

Suicide Attempters' Memory Traces of Exposure to Suicidal Behavior

A Qualitative Pilot Study

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Abstract. *Background:* In the course of their lives individuals may encounter the phenomenon of suicide in various ways, for example, directly through suicidal behavior in the family or among peers; or indirectly through hearsay, the media, literature, etc. *Aims:* The study investigates such memory traces (engrams) in patients with and without a suicide attempt. *Methods:* Ten patients from a psychiatric crisis unit who had attempted suicide and ten patients without a history of suicidal behavior were interviewed with a narrative/semistructured interviewing technique. Interviews were video-recorded and fully transcribed. Stepwise reduction of the content was used to develop categories of recurrent memories and models of suicidal behavior. *Results:* Suicide attempters reported more memories of direct exposure to suicidal behavior (e.g., witnessing a suicidal act) than did patients who had no history of attempted suicide. They also reported more own suicidal crises, but associated them more often with interpersonal problems than with depression. They considered suicide more often as normal behavior than nonattempters. The total number of suicide-related memories and their origins was remarkably similar in both groups. *Conclusions:* The results suggest that direct exposure to suicidal behavior may leave engrams (memory traces) that increase an individual's susceptibility to suicidal behavior.

Keywords: attempted suicide, social modeling, episodic memory, narrative interview

"An impression may be so exciting emotionally as almost to leave a scar upon the cerebral tissues" (James, 1890, p. 670).

Suicide is the last stage of individual developmental processes, for which Maris (1981) used the term "suicidal careers." The development toward suicide encompasses a large variety of factors, such as suicide in the family, social role models, repeated experiences of personal failure, contemplating suicide, etc. Estimates of lifetime prevalence of suicide ideation range from 8.9% to 64.8% (Bille-Brahe, 1997). A survey in the United States among a population aged 15 to 54 years (Kessler, Borges, & Walters, 1999) reported a probability of 26% for the transition from suicide ideation to a suicide attempt, and a probability of 72% for the transition from suicide plan to a suicide attempt. It can be assumed that the notion of suicide as an option in human life is common knowledge in a society. Suicidal behavior also has a strong cultural element that, for instance, in Hungary, includes the notion of suicide as an honorable act (Goldston et al., 2008; Leach, 2006).

On a more individual level, it can be assumed that individuals in the course of their life encounter the notion of suicide as an option in various ways, for example, through suicidal behavior in the family or among peers, hearsay,

literature, the media, etc. Suicidal behavior can thus be seen as the result of social learning or modeling (Bandura, 1977, 1986). For instance, Zahl and Hawton (2004) found that young patients who had harmed themselves often identified media portrayals as the source of their attitudes or behavior related to self-harm and suicide. A recent study in Vienna reported that exposure to suicidal behavior in peers was frequent among adolescents: 45% had "first-hand" experience with suicidal peers (Dervic et al., 2007). In a study by De Leo and Heller (2008), adolescent suicide attempters were more likely to have known someone who had completed suicide compared to others who had never attempted suicide. Similarly, a history of self-harm in the family was significantly more frequent in suicide attempters. Experiencing suicidal behavior in family members may – besides genetic transmission – be one of the factors responsible for the familial transmission of suicidal behavior (Melhem et al., 2007).

The meaning of episodic memories may vary in personal relevance for an individual, depending on the emotional loading of past events. Cognitive theories assume the existence of schemas that may be activated in specific situations. These involve all aspects of information processing including selection of data, attentional processes, memory,

and subsequent recall. Integrated cognitive-affective-behavioral schemas associated with physiological arousal have been associated with the concept of the mode (Beck, 1996). More specifically, Rudd, Joiner, and Rajab (2001) have described the suicidal mode, which may be triggered by internal and external stressors.

We hypothesized that individuals who have attempted suicide would differ in their engrams (memory traces) of exposure to suicidal behavior from individuals who had never attempted suicide. More specifically, we expected patients who had made a suicide attempt to have more explicit memories than controls. A narrative interviewing followed by semistructured cueing was chosen in order to allow individual associations of memories related to the same subject. The narrative approach (Angus, Lewin, Bouffard, & Rotondi-Trevisan, 2004) is characterized by open questions inviting the patient to answer in the form of short stories, telling the interviewer about significant personal memories as they come to his or her mind. The semistructured part consisted of additional questions probing for possible origins of engrams that were not mentioned in the patients' spontaneous recall (e.g., "Do you recall any suicidal behavior in school, or in the media?")

Method

Patients

Patients admitted to the crisis unit were asked to participate in the study. Exclusion criteria were psychotic disorders (ICD-10: F2), substance abuse as a primary diagnosis (ICD-10: F1), dementia (ICD-10: F0), and acute suicidality (current suicidal plans). Ten consecutively admitted patients who had attempted suicide and ten patients without a history of attempted suicide were included. Attempted suicide was defined according to the definition used in the WHO/EURO Multicenter Study on Suicide and Attempted Suicide (Platt et al., 1992). Patients were told that the objective of the study was to better understand when and how people throughout their lives were confronted with suicidal behavior as an option in a person's life. Patients gave written consent for the interviews to be videorecorded. The study was approved by the local ethics committee.

Interviews

After two pilot interviews, patients were interviewed using a combination of narrative and semistructured interviewing technique (Bartholomew, Henderson, & Marcia, 2000; Smith, 2000). Interviews started with a narrative opening: "Consider a child does not know that people can and do kill themselves. Please try to go back in your life and tell me what experiences you remember in which you were confronted with the idea that suicide maybe an option in human

life." In the second part of the interview, a number of cues were used ("Looking back, do you see any other events that are related to suicide? For instance, there may have been suicidal behavior in your family, or at school."). Once an individual list of events was completed, persons were asked to rate the subjective self-relevance of each of these engrams on a scale of 1–10 (participant coded semistructured interviewing, see Bartholomew et al., 2000).

Content Analysis and Coding

The interviews were videorecorded and fully transcribed. For thematic analysis, principles of grounded theory (Green, 1998; Strauss, 1987) were used, with a stepwise reduction of content leading to an emerging categorization of recurrent models of suicidal behavior. Emerging categories of memories related to suicidal behavior were regularly discussed in the group of raters (KM, LV, TR), and categories were defined. The coding system included eight categories related to characteristics of recalled suicidal behavior (e.g., direct/indirect, suicide method specified), ten categories related to reasons given for suicidal behavior (e.g., relationship problems, depression), and eight categories related to the origin of suicide as a model (e.g., family, school, media).

Categorical coding of interview passages relating to the research topic was performed by LV, TR, and KM. Interrater agreement over all categories was "substantial," with a Kappa of .62 (Landis & Koch, 1977).

Coding Example

"I was confronted with suicide very early in my life, in the first year at school. The mother of a schoolmate threw herself under a train. Up to then, i.e., the age of 7, suicide had been a taboo theme at home, and this event, I have to say, shocked me quite a bit. Later, I heard that this woman was about to become blind and therefore had escaped from this life, which is somehow understandable . . ."

Coding categories: (1) suicidal person: other, (2) experience: indirect, (3) suicidal act: completed suicide, (4) source: schoolmate, (5) reason given: physical illness.

Questionnaires

- BDI (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) was used to assess the level of depression. The German version of BDI has a good internal consistency and validity (Hautzinger, 1991; Hautzinger, Bailer, Worall, & Keller, 1994).
- The Suicide Opinion Questionnaire (SOQ; Domino, 1996) was used to assess patients' attitudes toward suicide as an option in life. It includes four factor analytically derived scales proposed by the authors: the mental

Table 1. Nature of engrams of suicidal behavior; significance < .005 (*)

	Attempters		Nonattempters	
	N	%	N	%
Number of reported engrams	94	100	98	100
Number of suicidal behavior by others	60	63	60	61
Indirect (heard, read, etc.)	44	47	53	54
Direct (witnessed) * (Fisher's exact test)	13	14	2	2
Engrams of completed suicide	51	55	53	54
Engrams of attempted suicide	13	14	7	7
No. of own emotional crises * (Fisher's exact test)	23	24	7	7
With suicide attempt	19	39	9	14
With suicide ideation	7	30.4	6	86

Table 2. Source of information about suicidal behavior

	Attempters		Nonattempters	
	N	%	N	%
Number of reported engrams	94	100	98	100
Family	13	14	12	12
Friends, acquaintances	22	23	23	24
School, schoolmates	9	10	9	9
Media (TV, newspapers)	10	11	13	13
Book	1	1	4	4
Other	6	6	1	1

illness scale, normality scale, right to die scale, and cry for help scale. The SOQ is a self-administered questionnaire using a five-point Likert-type response format. The questions were translated into German and revised after backtranslation.

Statistical Analysis

χ^2 tests were utilized to assess the significance of the differences between the frequencies of the categorical variables in the two studied groups (patients with and patients without a recent suicide attempt). The nonparametric Mann-Whitney U-test was used for testing the significance of differences between the scores in the SOQ in the two studied groups. Additionally, odds ratios were calculated to estimate the differences in probability between the two groups.

Results

Patients

Suicide attempters (8 female, 2 male): The mean age was 37.0 (range 22–43). The time lapse between the last suicide attempt and the interview ranged from three weeks to 25

years (one case). The average number of attempts was 1.5, range 1–5.

The mean BDI score was 28.5 ($SD = 12.3$, range 13–48), with a Cronbach's α of .92. Clinical diagnoses were: depressive episode (7), bipolar disorder (3); in 3 cases an axis II diagnosis of personality disorder was made.

Nonattempters (4 female, 6 male): The mean age was 35.5 (range 18–51). Mean BDI score 24.7 ($SD = 13.7$, range 6–40). Clinical diagnoses were: depressive episode (8), bipolar disorder (1), obsessive-compulsive disorder (1), social phobia (1); in 2 cases an axis II diagnosis of personality disorder was made.

There was no difference in the BDI scores between attempters and nonattempters (Mann-Whitney U-test, $U = 27.5$, $p = .68$), nor was there any correlation of BDI scores with the Suicide Opinion Questionnaire.

Memories of Exposure to Suicidal Behavior (Table 1)

Suicide attempters did not differ from nonattempters in the total number of reported memories of exposure to suicidal behavior (98 vs. 94 engrams), nor did they differ in the proportion of memories of indirect exposure (family, friends, school, media, etc.) to suicidal behavior (47% vs. 54%; χ^2 , $p > .05$). However, suicide attempters reported a higher proportion of engrams of *direct exposure to suicidal*

behavior of others (14%; $N = 94$) (e.g., witnessing suicide or suicide threats by others) than nonattempters (2%; $N = 98$) ($\chi^2 = 9.3$, $df1$, $p = .002$; odds ratio (OR): 7.7, 95% confidence interval (CI): 1.69–35.15). The difference is even more striking when individuals are compared: 8 (out of 10) suicide attempters remembered events of direct exposure, while only 2 (out of 10) nonattempters did so ($\chi^2 = 7.2$; $p = .007$; OR = 16.0, 95% CI 1.79–143.15). These differences held when controlled for gender.

Out of the total of 192 memories reported, 104 events were related to cases of completed suicide, with no difference in frequency between suicide attempters and nonattempters (49% vs. 51%), while only 20 reports were related to someone attempting or threatening to attempt suicide. Suicide attempters more often reported own suicidal crises in the past (24% vs. 7%; $\chi^2 = 10.9$, $df1$, $p = .001$).

Sources of Information About Suicidal Behavior (Table 2)

There was remarkable similarity in the numbers of sources of the suicidal behavior in both groups. Most reported suicidal behaviors took place in the circle of friends and family.

Reasons Given

There were no significant differences between attempters and nonattempters in the reasons given for suicide in general (“What would you say can get a person to commit suicide?”), although suicide attempters tended to associate suicide more often with relationship problems (15% vs. 7% of the citations; Fisher’s exact test, $p = .068$) and with physical illness (6% vs. 1% of the citations; Fisher’s exact test, $p = .053$), compared with depression (14% vs. 20%, NS).

Suicide Opinion Questionnaire

Suicide attempters saw suicide more often as “normal” (SOQ scale 6, Normality scale; Mann-Whitney U-test, $U = 17$, $p < .05$; Cronbach’s $\alpha = .70$). The groups did not differ in the subscales 5 (impulsivity), 7 (aggression), 8 (suicide is morally bad), but they differed in the total score (Mann-Whitney U-test, $U = 24$, $p = .05$, Cronbach’s $\alpha = .75$). The two groups also differed in their responses to item 106 of the SOQ (“What is the probability that at some point in your life you might attempt suicide?”). Here, none of the suicide attempters indicated the suicide probability as zero, five indicated a probability of less than 10%, while four rated their suicide likelihood as 50% and higher. There was a significant correlation between attempting suicide and the subjective indication of a probable suicide (Pearson r ; $p =$

.04, though the χ^2 did not reach the .05 level of significance).

Subjective Relevance of Engrams

There was no difference in the patients’ own ratings of the personal relevance of the reported events on a 10-point Likert scale (mean 6.01 and 6.25 for attempters and nonattempters, respectively).

Discussion

This study used a narrative approach, supplemented by semistructured questions, investigating suicide attempters’ engrams (memory traces) of earlier exposure to suicidal behavior. It should be noted that this interviewing technique is different from highly structured interviews, such as used by Mercy et al. (2001), a study which, in contrast to the studies of others, found that exposure to suicidal behavior in relatives, friends, and the media had a *protective* effect. The interviewing method used in our study is also different from telephone (Crosby & Sacks, 2002) or online surveys (Pirelli & Jeglic, 2009). The narrative interviews performed in our study were a form of associative recall searching for subjective memory traces, which allowed an in-depth analysis of the patients’ meaning given to events. Different to quantitative research, in the qualitative method used, the interviews were transcribed and the content analyzed by an emerging coding system.

Our main finding is that suicide attempters recalled significantly more memories of direct exposure to suicidal behavior. Surprisingly, the total number of memories of exposure to suicidal behavior did not differ between suicide attempters and nonattempters. It is possible, therefore, that exposure to suicide in a direct way (finding the dead person, experiencing a family member repeatedly threatening suicide) leaves a particularly strong impact on the person.

Our results support the De Leo and Heller (2004, 2008) studies, which, using a self-report questionnaire, found that adolescent suicide attempters were more likely to know someone who had attempted suicide, and that a great proportion of attempters had a friend with a history of deliberate self-harm. Males who had been exposed to nonfatal suicidal behavior among their friends were 21.3 times more likely to engage in self-harming behavior than males without such exposure. Furthermore, De Leo, Cerin, Spathonis, and Burgis (2005) reported that having personally known someone who had attempted suicide was associated with a higher probability of suicidal ideation and suicide attempts. Stein, Brom, Elizur, and Witztum (1998) had found that adolescents exposed to suicide revealed a significantly more accepting attitude. Consistent with this and other investigations, suicide attempters in our sample expressed a more accepting attitude toward suicide. They also indicated

a higher probability that they might some day end their lives by suicide. Indeed, there is evidence that individuals who are more accepting of suicide exhibit higher levels of suicidal ideation and are more likely to attempt suicide (McAuliffe, Corcoran, Keeley, & Perry, 2003).

We were surprised by the number of suicide-related engrams reported by nonattempters. It is possible that the narrative interviewing combined with cueing questions used in our study, elicited more suicide-related engrams in the nonattempters' group than questionnaire-based studies. Considering the association of suicide engrams with the individual's own suicidality, a higher personal relevance of certain memories, i.e., a qualitative effect, would be expected. However, suicide attempters reporting events of direct exposure did not attribute a higher personal relevance to them. A possible explanation could be that the emotional content of such memories is not normally accessible by the individual concerned. Schacter (1996) argued that we are largely unaware of our own schemas of knowledge about the everyday world and ourselves. The notion of event-based prospective memory assumes automatic or strategic processes that are highly dependent on circumstances (McDaniel & Einstein, 2000). Repeated activation of a specific memory may increase its consolidation (Dudai & Eisenberg, 2004), for instance, through endogenous activation, or activation due to external stimuli.

A growing number of studies show that the ability to deal with difficult situations depends much on the same neural machinery that is needed to remember knowledge acquired in the past. Above all, episodic memory, which has traditionally been defined as a memory system that supports the recall of personal experiences, allows individuals to engage in "mental time travel" into both the past and the future into a simulation of a novel event (Schacter, Addis, & Buckner, 2007). For instance, Holmes, Crane, Fennell, and Williams (2007) recently reported that depressed patients who had been suicidal in the past had detailed mental imagery about making a further suicidal attempt. The images were interpreted as "flash-forward," similar to flashbacks in posttraumatic stress disorder. In a similar vein, it is conceivable that experiences of direct exposure to suicidal behavior of others will only be reactivated if the person faces a serious emotional crisis. The results are compatible with a model of suicide as part of goal directed systems (Michel & Valach, 1997). This model assumes that *in vivo* experience of suicidal behavior of others may be relevant for the construction of one's own suicide actions in the sense of joint or socially shaped actions. Interestingly, the findings reported by Gutierrez, King, and Ghaziuddin (1996) suggest that exposure to death in general and not suicide in particular may be related to an increased risk of suicide.

In their narratives of memory traces of suicidal behavior, informants often provided information regarding the reasons given for suicidal behavior. Suicide attempters mentioned relationship problems, in contrast to depression slightly more often than nonattempters. This is consistent

with earlier findings that suicide attempters often do not think that they have a psychological condition which needs psychiatric treatment (Michel, Valach, & Waeber, 1994). This, of course, is in sharp contrast to professional evidence, which stresses the importance of recognition and treatment of mental disorders in order to prevent suicide. Together with the results of the normality score in the SOQ, the findings illustrate the discrepancy in thinking about suicide between health professionals and people who resort to suicidal behavior.

Our study has obvious limitations: It has pilot character, and the conclusions are, as in many qualitative studies, limited by the small sample size. It is a retrospective study with all the limitations of such a research paradigm. The fact that some of the suicide attempts were not recent, may have made it difficult for suicide attempters to recall suicide-relevant memories. Suicide attempters have been reported to have a strong tendency to be overgeneral in their recall of the suicidal crisis (Williams & Dritschel, 1988). Pollock and Williams (1998) assume that overgenerality is a trait marker of individuals with poor problem solving capacity and a vulnerability to emotional disturbance – which would obviously affect the number and attribution of the reported memories. Depression may have moderated the recall of specific memories, with mean BDI scores corresponding to severe depression in both groups. Therefore, as a direction of future research, a long-term prospective study of individuals witnessing suicidal behavior would provide more objective information on the impact of such experiences.

Conclusions

The results suggest that, in assessing suicide risk, it may be useful to explore models of suicidal behavior related to earlier experiences of suicidal behavior by others, above all direct exposure to suicidal behavior by others. Such memory traces may be conscious or unconscious and may be related to a readiness to respond with suicidal behavior to experiences of psychological impasse. Recalling events of direct exposure to suicidal behavior (e.g., in the family) may be helpful in understanding the meaning and valence of suicide engrams on an individual's coping mechanisms as well as their possible impact on the patient's suicide intentions.

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