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Shame, guilt, time perspective, time of imprisonment and PTSD symptoms in sentenced motor vehicle accidents perpetrators – a preliminary report

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Summary

Aim. The study aimed at exploration of a relationship between PTSD symptoms, trauma-related guilt (TRG), time perspective (TP), and guilt/shame proneness among perpetrators of motor vehicle accidents (MVA). We also analyzed relationships between length of imprisonment, PTSD and trauma-related guilt.

Methods. The sample consisted of 37 incarcerated perpetrators of MVA. They were asked to fill in the set of questionnaires: Zimbardo Time Perspective Inventory, Guilt and Shame Proneness Inventory, Trauma-Related Guilt Inventory.

Results. The results showed that 50% of the perpetrators met the DSM–5 PTSD criteria. The proneness to guilt and shame positively correlated with the trauma-related guilt. Shame susceptibility as a consequence of negative self-esteem was associated with a greater trauma-related shame. There was no correlation between guilt/shame or trauma-related guilt and PTSD. The time perspective was associated with PTSD – the stronger the tendency of the respondents to focus on the present/past, the greater the symptoms of PTSD. Focusing on the hedonistic present positively correlated with guilt related to trauma.

Conclusions. In the studied population, every second perpetrator of the accident was affected by PTSD, which was associated with the past and present time perspective. Negative assessment of self and behavior intensified the guilt associated with trauma and reduced the search for justification for one's own actions in external circumstances. Time spent in prison had no effect on moral attitudes or on the moral evaluation of one's own behavior that caused harm to others. However, it was associated with experiencing stress and focusing on one's own suffering.

Keywords: moral behaviors, drivers, road accidents

Introduction

Acute stress disorder (ASD) and post-traumatic stress disorder (PTSD) are a relatively common consequence of being involved in a road accident. Recent meta-analyses of studies evaluating the frequency of development of ASD and PTSD after a road accident show that, on average, about 15.8% of those involved in these accidents suffer from ASD [1] and 22% from PTSD [2]. The above data are alarming, especially as ASD and PTSD are associated with cognitive impairment and symptoms of increased arousal, which significantly reduce the ability of drivers – road accident participants – to move safely in road traffic [3, 4].

Studies concerning the psychological effects of being involved in a road traffic accident are relatively common. It should be noted, however, that our knowledge of the health effects of these events in perpetrators is limited. Rare research in this area does not provide clear conclusions as to the prevalence of ASD and PTSD, nor as to the determinants of the development of these disorders [4-6]. In psychiatry, although the terms *perpetrator trauma* and *perpetration induced traumatic stress (PITS*) [7] have been used for years, these terms refer to a situation in which the perpetrator intends to kill or hurt another person and this is either for personal reasons or for role fulfilment (e.g., participation in a war operation). However, these terms do not apply in the case of perpetrators of road accidents, because we cannot talk about the intentions to kill or hurt another person. Therefore, the findings of the PITS study cannot be generalized to the population of road traffic accident perpetrators.

In light of the above considerations, it seems important not only to identify the prevalence of PTSD in the perpetrators of accidents, but also to analyze its determinants and the cognitive and emotional consequences of the crime, which may be relevant not only to the mental health of these people, but also to the course of the rehabilitation process during the sentence.

The main aim of this study was to identify the attitude of people who committed road traffic offenses toward the committed act, to examine their experienced moral emotions in relation to the incident and to assess the prevalence of PTSD. In addition, the study analyzed the relationship between time perspective as a relatively constant personal characteristic and the development of PTSD and the sense of guilt and shame associated with causing an accident.

The role of psychological time in human functioning

Recently, the role of the time perspective in shaping human well-being has been increasingly emphasized. The use of a specific time perspective influences, among other things, the mechanism of restoring life after traumatic events.

One of the contemporary theoretical concepts describing the importance of time in human life is Zimbardo's time perspective theory [8]. According to this theory,

time perspective is a fundamental, but unconscious process organizing individual and social life. This process consists in assigning personal and social experience a time frame (perspective) that helps to give order, consistency and meaning to this experience. The time perspective is also used in the process of encoding, storing and evoking experiences. It influences the shaping of expectations, the definition of objectives and the development of imaginary scenarios for future actions. There is evidence that the adoption of a specific time perspective (past, present or future) is a relatively constant individual characteristic that determines human perception, assessment and action.

Research on the influence of the time perspective on human functioning is rarely undertaken. The various methods of measurement used make the comparison of results doubtful or even impossible, hence the need for further exploration of this issue. Past research [8-10] has shown that future-oriented people achieve more in life, have a higher socio-economic status and lead healthier lives. In turn, people focused on the present face various health problems and addictions, are more likely to break social norms and be in conflict with the law.

Recently, several studies on the role of time perspective in the development and persistence of PTSD symptoms have been published [11-13]. On the one hand, we can say that focusing on the traumatic past and feeling a shortened life perspective are the basic characteristics of PTSD; on the other hand, an acquired tendency to focus on the past and perceive the present through the lens of negative past events can reinforce and sustain PTSD symptoms, hinder adaptation to post-traumatic life and weaken motivation for treatment [11, 14].

Guilt and shame – moral emotions in the development of PTSD

Guilt, self-blame and shame alone are considered to be common symptoms accompanying trauma [15]. Guilt is a complex phenomenon that can be taken from actual responsibility for a traumatic event (e.g., contributing through reckless driving to a fatal accident) or can result from attributing responsibility for something that was not done (e.g., a survivor can feel responsible for the death of other people in a natural disaster and believe that he or she could have prevented it).

Kubany and Watson [15] believe that guilt brings a person into a specific mental state, which consists of stress, mental suffering and dysfunctional beliefs about one's own role in a traumatic event. These dysfunctional beliefs focus on four issues: (a) the possibility of avoiding an event ("I could have chosen another way"), (b) exclusive or primary responsibility for everything that happened, (c) lack of justification for one's own behavior, and (d) transgression of moral principles and violation of values [16, 17]. The paradox of guilt is that someone can cause an accident but not feel guilty, while someone else can be the victim but feel guilty even if the accident was not his/her fault. Subjective, irrational guilt in the victims of traumatic events is much more often investigated than in the perpetrators of such events [18, 19]. It has

been proven that excessive, irrational guilt exacerbates stress and makes the process of regaining mental balance even more difficult [19, 20]. For this reason, therapeutic programs are proposed for individuals to reduce the inadequate guilt associated with traumatic events [16].

An emotion strongly connected with guilt is shame. Compared to guilt, shame has a more holistic character. Guilt refers to behavior, to things that have been done or have not been done in a crisis/trauma situation. On the other hand, shame results from a negative self-evaluation of oneself as a human being. It is strongly rooted in the sense of loss of face in front of oneself and others, in the sense of being worthless or inappropriate and in the sense of losing the continuity of one's own history caused by breaking professed standards and values [19].

It is increasingly being pointed out that rational and irrational feelings of guilt and shame are associated with a greater severity of PTSD symptoms [11]. Studies of people with diagnosed PTSD show that shame is the mediator between a traumatic event and PTSD [21, 22].

Experiencing moral emotions also depends on the emotionality of individuals, i.e., the tendency to experience shame and guilt in everyday life. Such susceptibility is rooted in moral judgments based on deeply internalized norms that have a strong motivational value and influence the person's activity. The susceptibility to shame is perceived as a predictor of post-traumatic symptoms [23] and general mental and social maladjustment [24, 25]. The susceptibility to guilt, in turn, is considered to be a more adaptive moral emotion. Research shows [25] that even in detained offenders, it positively correlates with empathy and taking responsibility for one's own actions.

According to the authors' best knowledge, the mechanisms of strengthening the sense of guilt and shame in perpetrators of road traffic offenses and their links with the development of PTSD have not yet been investigated.

Legal issues and PTSD among perpetrators of accidents

The general legal system is based on the assumption that proven guilt requires punishment, which in turn is to move the conscience of the perpetrator and be a tool for correcting undesirable social behavior. Is this the case? Research into the relationship between a conviction for causing an accident, feelings of guilt related to trauma and the development of PTSD is rare. Although Lowinger and Salomon [18] have undertaken such a task, they have found no differences in the intensity of PTSD symptoms depending on the severity of the sentence (prison, community service, probation), but have observed a correlation between the length of the decision to detain a driving license and the intensity of PTSD symptoms. The longer the license withdrawal penalty, the more serious the symptoms of PTSD were reported by the punished drivers. Furthermore, the researchers found an interesting link between the acceptance of the sentence (the belief that the punishment is proportional to the seriousness of the offense)

and the feeling of guilt, shame and symptoms of PTSD. Those offenders who felt that the punishment was too lenient, experienced more shame and guilt and symptoms of PTSD than those who found the conviction too severe or inappropriate for the offense [15]. Similar conclusions were reached by Rassool and Neil [26] in qualitative studies of perpetrators of road fatalities. They also found that the process of resolving PTSD after inadvertently causing death is blocked by the belief that being the perpetrator excludes the possibility of talking about one's own suffering.

In the absence of studies of the psychological situation of those who inadvertently led to death or serious injury to others, this study explores the relationship between PTSD symptoms, feelings of guilt related to trauma, time horizon, and the propensity to feel guilt/shame of the inmates of car accidents. The relationship between the length of sentence, PTSD symptoms and guilt associated with trauma was also analyzed.

Methods

This was a pilot study on imprisoned MVA perpetrators. The study was anonymous and voluntary. Prison psychologists distributed 100 surveys among prisoners sentenced due to road crimes. The response rate was 48%, but in some of the returned surveys there were numerous mistakes and crucial data was missing. Therefore, only the data from 37 participants were included in the analysis.

We used the following methods: (a) survey about circumstances and outcomes of accident and a sociodemographic survey; (b) Polish adaptation of PTSD Checklist for DSM-5 (PCL-5) to assess severity of PTSD symptoms; (c) Trauma-Related Guilt Inventory (TRGI-PL) to assess accident-related guilt; (d) Guilt and Shame Proneness Scale (GASP-PL) and (e) Zimbardo Time Perspective Inventory (ZTPI).

Measurement Tools

The authors developed a survey that included questions regarding the sociodemographic characteristics of respondents (age, gender, education), accident characteristics, legal qualification of the accident and sentence. In addition, data were collected using standardized questionnaires, such as:

- *Polish adaptation of PTSD Checklist for DSM-5 (PCL-5)* is a self-report screen for PTSD, which can be scored for both diagnostic assessment and symptom severity measurement. The PCL-5 is an updated version of the questionnaire and includes 3 new items corresponding to the new DSM-5 negative alteration in cognition and mood criterion category. PCL-5 limits the scope of the assessment to the "past week," whereas prior versions of the PCL assessed symptoms over the past month. The reliability of the Polish version of the PCL-5 is very good – the Cronbach alpha coefficient for the whole scale is 0.96 and the absolute stability coefficient is 0.89 [27-29].

- *The Trauma-Related Guilt Inventory (TRGI-PL)* [20, 30] is an event-focused self-report measure of emotional and cognitive components of trauma-related guilt. It consists of 32 items, forming a 4-item scale of the general sense of guilt experienced after a traumatic event; a 6-item scale of distress related to traumatic memories, and a 22-item scale exploring the cognitive aspects of guilt (sense of responsibility, wrongdoing – violation of personal standards, and lack of justification for breaking norms and values).

The respondents refer to the statements of the questionnaire on a 5-point scale, where 1 means "definitely true" and 5 "not at all true". The questionnaire has satisfactory theoretical and predictive accuracy. The reliability of the Polish version of the questionnaire is satisfactory – the Cronbach alpha coefficients for the TRGI-PL subscales range from 0.72 to 0.92 and correspond to those of the original language version [20].

- *The Guilt And Shame Proneness Scale (GASP-PL)* [31] measures the propensity to experience guilt and shame across a range of individual transgressions. The GASP-PL contains two subscales that assess guilt:
  - Negative behavior-evaluations – NBEs (e.g., "After realizing you have received too much change at a store, you decide to keep it because the salesclerk doesn't notice. What is the likelihood that you would feel uncomfortable about keeping the money?");
  - Repair action tendencies following private transgressions – GR (e.g., "You are privately informed that you are the only one in your group that did not make the honor society because you skipped too many days of school. What is the likelihood that this would lead you to become more responsible about attending school?").

  GASP-PL also contains two subscales to assess shame:

  - Negative self-evaluations – NSEs (e.g., "You rip an article out of a journal in the library and take it with you. Your teacher discovers what you did and tells the librarian and your entire class. What is the likelihood that this would make you would feel like a bad person?");
  - Shame withdrawal tendencies following publically-exposed transgressions – SW (e.g., "After making a big mistake on an important project at work in which people were depending on you, your boss criticizes you in front of your co-workers. What is the likelihood that you would feign sickness and leave work?").

Each subscale has four items. Respondents rate each item on a 7-point scale, from 1 "very unlikely" to 7 "very likely". The Polish adaptation of the questionnaire was prepared by the authors for the purposes of this study. The research was conducted in a group of 181 adults. Cronbach's alpha coefficients for the subscales range from 0.71 to 0.85.

- *Zimbardo Time Perspective Inventory (ZTPI)* comprises 56 items that measure the five TP dimensions:
  - Past-Negative ("I think about the bad things that have happened to me in the past"),
  - Present-Hedonistic ("I take risks to put excitement in my life"),
  - Future ("I complete projects on time by making steady progress"),
  - Past-Positive ("It gives me pleasure to think about my past"), and
  - Present-Fatalistic ("My life path is controlled by forces I cannot influence").

Respondents rate each item on a 5-point scale, from 1 "very untrue" to 5 "very true". The indicators of the reliability of the Polish adaptation of the questionnaire [32] should be considered as satisfactory – the Cronbach alpha coefficients are respectively for: Past-Positive 0.65, Past-Negative 0.81, Present-Hedonistic 0.78, Present-Fatalistic 0.73, Future 0.74.

The study design was approved by the Bioethical Committee of the Nofer Institute of Occupational Medicine in Lodz. All the participants signed informed consent.

Data analysis

In order to characterize the perpetrators and the consequences of road accidents caused by them, we used descriptive statistics. Between the results of the scales used in the study, Spearman's correlation coefficients were calculated. For intergroup comparisons, we used the Student's one-ample t-test and Mann-Whitney rank test.

Results

Men prevailed in the study group (97%) and the mean age of prisoners was 39 years (SD = 10.85). They had a relatively low education level: 39% had primary education, 30% basic occupational, 27% secondary education and 4% received higher education. The majority of the respondents (73%) participated in more than one motor vehicle accident. Over half of them (52%) were driving under the influence of psychoactive substances in the MVA for which they were sentenced. Most of the participants (76%) declared that the accident they had caused resulted in unpleasant feelings and emotions. Among those who reported negative emotional outcomes of the accident, 21% were consulted by a physician, 29% had an appointment with a psychologist, and 15% used psychiatric services.

We also asked our subjects about other potentially traumatic events in their lives. The most frequent events were serious illness or threat to the life of close relatives (42%) and the death of close relatives (15%), followed by other health/life-threatening accidents (12%). Violent acts were experienced by 3% of subjects.

All MVA were classified as road crimes accordingly to the Polish law: 22% with fatal consequences. In most cases (92%) there were people injured: passengers or

drivers of the other cars (42%), passengers of the sentenced driver (24%), pedestrians (19%) and sentenced drivers themselves (16%).

On the basis of the results obtained in the PCL-5 questionnaire, the prevalence of PTSD in the studied group was calculated. The results of the PCL-5 questionnaire were referred to the PTSD criteria in DSM-5. Half of the respondents met these criteria (14 out of 28). Following the PCL-5 authors' suggestion, another criterion of diagnosing PTSD using the PCL-5 questionnaire was also used to confirm the diagnosis, i.e., obtaining at least 33 points on the scale. Using the latter criterion, we obtained exactly the same indicator.

The basic statistics for GASP-PL, TRGI-PL and ZTPI scores are presented in Table 1.

Table 1. **Mean results obtained by the respondents in GASP-PL, TRGI-PL and ZTPI**

GASP-PL subscales		Sample group (n=30)	
		M	SD
Guilt	Negative behavior-evaluation	4.62	1.81
	Guilt-repair	4.69	1.37
Shame	Shame-withdraw	2.80	1.01
	Negative self-evaluation	4.53	1.49
TRGI-PL subscales			
Distress		15.95	7.95
Global Guilt		11.63	2.22
Guilt Cognitions		57.37	22.22
Hindsight Bias/Responsibility		18.00	8.39
Wrongdoing – violation of personal standards		15.74	6.41
Insufficient Justification*		7.53	3.81
ZTPI subscales			
Past positive		3.67	0.43
Past negative		3.60	0.56
Future		3.57	0.57
Present hedonistic		3.30	0.64
Present fatalistic		2.78	0.80

*reversed response scale

The Student's t-test for one sample was used to determine which of the time perspectives was dominant. The results of ZTPI subscale average (mean) comparisons are presented in Table 2.

Table 2. **Matrix of results of comparing mean values in ZTPI scales using t-Student test for one sample (df=24)**

	Present fatalistic	Present hedonistic	Future	Past negative
Past positive	t=10.311; p<0.001	t=4.294; p<0.001	t=1.170; p=0.253	t=0.823; p=0.419
Past negative	t=7.294; p<0.001	t=2.646; p=0.014	t=0.232; p=0.818	
Future	t=6.902; p<0.001	t=2.354; p=0.027		
Present hedonistic	t=4.111; p<0.001			

The respondents obtained the highest means in the Past-Positive, Past-Negative and Future scales. The results on these scales were significantly higher than the means on the Present-Hedonistic and Present-Fatalistic orientation scales. The mean in the Present-Hedonistic scale was significantly higher than the mean in the Present-Fatalistic scale.

In this study we were interested in answering the question whether the generalized personality tendency to experience guilt and shame is related to the guilt developing as a result of the traumatic experience. In order to acquire an answer to this question, the results obtained by the respondents on the GASP-PL and TRGI-PL scales were correlated. The correlation matrix is presented in Table 3.

Table 3. **Correlations between GASP-PL and TRGI-PL results**

		GASP subscale			
		Guilt		Shame	
		Negative behavior – evaluation	Guilt-repair	Shame-withdraw	Negative self-evaluation
TRGI-PL subscale	Distress	-0.817**	-0.775**	0.051	-0.735**
	Global Guilt	0.427	0.349	-0.032	0.238
	Guilt Cognitions	-0.772**	-0.675**	-0.227	-0.702**
	Hindsight Bias/Responsibility	-0.818**	-0.707**	-0.140	-0.729**
	Wrongdoing – violation of personal standards	-0.604*	-0.451	-0.306	-0.482
	Insufficient Justification[1]	-0.333	-0.468	-0.413	-0.505*

** $p \leq 0.001$; *$p \leq 0.01$

[1]reversed response scale

No significant correlation was found between the TRGI-PL scales and the Shame-withdraw subscale (Table 3). All significant correlations between the TRGI-PL and GASP-PL scales were negative. Means in the Distress, Cognitive aspect of guilt and Hindsight Bias/Responsibility scales negatively correlated with the results in the Negative evaluation of own behavior, Guilt-repair and Negative self-evaluation subscales. The indicator in the scale of Wrongdoing – violation of personal standards

negatively correlated with the average in the scale of Negative behavior-evaluation, and the average in the scale of Insufficient Justification negatively correlated with the Negative self-evaluation.

The next step in the analysis was to explore the potential relationships between time perspectives and guilt associated with trauma. The correlation analyses generally do not indicate the coexistence of past and future time perspectives with various aspects of guilt related to traumatic experience (Table 4). Only the Present-Hedonistic time perspective correlated significantly with the TRGI-PL subscales – with the scale of Global Guilt negatively, and with the scales of Guilt Cognition and Insufficient Justification positively.

Table 4. **Correlations between results in ZTPI and TRGI-PL**

		ZTPI subscale				
		Past negative	Past positive	Present hedonistic	Present fatalistic	Future
TRGI-PL subscale	Distress	0.064	0.059	0.440	0.290	-0.328
	Global Guilt	-0.337	-0.304	-0.574*	-0.434	-0.023
	Guilt Cognitions	0.008	-0.052	0.610*	0.283	0.034
	Hindsight Bias/Responsibility	0.004	-0.018	0.437	0.307	-0.244
	Wrongdoing – violation of personal standards	-0.029	-0.087	0.248	0.047	-0.067
	Insufficient Justification[1]	0.102	0.214	0.591*	0.383	0.074

*$p \leq 0.01$

[1]reversed response scale

Another area of analysis was the interrelationship between individual personality tendency to experience guilt and shame, trauma-related guilt, time perspectives and PTSD symptoms. There were no significant relationships between the results of the TRGI-PL, GASP-PL and PCL-5 questionnaires.

Table 5. **Correlations between results in ZTPI and PCL-5**

	ZTPI subscale				
	Past negative	Present hedonistic	Past positive	Present fatalistic	Future
PCL-5	0.569*	0.518*	0.246	0.671**	0.133

** $p \leq 0.001$; *$p \leq 0.01$

The PCL-5 score was positively correlated with the results in three out of five ZTPI scales: Past-Negative, Present-Hedonistic and Present-Fatalistic (Table 5).

As more than half of the imprisoned drivers (52%) were under the influence of psychoactive agents (alcohol or drugs) at the time of the accident, it was checked whether this was associated with a stronger guilt due to trauma and more intense PTSD symptoms. TRGI-PL results of two groups were compared: (a) those who were sober at the time of the accident, and (b) those who were under the influence of psychoactive substances at the time of the accident. The Mann-Whitney test did not reveal any significant differences in the results of the TRGI-PL and PCL-5 questionnaires between the groups.

It was also verified whether there were any significant relationships between the length of the prison sentence and the guilt associated with the trauma. Only the results on the Distress subscale significantly correlated negatively with the length of the sentence ($\rho = -0.51$; $p \leq 0.05$).

Discussion

With regard to the psychological consequences of car accidents, the focus of researchers and practitioners is mainly on victims and their relatives. Only in a few studies has the topic of the psychological consequences of causing death or injury to another person been addressed [4, 5, 18, 26, 33, 34]. All of these studies have shown that causing an accident, whether fatal or resulting in an injury, in many cases leads to serious life crises, to the induction and persistence of PTSD symptoms, to depression and to a change in self-perception.

In this study, data from imprisoned perpetrators of road traffic accidents are analyzed. These data show that many of the survey participants meet the DSM-5 criteria for PTSD – the frequency of this disorder was much higher than in other groups of Polish perpetrators of accidents who have never been convicted (50% versus 11%). We believe that such a large difference cannot be the result of only methodological differences (using two different methods of assessing PTSD, accordingly: PCL-5 and the interview for PTSD) [27, 29]. This result requires confirmation in further studies and should be interpreted with caution.

The cognitive aspects of trauma-related guilt were clearly related to the personality susceptibility to guilt and shame. The stronger the tendency of perpetrators to negatively assess their behavior in situations of breaking social norms, the more distressed they felt in relation to the accident, the stronger was the conviction about their own guilt, responsibility for the accident and greater condemnation of their own actions. In turn, the stronger was the tendency to repair the injury, the more stressful the memory of the accident, the stronger the conviction of guilt and the greater the feeling that the perpetrator could have done something to prevent it and the stronger the sense of responsibility for the accident. The stronger was the negative generalized self-esteem as a result of breaking the norms, the greater their distress, greater sense of responsibility for the accident and lesser tendency to seek justification for causing

the accident in external circumstances. The tendency to withdraw because of shame did not correlate with any dimension of guilt associated with trauma.

The results confirm the fact that the early interiorization of moral norms feeding the sense of guilt and shame is of importance for the development of guilt in the situation of causing an accident. People who have deficits in this area do not feel the emotional consequences of personal responsibility for the accident (or feel it to a lesser extent). The trauma-related guilt has also proven to be strongly correlated with time perspective. The participants focused mainly on the past, often on past negative memories. Quite often they also presented a focus on the future. They rarely concentrated on the present-fatalistic perspective. As far as the relationship between the presented time orientation and the feeling of trauma-related guilt is concerned, a significant correlation occurred only with the hedonistic orientation toward the present. The stronger was the hedonistic orientation toward the present, the greater the general feeling of guilt and the less moral reflection on one's own act (Table 4). The subscale of the lack of justification was also strongly correlated with the hedonistic present, which means that the focus on the hedonistic present was associated with a stronger tendency to search for external causes of one's own behavior and to justify one's act with external circumstances.

Earlier research has shown that the present-hedonistic time perspective is associated with sensation-seeking, addictions, risky driving, and risky sexual behavior measured by the number of partners [35-38]. To the best of our knowledge, no studies have analyzed the direct relationship between time perspective and trauma-related guilt, so we cannot compare our results with others. Nevertheless, we can discuss these results by referring to the Zimbardo and Boyd time perspective theory [8]. According to them, the present-hedonistic time perspective can be described as a limited sense of control, a strong focus on pleasure, on "here and now" and on avoiding pain. People presenting this time perspective ignore the past and do not think much about the future, because they often focus on things that give them immediate pleasure, no matter what the consequences may be in the future. This approach encourages a tendency to place responsibility for one's own actions in external circumstances.

The relationship between the present-hedonistic time perspective and general guilt (as measured by statements relating to the frequency and intensity of self-blame for what has happened) may be twofold. On the one hand, hedonism can serve as a mechanism for defending against guilt and helping a person to distance himself or herself from the harm done. On the other hand, dedication to hedonism may be associated with certain deficits in moral reasoning, which manifests itself in a low level of guilt associated with misconduct and selfish behavior [39]. Our results support the first assumption because they have shown that the present-hedonistic time perspective has been associated with a greater overall guilt and less justification. This would mean that this group of perpetrators of accidents, applying the carpe diem

principle, would try to protect themselves from the incriminating awareness of their sole responsibility for the tragic accident. At first glance this may seem paradoxical, nevertheless, drowning out the conscience by immersing into present, even simple pleasures may bring temporary relief for those who reluctantly look at their past and simultaneously reluctantly look ahead into their uncertain future. In our studies, we have not found a link between future time horizons and PTSD or feelings of guilt/shame. The lack of this link is in line with expectations. In general, future-oriented orientation is a prodevelopmental orientation and a strong factor associated with safe, prohealth behaviors [40]. However, the question remains whether the lack of such a relationship is the result of trauma (in terms of shortened time horizon as a symptom of PTSD) or whether poor future orientation was characteristic of those surveyed even before the accident they caused. This doubt can only be resolved in longitudinal studies.

Interestingly, trauma-related guilt was not associated with PTSD symptoms in the inmates. These results contradict theoretical assumptions about the relationship between guilt and PTSD, and empirical evidence from studies of victims of various traumatic events [17, 41]. Most studies [16, 19, 42, 43], with one exception [41], confirm a direct link between guilt related to trauma and PTSD. More contradictory results can be found in the study of the relationship between the tendency to experience guilt and PTSD. Although the tendency to feel guilty correlates with trauma-related guilt, the direct relationship between guilt as a trait and PTSD has neither been systematically investigated nor often confirmed empirically [22, 41].

In our study, the tendency to feel guilty did not correlate with the symptoms of PTSD. Instead, three out of five time perspectives were associated with PTSD (Table 5). This result is consistent with the assumptions of Zimbardo and his colleagues [8, 12, 13, 44]. The more the subjects were focused on the present or past, the stronger were the symptoms of PTSD. Due to the fact that the study was cross-sectional in nature, we are not able to interpret these results in terms of cause and effect relationships. Two explanations are theoretically possible: (a) either the focus on the negative past or the persistence in the fatalistic or hedonistic present is strengthened by the symptoms PTSD [12] or (b) the tendency to persist in the negative past or the fatalistic and hedonistic present results in stronger symptoms of PTSD after a traumatic event [45]. Determining which of these hypotheses is true requires further investigation.

We were also interested in the role of shame in the development of guilt related to trauma and PTSD. We analyzed two aspects of shame susceptibility: (1) a driven by shame tendency to withdraw from social relationships after the offense and (2) a driven by shame tendency to develop a generalized negative self-esteem. We found no association between the tendency to experience shame and the symptoms of PTSD. This result contradicts the results obtained, for example, in the group of prisoners of war and students [22, 46]. A recent review of the role of shame in PTSD has shown

that most of the studies on this subject have similar results indicating a positive correlation between shame and PTSD [47]. There is also a fairly large representation of studies showing the role of shame in the development of psychopathology [24, 48]. Therefore, our results should be verified in further research to find the cause, perhaps, of the different role of shame in road traffic accidents.

As more than half of our respondents were under the influence of psychoactive substances at the time of the accident, it was checked whether awareness of this fact generates greater trauma-related guilt and stronger symptoms of PTSD. We hypothesized that the guilt caused by the accident should be greater for those who were under the influence of psychoactive substances and that this would result in stronger symptoms of PTSD than for those who were sober. Contrary to expectations, in both groups the TRGI-PL and PCL-5 indices did not differ significantly. However, this may have been due to the small size of the group.

Interestingly, in light of our research, the length of imprisonment was not a motivating factor for moral reflection on one's own act, but was associated with greater stress, which in the concept of Kubany is an experience of emotional pain. In a way, we are observing a paradoxical phenomenon here – I am suffering, but this suffering does not lead me to think about my responsibility for the accident, and with the length of the punishment, this suffering is more severe.

This study has its limitations. First of all, due to the small group of subjects, it should be treated as a preliminary report. The small number of participants also made it impossible to conduct analyses taking into account the coexistence and interaction of the studied phenomena, which may have provided additional information about the relationship between guilt, shame, perception of time and PTSD. Secondly, the cross-sectional nature of the study does not allow us to answer the fundamental question whether the time perspective may be a risk factor for the development of PTSD, or whether it is rather the PTSD that may lead to the transfer of an individual to another dimension of psychological time. Similarly, the potentially predictive role of the personality tendency to feel guilt and shame in the context of PTSD development is also relevant. In both cases, in-depth research using quantitative and qualitative methods is necessary. In particular, the latter group of methods would allow for better identification of mechanisms of coping with transgression in perpetrators of crime. Despite these limitations, the presented study results seem inspiring and encourage further in-depth analysis of the psychological situation of road traffic offenders.

Conclusions

1. Post-traumatic stress disorder in the studied population of road accident perpetrators was frequent – every second inmate is affected by it.
2. Stronger symptoms of PTSD coexisted with a past-negative time perspective and a focus on the present – hedonistic or fatalistic time perspective.

3. Contrary to previous studies, this study demonstrated that the tendency to experience shame and guilt was not associated with symptoms of PTSD.
4. The personality tendency to negatively assess self and own behavior in a situation of breaking social norms intensified the feeling of guilt related to trauma, and the respondents to a lesser extent sought justification for their own actions in external circumstances.
5. The length of prison sentence did not correlate with the cognitive aspects of guilt associated with trauma, but did correlate with the mental suffering associated with traumatic memories.
6. The obtained results indicate the need to identify and treat PTSD in road traffic accident perpetrators and to adopt therapeutic measures not only to alleviate the symptoms of PTSD but also to develop a balanced time perspective. A balanced time perspective, in turn, could provide the basis for positive changes in lifestyle and moral thinking.

Further research into the relationship between shame, guilt and PTSD in road traffic accident perpetrators is needed in order to explain the unexpected results of this study. In future studies, it would be valuable to also analyze the role of defense mechanisms in the relationship between shame, guilt and PTSD associated with an offense.

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