ORIGINAL RESEARCH

Management of traumatic events: influence of emotion-centered coping strategies on the occurrence of dissociation and post-traumatic stress disorder

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Abstract: Our aim was to assess the influence of the coping strategies employed for the management of traumatic events on the occurrence of dissociation and traumatic disorders. We carried out a 1-year retrospective study of the cognitive management of a traumatic event in 18 subjects involved in the same road vehicle accident. The diagnosis of post-traumatic stress disorder (PTSD) was made for 33.3% of the participants. The participants with a PTSD diagnosis 1 year after the event used emotion-centered strategies during the event more often than did those with no PTSD, $P < 0.02$. In the year after the traumatic event, our results show a strong link between the intensity of PTSD and the severity of the post-traumatic symptoms like dissociation ($P = 0.032$) and the use of emotion-centered strategies ($P = 0.004$). Moreover, the participants who presented Peritraumatic Dissociative Experiences Questionnaire scores above 15 made greater use of emotion-centered coping strategies than did those who did not show dissociation, $P < 0.04$. Our results confirm that the cognitive management of traumatic events may play an essential role in the development of a state of post-traumatic stress in the aftermath of a violent event.

Keywords: trauma, coping, emotions, peritraumatic dissociation, post-traumatic stress disorder

Introduction

Post-traumatic stress disorder (PTSD) is a particularly disabling illness induced by exposure to a shocking event.[1,2] The prevalence of this disorder is high, with figures for the general population in the range of 1%–9% and up to 39% among victims of road accidents.[3–5]

Although the onset of PTSD after experiencing a traumatic event is still hard to predict, the presence of a state of peritraumatic dissociation (time distortion, reduced awareness, emotional numbing, amnesia, and derealization) may influence its advent nonspecifically.[6–10] However, this reaction, which reflects the immediate impact of the event, is complex and heterogeneous, and it has been suggested that its clinical dimensions or factors associated with its onset should be examined.[8] Hence, the study of the immediate response to the traumatic experience offers a promising avenue of investigation, in particular through the coping strategies used by patients to mitigate or control external threats.[11]

For Folkman and Lazarus,[12] coping corresponds to all the cognitive and behavioral efforts made to control, reduce, or tolerate the internal or external requirements that threaten or overwhelm the individual's response capacity, ie, the regulation of emotional

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distress (internal) and problem management (internal or external). Several authors have sought to characterize these strategies, eg, according to how the subject reacts to the situation.[13–15] In this article, we refer to three types of regulations proposed by Lazarus and Folkman[16] in 1984. These regulations are problem-centered coping, emotion-centered coping, and coping centered on social support. Problem-centered coping comprises two factors: problem solving (seeking information, devising action plans) and facing the situation (direct effort and action to address the problem). Emotion-centered coping is an attempt to manage the emotional responses induced by the situation. This management or regulation of the emotions can be performed in different ways (emotional, physiological, cognitive, or behavioral). Numerous strategies belong to this category, including substance use, physical activity, expression of emotions, feeling of responsibility, minimization of the event, alteration, denial or avoidance of reality, hoping for a miracle, and use of the imagination. Among all these emotional behaviors, avoidance of the event seems to particularly influence evolution to PTSD, suggesting that emotion-centered strategies (avoidance, flight, denial, or self-accusation) may lead to more negative outcomes after a traumatic event than do problem-centered strategies (seeking information, making problem-solving plans).[17–19] Emotion regulation deficits may also be associated with negative outcome to PTSD.[20] However, the place taken by emotion-centered strategies other than avoidance has not been fully explored. We set out to examine the influence of emotional response in the occurrence of disorders, both acute (peritraumatic dissociation) and delayed (PTSD) after exposure to a traumatic event.

The main aim of our study was to seek a link between the use of emotion-centered strategies and the occurrence of a state of post-traumatic stress. Our secondary aims were to assess the link between peritraumatic dissociation and PTSD and to show that the implementation of emotion-centered coping strategies was more often associated with the intensity of peritraumatic dissociation.

Method

This was a retrospective study of a population of 24 firefighters who survived a bus crash in May 2005. This particularly serious accident, involving 26 people (two dead, four seriously injured), occurred while they were travelling abroad on a trip. This noninvasive research was approved by an ethical institutional board.

Data collection was carried out 1 year after the traumatic event using a standardized semistructured questionnaire

to record sociodemographic data associated with clinical evaluation scales comprising the following:

- The Mini-International Neuropsychiatric Interview (MINI) and the Clinician-administered PTSD Scale Part 2 (CAPS-2), which determines the diagnosis of PTSD according to the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, and measures its intensity.[21–23]

- The Peritraumatic Dissociative Experiences Questionnaire (PDEQ), a 10-item self-questionnaire used for the retrospective assessment of awareness dissociation features on exposure to trauma.[24] The French version (PDEQ-10- Self Report Version [SRV]) used was translated by Birmes et al.[25] The score was obtained by summing the 10 items. Marmar et al[26] suggested a clinical positive threshold of 15 (score above which patients are considered as having presented an episode of peritraumatic dissociation).

- The Ways of Coping Checklist (WCC), a coping scale inspired by Folkman and Lazarus' transactional model of stress.[27] The original scale had 68 items and assigned coping strategies to three types: problem-centered, emotion-centered, and centered on social support, defined by Lazarus and Folkman.[16] In our study, we used the 42-item French version validated by Bruchon-Schweitzer et al.[28] This French version presents a strong construct and criterion validity, and the factor structure is stable across gender.

The participants who gave informed consent were seen individually at a visit in the psychiatry unit of the emergency ward. The interviews, which lasted 3 hours, were carried out by the same psychiatrist, who was trained in administering questionnaires. All the patients were evaluated during the month of May 2006, ie, 1 year after the accident. The assessment of PTSD occurrence using CAPS-2 and MINI was carried out over the previous 11 months (so that PTSDs resolving in this period were included). Self-questionnaires were also administered during this visit. With regard to the instructions, the stated reference period for filling out the PDEQ and WCC self-questionnaires was the period immediately following the event.

Statistical analysis

We used version 15.0 of the SPSS software (SPSS Inc., Chicago, IL, USA) to conduct statistical analyses. Sociodemographic data and scale scores were processed with the descriptive statistics method. The normality of the data was assessed by calculating skewness and kurtosis

statistics (the criterion chosen was that the dividend of the coefficient and the standard errors did not exceed ±2.0). All score scales were normally distributed. Relationships between continuous variables were analyzed with Pearson's product moment correlation coefficient. The following procedure was employed to identify bivariate outliers. First, scale scores were transformed in Z scores (ie, mean [M] = 0 and standard deviation [SD] = 1), then Mahalanobis D^2 was measured.[29] Z and D^2 critical thresholds were 2.70 and 9.92, respectively. No participant exceeded the thresholds. Because of the small size of the sample, between-group comparisons were performed with a two-tailed nonparametric test (Mann–Whitney U test), and a χ^2 statistic was used to compare nominal variables. A probability value of 0.05 was taken as the significance level. In order to explore the influence of dissociation on the occurrence of PTSD we chose to dichotomize the sample in two groups based on the approach proposed by Marmar et al,[26] who suggested that patients who presented a clinical positive threshold of 15 on the PDEQ are considered as having an episode of peritraumatic dissociation.

Results

Out of the 24 people involved in the accident, 18 (75%, 11 men and 7 women) agreed to take part in our study (mean age: 46.6 years ± 11.1, Table 1). Six patients could not be included in the study, of whom two had moved, two had neurological sequelae that were not compatible with filling out questionnaires, and two refused to recall the accident. No difference between participants and nonparticipants concerning mean age and gender was found (Table 1). All participants had similar educational level (associate-level degree).

PTSD was diagnosed 1 year after the event for six participants (33.3%) by the MINI and confirmed by the CAPS-2 (Table 2). All the patients received psychotherapeutic care after the event. One year after the event, eight patients (44.4%) were taking anxiolytic drugs, one-third antidepressants, and one-third hypnotics. Of the symptoms most often reported 1 year after the event, 13 participants (72.2%) experienced flashbacks and seven (38.9%) experienced arousal. Distress was clinically significant in eight participants (44.4%, Table 2).

Assessment of peritraumatic dissociation gave a mean PDEQ score of 21.5 (SD = 9.8). A clinical score above the threshold of 15 was presented by 12 participants (66.7%).

For the immediate information, the mean WCC scores were 24.6 (SD = 5.2) for problem-centered strategies, 21.1 (SD = 7.6) for emotion-centered strategies, and 24.7 (SD = 4.3) for strategies centered on social support.

Peritraumatic dissociation and PTSD

The total CAPS-2 score (mean [M] = 33.3, SD = 26.8) was significantly correlated with that of the PDEQ (M = 21.5, SD = 9.8), $r = 0.521$, $P < 0.05$ (Table 3). Of the participants presenting with a PTSD 1 year after the event, those who presented a peritraumatic dissociation after the trauma differed from those who did not (PDEQ score < 15) in their CAPS-2 total score (M = 40.1 ± 25.4 vs M = 9.8 ± 10.5), $Z = 2.536$, $P < 0.01$, and their mean scores for two criteria of CAPS-2 (Table 2). However, of the participants who presented no PTSD 1 year after the event, 50% gave a PDEQ scale score above the threshold score of 15.

PTSD and coping strategies

The participants who presented a PTSD 1 year after the event used emotion-centered strategies more often (M = 28.5, SD = 2.4) than did those with no PTSD (M = 18.9, SD = 7.3), $Z = -2.341$, $P < 0.02$, and, in particular, self-accusation (M = 10.0, SD = 1.8 and M = 5.2, SD = 2.2, respectively), $Z = -2.652$, $P < 0.01$ (Table 4). The mean score for the use of the emotion-centered strategies of the WCC was correlated with the total

Table 1 Descriptive and comparative statistics concerning participants and nonparticipants

Total population (N = 24)	Number of participants (N = 18)	Number of nonparticipants (N = 6)	χ^2	**P**
Gender				
Males (%)	11 (61.1)	4 (66.7)	0.018	>0.05
Females (%)	7 (38.9)	2 (33.3)	0.063	>0.05
			Z	**P**
Mean age, years (standard deviation)	46.6 (11.1)	40.7 (3.6)	−1.002	0.317
Treatment at 1 year after event				
Antidepressant (%)	6 (33.3)	NC		
Anxiolytic (%)	8 (44.4)	NC		
Hypnotic (%)	6 (33.3)	NC		

Abbreviation: NC, not communicated.

Table 2 Relation between peritraumatic dissociation, coping strategies, and post-traumatic stress disorder

	Total population (N = 18)			Participants above the threshold (N = 18)	Peritraumatic dissociation present (PDEQ ≥ 15, N = 12)			Peritraumatic dissociation absent (PDEQ < 15, N = 6)			Z	P
	Mean	SD	Range	N (%)	Mean	SD	Range	Mean	SD	Range		
Criteria of CAPS-2												
A: Presence of traumatic event				18 (100)								
B: Flashback	13.0	11.1	0–33	13 (72.2)	17.1	10.6	1–33	2.8	5.7	0–13	2.647	0.008
C: Avoidance/numbing	10.0	9.9	0–29	6 (33.3)	10.0	8.9	0–29	5.0	4.6	0–9	1.010	0.312
D: Arousal	10.3	9.4	0–30	7 (38.9)	13.0	9.3	0–30	2.0	2.4	0–6	2.438	0.015
E: Duration ≥3 months	9.2	4.9	0–12	15 (83.3)								
F: Distress	3.4	3.2	0–9	8 (44.4)	4.2	3.4	0–9	1.0	1.2	0–3	1.724	0.085
Total CAPS-2 score	33.3	26.8	2–80	6 (33.3)[a]	40.1	25.4	8–80	9.8	10.5	2–28	2.536	0.011
WCC strategies												
Problem solving	24.6	5.2	17–35		25.4	5.5	17–35	21.2	2.6	17–24	1.273	0.203
Emotion-centered coping	21.1	7.6	9–34		22.9	7.3	10–34	14.8	4.7	9–22	2.059	0.039
Social support	24.7	4.3	17–32		24.9	4.4	17–32	23.6	4.5	18–29	0.597	0.597
PDEQ	21.5	9.8	10–41	12 (66.7)								

Note: [a]The same proportion was found according to the Mini International Neuropsychiatric Interview.
Abbreviations: CAPS-2, Clinician-administered PTSD Scale Part 2; PDEQ, Peritraumatic Dissociative Experiences Questionnaire; SD, standard deviation; WCC, Ways of Coping Checklist.

CAPS-2 score, $r = 0.642$, $P = 0.004$ (Table 3). Significant correlation coefficients were obtained for self-accusation and imagination strategies (Table 3).

Peritraumatic dissociation and coping strategies

The subjects who presented a PDEQ score above 15 used emotion-centered coping strategies more often (M = 22.9, SD = 7.3) than did the others (M = 14.8, SD = 4.7), $Z = 2.059$, $P < 0.04$ (Table 2). Moreover, we found no significant link between coping strategies as classified into three types by the WCC (ie, problem-centered, emotion-centered, and centered on social support) and the intensity of the peritraumatic dissociation measured by the PDEQ. On the other hand, using the classification of Roth and Cohen[13] (approach versus avoidance), we obtained a significant positive correlation

between the intensity of the peritraumatic dissociation (PDEQ score) and the implementation of avoidant coping strategies (measured on the WCC scale), $r = 0.506$, $P < 0.04$, but not for the other emotion-centered strategies (self-accusation or imagination (Table 3).

Discussion

Our results show a strong link between the intensity of PTSD and the severity of the post-traumatic symptoms like dissociation and the use of emotion-centered strategies. They support the hypothesis that there is a link between the intensity of peritraumatic dissociation after the event and the intensity of PTSD, as shown by the correlation between the CAPS-2 and PDEQ scores. These results are consistent with those in the literature[30–32] and, in particular, for road accident victims, as shown by a study by Ursano et al,[33]

Table 3 Correlation coefficients (Pearson's r) between Clinician-administered PTSD Scale Part 2 (CAPS-2) and Peritraumatic Dissociative Experiences Questionnaire (PDEQ) scores and coping strategies measured by the Ways of Coping Checklist

N = 18	CAPS-2	PDEQ	Emotion	Avoidance	Imagination	Self-accusation
PDEQ	0.521[a]					
Emotion	0.642[b]	0.417				
Avoidance	0.326	0.506[a]	0.617[b]			
Imagination	0.529[a]	0.285	0.878[c]	0.654[b]		
Self-accusation	0.664[b]	0.199	0.901[c]	0.393	0.782[c]	
Problem solving	0.021	−0.034	0.266	0.182	0.459	0.336
Social support	0.208	0.109	0.379	0.052	0.335	0.463

Notes: [a]$P < 0.05$; [b]$P < 0.01$; [c]$P < 0.001$.

Table 4 Comparison of mean Ways of Coping Checklist (WCC) scores between participants with and without post-traumatic stress disorder (PTSD)

WCC strategies	PTSD present (N = 6)			PTSD absent (N = 12)			Z	P
	Mean	Standard deviation	Range	Mean	Standard deviation	Range		
Problem solving	25.5	5.3	20–31	24.3	5.4	17–35	−0.267	0.789
Emotion-centered strategies	28.5	2.4	25–30	18.9	7.3	9–34	−2.341	0.019
Avoidance	14.5	3.3	10–18	12.8	3.8	7–22	−0.962	0.336
Self-accusation	10.0	1.8	8–12	5.2	2.2	3–9	−2.652	0.008
Imagination	21.0	3.2	18–25	16.4	4.7	9–24	−1.703	0.089
Social support	27.5	3.7	23–32	23.9	4.2	17–29	−1.280	0.201

who found that road accident victims with peritraumatic dissociation were 4.12 times more likely to develop an acute PTSD and 4.8 times more likely to develop a chronic PTSD than the other patients. This link between the intensity of the dissociational state and the onset of a PTSD has been challenged in a literature review, especially when the assessment is retrospective.[34] However, although the patients who developed a PTSD presented symptoms of peritraumatic dissociation after the event, the presence of this dissociation did not necessarily imply the subsequent onset of a PTSD, as all the patients presented symptoms of peritraumatic dissociation after the accident (lowest score 10). In fact, this symptomatic picture, which is sensitive but not specific, is still poorly predictive of evolution toward a PTSD (unless very intense) and highlights the need to continue research on predictivity factors.[8] Improved predictivity might, for example, be obtained by using the clinical detection threshold of the PDEQ (score ≥ 15) proposed by Marmar et al.[26] In our sample, all the patients with PTSD and 50% of the patients without PTSD 1 year after the event presented clinical peritraumatic dissociation (score ≥ 15) after exposure, suggesting that a higher clinical threshold (score ≥ 22) might be preferable, as advocated by Birmes et al.[35] In our sample, only three patients had a score greater than 22, so we did not test this threshold.

The study of coping strategies implemented to deal with an event may help to define predictability criteria. In our study, the patients presenting a state of post-traumatic stress differed in the coping strategies they implemented after the event from those without this disorder. The participants who presented a PTSD used emotion-centered strategies more often than did those with no PTSD. This relationship may appear in the early reactions, because there seems to be a relationship between the onset of acute disorder and the use of emotion-centered coping strategies. Thus, there was a link between the onset of a state of peritraumatic dissociation and the use of emotion-centered coping strategies.

To our knowledge, the literature reports no work linking emotion-centered strategies to PTSD, apart from the link between the use of avoidant coping strategies and the onset of peritraumatic dissociation.[18,19] Avoidance strategies are disturbance associated with sustainability of traumatism, as shown in a study by Golier et al,[17] in which the authors show in a population of Holocaust survivors that the subjects presenting with a PTSD had recourse to avoidance strategies when faced with trauma exposure. Our work underlines this influence. However, in our work, to extend the literature, we considered not only avoidance strategies but also other types of emotion-centered strategies (self-accusation and recourse to the imagination). This choice stems from the specific context of the study in which a group of victims suffered a traumatic event (a road traffic accident) that occurred at night in a foreign country. In most cases, the victims would not have had time to develop a problem-centered strategy at the moment of the event, because of the suddenness and unexpectedness of this type of accident. In our samples, we can suppose that most victims did not have the opportunity to resolve the problem by developing coping strategies focusing on problem resolution or social support. Indeed, they were in a foreign country and did not speak the language of their rescuers whom they had to wait for 2 hours. Those who have successfully used these strategies have been protected from an unfavourable evolution to dissociation and PTSD. In other types of traumatic event (eg, repeated trauma), it is possible to envisage problem-centered cognitive strategies or nonacute emotional regulation strategies (eg, substance use). This finding raises the question of the influence of the type of event on the type of cognitive strategy developed by individuals. Chung et al[36] have shown that the type of traumatic event (82 witnesses of aircraft accidents versus 66 witnesses of train accidents) influences the type of coping strategy implemented (studied using the WCC). This relationship underlines the need to homogenize the population studied as regards the traumatic event to avoid bias specific to this factor. Our study

also highlights the importance of setting in place immediate therapeutic action based on social and emotional support to address risk-associated cognitive responses. The patients described here did not benefit from this assistance, as their accident happened at night in an isolated spot in a foreign country. Finally, it is also important to note that the use of emotion-focused strategies is not always maladaptive, and it may be more beneficial that this strategy helps overcome the trauma. The help of an empathic therapist in the immediate aftermath of the confrontation or years later may favor resolution.[37]

This work admittedly suffers from a number of limitations, starting with the small sample size, which was justified by our wish to examine a population confronted homogeneously with the same event and to study the coping strategies it implemented. In addition, the retrospective assessment of the processing of the trauma information may be criticized, as the retrospectively measured coping strategy can be modified by the current state and by psychotropic treatment. However, an earlier measurement could equally have been modified by the peritraumatic reaction.[38] Also, several authors consider that coping measured by WCC is stable in time.[28,36] Concerning the PDEQ, Wittmann et al[39] consider that its retrospective assessment is questionable, whereas Marmar et al[40] report a very high stability in time for this scale. Thus, further work needs to be done to explore the importance of immediate processing of information in subsequent outcome. The last limit of our study is that we present "group" differences and analyses with a bisecting of a continuous variable (PDEQ), and this choice can have adverse consequences on the analysis. Other studies have been undertaken in order to check whether the threshold of 15 proposed by Marmar et al[26] can be valid to define categorical data.

Conclusion

The cognitive management of traumatic events has to date been under-researched, and yet it may play an essential role in the development of a state of post-traumatic stress in the aftermath of a shocking event, as shown in this study. It is a factor of influence to be combined with others that have already been identified, such as the type of event and individual perception of it.[2,31] In our study, the first variable was controlled, as the event was the same for all the subjects. In addition, we found that the cognitive management of the trauma was linked to peritraumatic dissociation, which, in the literature, is strongly predictive of the subsequent onset of a PTSD.[33,36,41] In particular, coping strategies focused on emotions seem particularly involved in the occurrence of

disturbances. It is not clear whether this relates to the use of these strategies or failure of these strategies during their use. If the characteristics of a profile that is especially vulnerable to a PTSD can be identified after a traumatic event, then victims can be offered early care adapted to their coping style.

Disclosure

The authors report no conflicts of interest in this work.

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