 1.05$) on a

response scale ranging from 1 to 7, thus showing that most participants reported a maximal emotional impact. Three weeks after the events, the average DES impact was of 5.24 ($SD = 1.29$) whereas 8 weeks later, it still exceeded the medium of the response scale, with a value of 4.66 ($SD = 1.36$). This huge emotional impact led to expect very high levels of social sharing (Rimé et al., 1998). Social sharing indeed abounded in our sample in the weeks following the attacks. Thus, 1 week after the event, 98.9% of our respondents manifested that they had shared about it at least to some extent. Three weeks after the event, the corresponding proportion still reached 84.5%. Finally, 8 weeks after the attacks, a bit more than half of respondents, 51.0% reported that they had still talked about the event. These proportions perfectly replicate those which have been reported in previous investigations of the social sharing of emotion (Rimé, 2009; Rimé et al., 1998). They confirm the generality of social communicative behaviors in response to important emotional episodes.

Testing Pennebaker and Harber' (1993) Stage Model of Responses to a Collective Trauma

In order to test the stage model of the temporal evolution of social sharing of emotion and mental rumination after a collective traumatic episode, we first relied upon the scales assessing respectively for each participant (1) the extent to which they had talked about the event, (2) the extent to which they had heard about it, and (3) the extent to which they had experienced mental rumination about the event. Average values observed on these three scales at the various measurement times are reported in Figure 1. It can be seen that the three curves evolved in parallel. A MANOVA with repeated measure for Time manifested a significant main linear effect of Time for talking, $F(1,644) = 3463,98, p < .0001$, for hearing, $F(1,644) = 23863,67, p < .0001$, as well as for ruminating, $F(1,644) = 1453,98, p < .0001$. At 1 week after the event, very high values occurred for all three variables. At 3 weeks, the values had decreased sharply, reaching a level which was slightly below the medium of the response scale. Finally, at 8 weeks, another decrease had occurred and all three manifestations had reached negligible levels. Paired t -tests comparing talking and hearing at the various observation times systematically yielded p values $< .001$, thus showing that on average, people continuously heard about the event more than themselves talked about. Paired t -tests comparing talking and ruminating evidenced a significant value ($p < .01$) at time 1, showing that initially, people talked more about the event than they ruminated about it. No difference was found in this comparison at time 2, whereas at time 3 a reverse affect was found, showing that people ruminated more than they talked ($p < .001$).

After our examination of the average extent to which respondents had talked, heard, and ruminated about the event, a second way to test the stage model consisted in looking at the respective proportion of respondents who did so. Figure 2 displays these proportions for the various measurement times. It reveals that initially, all three manifestations concerned virtually everyone in the sample. All the respondents had talked, had heard, and had ruminated about the event. Later on,

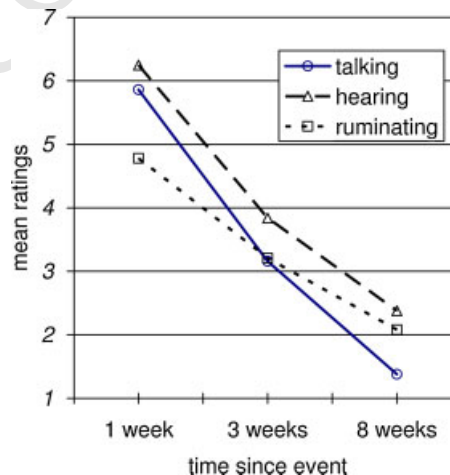


Figure 1. Mean ratings for the scales assessing respectively extent of talking, hearing, and ruminating about March 11th terrorist attacks at the various measurement times

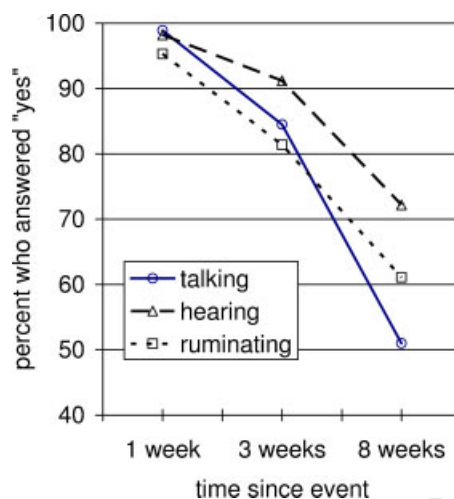


Figure 2. Proportion of respondents who reported talking, hearing, and ruminating about March 11th terrorist attacks at the various measurement times

however, the three variables evolved differently in such a manner that at the end of the observation period, there were more respondents who reported hearing (72.2%) than there were who reported talking about the event (51%); also there were more respondents who reported ruminating (61.1%) than there were who reported talking about the event (51%).

To sum up, it was found that the three investigated manifestations initially reached average levels among individuals very high levels and concerned virtually everyone in the sample. The intensity of these manifestations reached negligible levels 2 months after the event. At that time though, the proportion of respondents who reported talking, hearing, and ruminating still exceeded 50% for all three variables. Our first set of observations revealed that initially, people talked about the event more than they ruminated it; 2 months later, however, a reverse effect was found. In addition, at all three measurement times, participants heard more than they talked. The second set of observations confirmed this progressive preponderance across time of hearing upon talking in the cohort. It also manifested a progressive preponderance of ruminating upon talking.

Social Sharing Index

In our subsequent analyses, the two scales assessing social sharing (frequency of talking and frequency of hearing) will be integrated into one single social sharing index. In order to assess the convergent validity of these two scales, we examined associations between respondents' ratings of these scales and their open answers to the questions on "number of people they talked to" and "number of times they talked." Talking and hearing correlated positively and significantly, $r(644) = .59, p < .001$. The "talking scale" correlated with the number of times participants had talked, $r(644) = .22, p < .001$, as well with the number of people they had talked to, $r(644) = .16, p < .001$. To illustrate, participants who had rated "2" on the 7-point talking scale reported having talked on average to 6.5 persons and 5.6 times, those had rated "4" reported that they talked to 12.8 people and 13.6 times, and those who had rated "7" reported having spoken to 25.4 people and 38.2 times. The "hearing scale" also correlated with the number of times respondents had talked, $r(644) = .28, p < .001$, as well as with the number of people they talked to, $r(644) = .17, p < .001$. Participants who had rated "2" on the 7-point hearing scale reported having listened to an average of 3.4 people and 4.67 times, those who had rated "4" reported having listened to 8.8 people and 7.6 times, and those who had rated "7" reported having listened to 32.3 people and 43.9 times. Of course, answers to such open questions meant no more than gross estimations and could clearly not be taken literally. Nevertheless, the results just considered confirmed the validity of the questions on active and passive sharing—as speaker and as hearer. They all concur theoretically with the construct of interpersonal verbal communication about emotions. The two scales being markedly correlated, their average value was used hereafter as an indicator of social sharing.

Two-sided Effects of the Social Sharing of Emotion

The next step consisted in testing the two-sided view of the consequences of sharing emotions. The first side predicted that (1) repeated verbal emotional expression about the critical event would not reduce and might even sustain the intensity of the critical event-related emotional arousal and mental rumination, and (2) when intensive social sharing is still manifested some weeks after the critical event, it would end up in enhancing event-related mental ruminations and emotional arousal. Table 1 displays bivariate correlations proper to assess the validity of these predictions. If negative, correlations between indices of social sharing at a given time and emotional intensity and mental rumination at a later time would support a cathartic, discharge view of effects of sharing emotions. If positive, such correlations would support our view according to which early emotional sharing would reactivate the emotional turmoil, and late emotional sharing would indicate a lack of extinction of this turmoil. As can be seen from Table 1, all the correlation between social sharing and DES Emotional Intensity happen were positive ones. In particular, extent of sharing at time 1 predicted significantly DES Emotional Intensity at time 2 and at time 3. However, later social sharing (time 2) did not held significant correlations with concurrent nor with later DES Emotional Intensity. Finally, late sharing (time 3) had a positive concurrent correlation with DES Emotional Intensity at time 3. As regarded mental rumination, all its correlations with social sharing were positive and significant, or at least marginally significant. Thus social sharing at time 1 predicted positively the extent of mental rumination at time 2 and at time 3, social sharing at time 2 predicted positively the extent of mental rumination at time 3, and social sharing at time 3 had a concurrent marginally [significant](#)^{Q3} positive correlation with mental rumination at time 3.

Should we then conclude that sharing an emotion does not help and should be discouraged? The other face of the two-sided view of the social sharing of emotion proposes an answer in the opposite direction. It indeed predicts emotional expression about a critical experience to yield important psychosocial benefits for the actor. More specifically, sharing an emotion would open upon an enhanced social integration (i.e., lower perceived loneliness, higher perceived social support, and higher positive affect) of the person who shared as well as to an enhanced perception by this person of a positive emotional climate in the society (perceived climate of solidarity, of hope, of trust...). In addition, Tedeschi and Calhoun (2004) proposed that emotional disclosure contributes to the development of post-traumatic growth. We will first test the validity of these predictions in examining, controlling for DES Emotional Intensity, the bivariate correlations between on the one hand, measures of social sharing (sum of the two items examined in the previous section) at time 1, 2, and 3 and on the other hand, measures of social integration (social support; loneliness; and Positive Affect) and positive life changes (positive emotional climate; post-traumatic growth). As regards social integration, social sharing at time 1 had significant predictive correlations in the expected direction with all three relevant variables, with positive correlations for Positive Affect at time 2 and at time 3 (both p 's < .05), a negative correlation for Loneliness at time 3 (p < .05), and positive correlations for Social Support at time 2 and at time 3 (both p 's < .05). With some exception for Positive Affect, social sharing at time 2 and at time 3 was virtually devoid of predictive or concurrent correlations supporting the predicted

Table 1. Bivariate correlations between social sharing of emotion, DES emotional intensity, and mental rumination at the various measurement times

	Social sharing		
	At time 1	At time 2	At time 3
DES emotional intensity			
At time 1 (1 week after the event)	.06	.03	.06
At time 2 (3 weeks after the event)	.19**	.05	.11*
At time 3 (8 weeks after the event)	.19**	.05	.11*
Mental rumination			
At time 1 (1 week after the event)	.17**	.11**	.11*
At time 2 (3 weeks after the event)	.17**	.24**	.11*
At time 3 (8 weeks after the event)	.13**	.15**	.13*

Pearson product-moment coefficients. * p < .05; ** p < .01 (two-tailed).

enhancement in social integration. As regards positive life changes, here again, social sharing at time 1 provided predictive correlations consistent with the view that sharing contributes to their enhancement, with positive correlations with all the subscales and the total scale of post-traumatic growth as assessed at time 2 (all p 's < .01), and with a positive correlations with positive emotional climate as assessed at time 3 (p < .01). Social sharing at time 2 predicted only partially post-traumatic growth—it correlated positively with intrapersonal and with interpersonal benefits (both p 's < .01). Finally, social sharing at time 3 had concurrent positive correlations with the latter two variables (respectively, p < .05 and p < .01).

In sum, the prediction according to which sharing an emotion would bring the person a broad spectrum of psychosocial as well as personal benefits was fully supported by the data pertaining to the social sharing developed in the initial period following the critical event. For residual social sharing, or the social sharing manifested later in time, the support was much less clear. It can thus be concluded that, at least as far as regards initial social sharing of emotion, the two-sided view of the effects of sharing an emotion is nearly perfectly supported by the longitudinal data collected in the aftermath of the terrorist attacks occurred in Madrid. We now turn to an analysis of these data using SEM, with a specific concern for the prediction of positive life changes.

Social Sharing of Emotion and Positive Life Changes

Previous studies evidenced women to report stronger emotional responses to events as well as a higher level of coping (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001). It was also found that psychological proximity and the level of exposure to a trauma was related to respondents' reactions to this trauma (see Conejero & Etxeberria, 2007, for an analysis of the differences between Spanish regions and the role of national identification on personal reactions and emotional climate in the context of March 11 terrorist attacks). For these reasons, it seemed careful to take into account the gender of our participants as well as their personal involvement in March 11 attacks, and to use them as co-variables in the following analyses. Thus, we will first conduct an inspection of the correlations between our participants' sex and involvement in March 11th attacks and the main variables of the study. Thereafter, we will examine by means of Structural Equation Modeling (SEM), the predictive validity of relationships.

Table 2. Bivariate correlations between social sharing of emotions and variables assessing (1) social integration (social support, loneliness, and positive affect) and (2) positive life changes (post-traumatic growth and positive emotional climate)

	Social sharing		
	At time 1	At time 2	At time 3
Watson PANAS positive affect scale			
At time 2 (3 weeks after the event)	.09**	.07*	.07*
At time 3 (8 weeks after the event)	.11**	.06	.07*
UCLA loneliness scale			
At time 2 (3 weeks after the event)	-.04	-.02	-.04
At time 3 (8 weeks after the event)	-.08*	-.01	.01
Vaux social support scale			
At time 2 (3 weeks after the event)	.07*	.02	-.01
At time 3 (8 weeks after the event)	.11*	.03	.03
Post-traumatic growth (3 weeks after the event)			
Intrapersonal benefits	.11**	.11**	.10*
Interpersonal benefits	.14**	.11**	.16**
Collective benefits	.11**	.07	.07
Total post-traumatic growth	.14**	.11**	.13**
Positive emotional climate			
1 week after the event	.04	.02	-.01
8 weeks after the event	.15**	-.01	.03

Pearson product-moment coefficients. * p < .05; ** p < .01 (two-tailed).

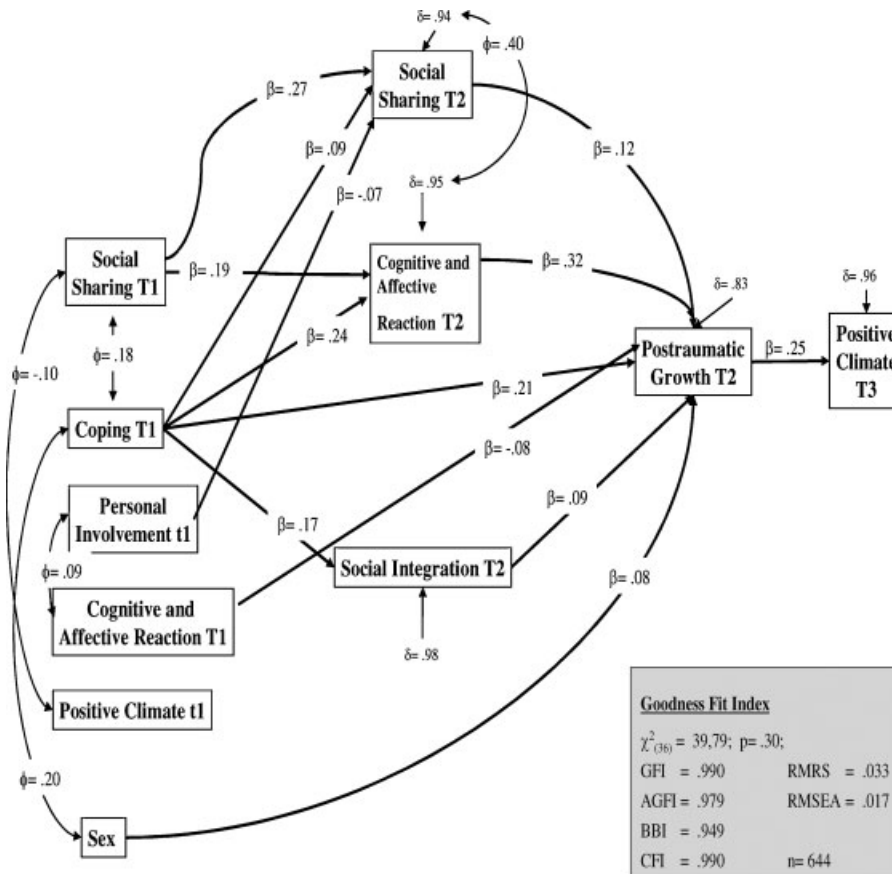


Figure 3. Structural relation among social sharing, coping, personal involvement, sex, social integration (social support/positive affect), emotional arousal or intensity, post-traumatic growth, and positive emotional climate

Women reported (biserial correlation, Men = 1, Women = 2) higher coping by mean of social support and positive reappraisal, $r = .21, p < .01$, higher social integration at 3 weeks, $r = .11, p < .05$, higher post-traumatic growth, $r = .209, p < .01$, and higher cognitive affective reaction at three, $r = .19, p < .05$ and at 8 weeks, $r = .16, p < .05$. Participants who reported personal concerns about March 11 event (biserial correlation, Involved = 2, No = 1) also reported a higher social sharing at the first week, $r(644) = .18, p < .05$, a higher coping by mean of social support, $r = .10, p < .05$, and a higher cognitive affective reaction (negative emotions and rumination) at three, $r = .12, p < .05$ and 8 weeks, $r = .11, p < .05$. They reported also a lower perceived positive climate at 8 weeks, $r = -.08, p < .05$. Emotional climate and social sharing were unrelated to gender, with the exception of a negative correlation at 8 weeks with sharing, $r = -.13, p < .05$. Subjective involvement was unrelated to post-traumatic growth and social integration, as well as to positive climate at 1 week.

Bentler's EQS Structural Equations Program was used to contrast different theoretical models for the structural relations between Social Sharing, Coping by Social Support, Cognitive-Affective Reaction (i.e., rumination and DES Emotional Intensity), Social Integration, Post-traumatic Growth, and Positive Emotional Climate. Due to the medium sample size, observed variables were used for the analyses. A model stressing the direct effect of Time 1 variables on Time 3, and a mediational model were compared against each other. EQS yielded a final model (see Figure 1) with the best fit for the data, $\chi^2(36, N = 661) = 39.79, p = .30, CFI .990$. CFI values [above](#)^{Q4} .90 are acceptable.

In this model, a significant path was found between post-traumatic growth at time 2 and positive emotional climate at time 3. There was also a significant direct moderate path between coping at times 1 and post-traumatic growth at time 2, as well as with Social integration at time 2. As predicted, coping at time 1, cognitive-affective reaction, social sharing and social integration at time 2 show a significant direct path on post-traumatic growth. Both coping and social sharing show a

significant path with Emotional Intensity and Social Sharing at time 2. Rumination and emotional intensity or cognitive affective reaction at time 1 also shows a significant negative path on post-traumatic growth at time 2. The indirect paths of social sharing and coping at time 1 with post-traumatic growth were significant and mediated by emotional intensity and social sharing at time 2. The indirect path between coping at time 1 and positive emotional climate was significant and mediated by post-traumatic growth. Indirect paths of social sharing and cognitive-affective reaction at time 2 with positive emotional climate at time 3 were also significant and mediated by post-traumatic growth. Covariances were significant between rumination and emotional intensity or cognitive reaction and personal involvement, coping by seeking social support and social sharing, and between social sharing and positive climate at time 1 (negatively). Gender direct path on post-traumatic growth were also significant, meaning that when controlling all variables, women report higher benefits finding. Personal involvement did not show a significant path with social sharing at time 2 and covariates with cognitive affective reaction at time 1, as could be expected.

DISCUSSION

March 11th events in Madrid had a very high emotional impact on participants, vicariously victimized, and as we expected (Rimé et al., 1998), their initial emotional responses measured 1 week after these events involved overabundant mental rumination and social sharing of emotions. This impact was higher for people who were more involved subjectively. The latter reported higher sharing, coping, cognitive-affective reaction, and a less positive emotional climate at follow up. These results are congruent with previous studies reporting that proximity to collective violence and identification with victims were associated to stronger reactions (Conejero & Etxeberria, 2007). Also coherent with previous review, compared to men, women report higher coping (Compas et al., 2001), post-traumatic growth (Helgeson et al., 2006), and rumination and emotional reaction (Nolen-Hoeksema & Davis, 2005). In addition, the present study showed women to report higher social integration at 3 weeks. Confirming previous observation from the study of the social sharing of emotion (Rimé et al., 1998), no differences occurred between men and women for social sharing, except for a lower level of social sharing among females at 2 months. As long term sharing manifests poor recovery, these results suggest that women evidence a more adaptive coping style. Controlling for these variables, women showed a higher post-traumatic growth in a multivariate analysis conducted by means of SEM. As expected and coherent with previous studies on September 11th and March 11th terrorist episodes (Conejero & Etxeberria, 2007), people who feel close to victims and who express a personal concern reported higher reactions and a lower positive emotional climate 2 months later. However subjective proximity to victims did not affect post-traumatic growth. Moreover, when controlling for these variables, personal involvement did not manifest a significant influence on the main outcomes.

What conclusion can be drawn from our observations as regards the validity of the stage model which was proposed by Pennebaker and Harber (1993)? According to this model, responses to a collective traumatic event involve first a 2–3 weeks emergency stage characterized by intensive sharing, rumination, arousal, and solidarity, and then a 2-month adaptation stage at which the various psychological and social responses would drop markedly. In our data, the temporal evolution revealing very high initial levels for the cognitive and social responses to a collective trauma and very low levels after a period of 2 months fit perfectly what Pennebaker and Harber (1993) had predicted. Yet, our data showed that even when the levels of these variables were low, a non-negligible proportion of the population (more than 50%) kept hearing, talking, and ruminating. The findings demonstrating that talking was progressively surpassed by hearing as well as by ruminating also nicely fit Pennebaker and Harber's expectations. It fits the view that a collective emotional event elicits a particular psychosocial dynamic in which members of the concerned community have their own emotions—and consequently their own need to talk—continuously reactivated by the need to talk and actual talking manifested by people around them (Rimé, 2007). According to a specific prediction of the stage model, mental rumination was expected to be maintained at high levels 1 month after the event whereas social sharing would vanish at this moment. Our measurement time 2 occurred 1 week before the time specified by the model. Our intensity data in which talking, hearing, and ruminating evolved strictly in parallel, did not fit the prediction. Yet, our proportion data, which might be closer to what Pennebaker and Harber (1993) had in mind, clearly followed the trend they had predicted. All in all, thus, the present data were strongly supportive of the stage model of psychosocial responses to a collective trauma.

Our investigation addressed the adaptational consequences of socially sharing emotions elicited by the collective trauma with a particular focus on a two-sided view of these consequences. An analysis of correlations between measures of social sharing and of emotional impact of March 11th events made immediately apparent that sharing emotions was associated with a higher initial emotional impact and was also predictive of a higher emotional impact at later measurement times, as predicted by our first side hypothesis. Moreover, concurrent correlations indicated that people who were still sharing emotions 2 months after the events were also higher on variables reflecting the emotional impact these events still had. These observations are in line with previous studies showing that sharing emotions has reactivating effects with regard to the shared emotional experience (Rimé et al., 1998) and that it fails to yield positive effects for emotional recovery. All in all thus, the findings totally contradicted the cathartic or discharge view of emotional expression. They were fully consistent with views that *merely* sharing an emotion yields emotional arousal and emotional reactivation (Rimé et al., 1998; Zech & Rimé, 2005) and that sharing an emotion cannot lead to emotional resolution unless it involves a *systematic cognitive processing* of the shared emotional experience (Rimé, 2009).

Paradoxically, however, as was predicted by the second side of the two-sided view, socially sharing emotions in the first week after March 11 events was also found associated with a good number of markers of social integration and well-being assessed in later weeks. Thus, the initial sharing of emotions related with (1) higher perception of social support, reduced feelings of loneliness and enhanced positive affect at 3 and 8 weeks, (2) a strengthened perception of positive changes in reaction to trauma, or of post-traumatic growth, and (3) a reinforced perception of contentment, hope, solidarity, and confidence in the emotional climate. Multivariate analysis by means of SEM showed that social sharing effects at time 1 on post-traumatic growth were indirect and mediated by social sharing at time 2 and by emotional arousal or intensity at time 2. Positive effect of social sharing at time 2 on positive emotional climate were mediated by post-traumatic growth. Thus, direct and indirect effects of social sharing on positive outcomes were observed. These results support theoretical views according to which the social sharing of emotions fulfills important functions to the enhancement of social cohesion and to the reconstruction of positive beliefs about the group (Rimé, 2009; Rimé et al., 1998). They also fit findings from experimental studies showing that even though sharing emotions was not conducive to emotional recovery, participants in sharing sessions reported a good number of positive benefits from such sessions (Zech & Rimé, 2005).

Bivariate and particularly multivariate results confirmed that emotional intensity, social sharing, coping by social support, and social integration are the main predictors of post-traumatic growth. Other studies also found that measures of emotional upset were positively associated with a number of benefits. For instance, Davis and Macdonald (2004) observed that distress was a positive predictor of the extent to which people reported post-traumatic growth 6–11 weeks after September 11th. This suggests that some emotional distress and arousal may be a necessary condition for people to perceive benefits or growth (Armeli, Gunther, & Cohen, 2001). Multivariate results confirmed that coping was a stronger predictor of post-traumatic growth than social sharing. Raw social sharing is thus less functional in this regard than an intentional coping reaction which includes both the search of emotional support and cognitive reevaluation. Positive effects of this type of coping are congruent with previous meta-analysis and reviews (Compas et al., 2001; Penley et al., 2002).

To sum up, the above results brought us two sets of facts which at first sight, are as opposed as they can be. On the one hand, initial social sharing of emotions and coping by means of social support were associated to and found to be predictive of enhanced emotional arousal and social sharing at 3 weeks. On the other hand, the same variables were also found to be significant predictors of effects in the opposite direction, such as enhanced social integration, post-traumatic growth, and positive emotional climate. The question then arises of how to integrate these two sets of results in a reconciling theoretical framework. Two different processes seem to be at play behind the paradoxical effects of the social sharing of emotions and coping by emotional expression and social support. On the one hand, by virtue of reactivation of the negative emotional experience, both coping, and social sharing reinforces negative affect and rumination which contributes to the formation and maintenance of a negative emotional climate. On the other hand, social sharing and coping have a number of immediate positive consequences on interpersonal relationships because they open upon effects such intimacy, empathy, prosocial behaviors, enhanced social support, affiliation, and enhanced social integration (Christophe & Rimé, 1997; Rimé, 2009). Research has also shown that social support significantly reduces reactions to stress (Martínez-Sánchez & Páez, 2004). Participating in verbal communication about a collective emotional event thus reinforces positive beliefs about relations with others and the social world. It emphasizes the positive aspects of response to trauma and at the same time, it strengthens the perceived social cohesion. It can thus be concluded that both social

sharing and coping reinforce the perception of solidarity, of trust, of contentment and of hope through the many interpersonal benefits which emotional expression in an interpersonal context can provide.

Our results and their interpretation fit well a social functionalist perspective on collective activities of remembering. Thus, in his classic work titled “The Elementary Forms of Religious Life,” Durkheim (1912) argued in favor of the socially functional nature of shared activities of recall of emotional events, especially when they regard events which affected the social group or community. His view involved the following aspects. First, in shared activities in which a common emotional event is recalled, participants’ attention becomes focused on one and the same element. Second, activities of this type induce among participants a convergence through a reciprocal intensification of emotions and beliefs. Third, the process further provokes an emotional contagion because of the verbal and non-verbal exchanges involved and because of the shared collective behaviors developed by participants. Fourth, this sharing of affect contributes to build up a similarity in beliefs and a common emotional climate among participating individuals. Fifth, a similarity in beliefs and a common emotional climate both are necessary preconditions to social cohesion and to the construction of social representations, or shared positive beliefs, about the group. If we [follow](#)^{Q5} Durkheim (1912), sharing emotions after a collective trauma would fulfill the same function as participating in ceremonies and rituals. Such social behaviors would be functional because they contribute to the search for meaning, to the reinforcement of positive affect, to the enhancement of interpersonal integration and social cohesion, and to the strengthening of positive shared beliefs about the society. These processes help to compensate the negative affects which were elicited by the traumatic event and were maintained by the social sharing process. The findings of the present longitudinal study on the social sharing of events of March 11th largely supported these various functions.

CONCLUSION

This study contributed to shed light on the paradox of the verbal expression of emotions. It confirmed that talking about a vicarious traumatic event incurs the cost of maintaining negative emotional arousal, even though it opens at the same time on a good deal of positive effects such as social integration, reinforcement of social support and positive affect, reinforcement of positive social beliefs, and the creation of a more cohesive social climate. It supports the idea that as regards to these cohesive effects, the most important mediating process probably lay in changes that the social sharing of emotions elicits in social representations about the group. The latter would be anchored, in turn, in strong cognitive-emotional arousal and also on social integration and actual supportive mobilization of the group.


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