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# Study of Predisposing Factors of Post-Traumatic Stress Disorder and Post-Traumatic Growth in Patients Affected by Car Accidents

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## Abstract

**Background**: Traumatic stress leading to post-traumatic stress disorder (PTSD) is significant psychological burden, particularly for individuals involved in car accidents. These incidents frequently result in severe emotional distress, affecting victims worldwide and often leading to long-term psychological consequences. This study aims to examine the predisposing factors of PTSD and post-traumatic growth (PTG) in individuals who have experienced car accidents.
**Methods**: Using a causal-comparative approach, 100 participants (92 males and 8 females) from Shahid Rajaie Hospital in Shiraz were selected. They completed assessments on self-control, self-compassion, integrative self-knowledge, and defense mechanisms. Additionally, PTSD and PTG questionnaires were administered one month post-accident. The collected data were analyzed using multivariate analysis of variance (MANOVA).
**Results**: Results indicate that self-compassion, mature defense mechanisms, and neurotic defense mechanisms significantly impact how individuals respond to trauma and stressful events.
**Conclusion**: Understanding these psychological factors can contribute to more effective interventions aimed at reducing PTSD symptoms and fostering post-traumatic growth in accident survivors. Moreover, by identifying the roles of individual differences in coping, this research may assist clinicians and mental health professionals in tailoring treatment approaches that are more responsive to each survivor's psychological profile and their recovery needs.

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## Introduction

Car accidents are a common occurrence worldwide, and also are potentially a source of trauma for those who are involved. Depending on the severity of incidents, they can lead to psychological problems and physical injuries for the victims. Post-traumatic stress disorder is a set of symptoms that individuals might face after life-threatening events such as accidents, war, murder, and rape (1). On the other hand, car accidents as a kind of trauma and due to their shocking nature, can also have adaptive effects, along with the adverse consequences (2). These adaptive effects and positive changes that occur for individuals as a result of successful post-traumatic treatment, are known as post-traumatic growth (3).

Research showed that, the link between post-traumatic stress disorder and post-traumatic growth would be in three ways as follows: the experience of PTSD symptoms disrupts human functioning and quality of life, thus hindering the growth (4). In other word, it can be argued that, PTSD and PTG are opposites (5). In the case of another form, the growth experience is only possible when symptoms of PTSD occur (6, 3). In the third form, PTSD and PTG are two outputs that are separate from each other and may independently exist in an individual (7). Apart from the fact that which model is correct, the basic question is that: "what are the psychological factors that make a person more adaptive, while making the other one less adaptive and lead to worse consequences like PTSD in another one following

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a traumatic event?"; therefore, this study addressed this issue.

Trauma is an unexpected and stressful incident leading to problematic changes at the physical and mental levels. Traumatic experience requires a return to equilibrium and adaptation in a person (8). Individuals can take various ways to encounter this phenomenon, which can be through acknowledging and accepting their experiences, and feelings or avoiding facing their experience. Also, these ways are probably important factors in their re-adaptation (8). Individuals may deal with the trauma using blaming, distortion, denial or suppressing their inner experience; since the trauma has only occurred to them, they may exclude themselves from others and may not be able to manage the heavy emotions that it causes (1). Given the fact that, admission, experience, and non-denial of trauma help the person to be adapted, the question is what factors and constructs contribute to this admission. By looking at definitions and functions of constructs like self-compassion, integrative self-knowledge and self-control can be considered as effective factors in this regard.

Self-compassion means to be in contact with your experiences and suffering, and to have a look away from criticism and blaming on failures, incompetence, and pain in a way that the individual sees them as experiences that occur for all other human beings except him (9). This kind of view will prevent self-blame, feelings of shame, guilt, and rumination associated with PTSD in a person (1) and help him to achieve reconciliation and acceptance of the event (8, 10, 11). Integrative self-knowledge by integrating the experience of the individual in the past, present, and future (12), can help the individual to take a comprehensive look at the trauma experience and the emotions with which it is associated without distorting, denying or suppressing the inner experiences, and also by consolidating these experiences over time (13). Previous research has also pointed to the role of this construct in return to the initial equilibrium after experiencing stress (14, 15, 12, 16, 10). On the other hand, self-control as a mechanism for regulating the impulses (17), can prevent common irritable behaviors in the PTSD disorder (18) and is also associated with psychological adjustment (19).

On the other side of this process, which highlights the importance of fully accepting your experience without creating any distortion in the processing, an individual can examine denial or distortion of the internal and external experiences. This may happen due to the intense emotions, the bitterness of events, and anxiety (20). These distortion mechanisms are called in psychology as defense mechanisms (20). Therefore, it is possible to use defense mechanisms against traumatic pain acceptance and experience, which are used to escape from real feelings (21). Defensive mechanisms that are commonly used by anyone, can affect the type of symptoms after the trauma. Moreover, each individual's styles and patterns of defense can explain why some people develop a specific pathology pattern and some others in contrast are not in exposure to trauma (22).

Due to self-compassion, integrative self-knowledge, and self-control that can help in bringing an individual closer to equilibrium by reducing the traumatic consequences; the question is whether they can also contribute to post-traumatic growth. According to Tedeschi & Calhoun (3), PTG can be affected by various factors including characteristics and personality traits. On the other hand, it also needs to be considered that whether post-traumatic growth is a healthy and developed response to trauma, or an unhealthy response to avoid anxiety and processing this excitement. In other words, PTG appears likely to be positive and adaptive; however, it is actually not. Various studies have shown that, victims of trauma, despite the PTG experience, still experience and report some degrees of psychological distress (23,24, 25). For this reason, it is important to examine the differences among the traumatized individuals regarding post-traumatic growth experience and the defense mechanisms, which are other goals of this study.

## Materials and methods

### Participants

The sample consisted of 100 purposefully selected patients (92 males and 8 females) with a mean age of 27.53 years old (SD 7.8) who were admitted to Shahid Rajaie Hospital of Shiraz. The participants' age range was between 15 and 49 years old, with the highest incidence of 15- to 26-year-old (53%). Moreover, regarding the educational level, the highest frequency was belonged to post-secondary education (44%). In the second step, considering the drop rate in the sample, a total of 74 respondents answered all the questionnaires.

### Procedures

All procedures were approved by Shiraz University and Shiraz University of Medical Science. This study was a causal-comparative study. Also, the patients were examined by the psychologist at the time of entrance to the hospital and self-compassion, self-control, self-knowledge, and defense mechanism questionnaires were individually read for them and they answered. After one month, they were evaluated for post-traumatic stress disorder and post-traumatic growth.

### Measures

The Mississippi Post Disorder Stress scale (26) includes 35 phrases and a 5-point scale from "false" (1)

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to "completely correct" (5). In this study, the median score obtained from individuals was 79 which was used as a cutoff score for determining post-traumatic stress disorder. This test had high reliability and was well correlated with other instruments for measuring post-traumatic stress disorder (26). The validity and reliability of the Persian form of this scale, which is called "Eshel" in Iran, has been calculated and approved by Goodarzi (27).

Post-traumatic growth (PTGI) (6) includes 21 items on a Likert scale of six degrees from "never" (0) to "always" (5). In this study, the median score obtained from individuals was 70 which was used as the cutoff score to determine the severity of post-traumatic growth. Tedeschi and Calhoun (6) have considered the validity and reliability of this scale to be appropriate. In Iran, Seyyed Mahmmodi, Rahimi and Mohammadi (28) studied their psychometric properties and achieved favorable results.

Self-Compassion Scale (11) includes 26 items and uses a five-point Likert scale ranging from rarely (1) to almost always (5). The scale measures three bipolar components in the form of six sub-components of self-kindness versus self-judgment, common humanity versus isolation, and mindfulness versus over-identification. Neff (11) has reported its validity and reliability to be acceptable. In 2013, it was evaluated by Khosravi, Sadeghi, and Yabandeh in Iran and has achieved favorable results (29).

Short form of self-control scale (19) includes 13 items that are designed to measure self-control and have a five-point degree ranging from "never" (1) to "very high" (5). Tangney et al. (19) considered this short form to have desirable validity and reliability. In Iran, Mousavi Ghadam, Huri, Omidi, and Zahirikhah (30) calculated and validated this scale.

The integrative Self-knowledge Questionnaire (ISK) (13) has 12 items and used a 5-point Likert scale. Several studies have confirmed the validity and reliability of this scale. The average alpha coefficient of this scale was 80% in the above studies. Self-knowledge in the prediction of mental health has increasing validity compared to five major factors of the personality and it is capable of explaining mental health beyond these personality factors (13).

Defensive Style Questionnaire (DSQ) (31) includes 40 items on a 9-point Likert scale (From completely agree to completely disagree) and measures 20 defense mechanisms based on three mature, neurotic, and immature defense styles. Cronbach's alpha coefficient for the items of each of the defensive styles has been described by Andrews et al. (31) as satisfactory. Psychometric properties of the Persian version of this questionnaire have been reviewed and approved in researches conducted between 1999 and 2006 in the patient and normal samples (32).

## Results

Means and SDs were computed for all variables (Table 1). Cronbach's alpha scales also indicated their internal consistency (Table 1). To check the normality of data, the Kolmogorov-Smirnov test was used. Based on this test, the scores in all variables are not significant; therefore, the distribution of scores was normal. After obtaining scores of people on the Mississippi and post-traumatic growth scales, we split the scores into two categories based on the median. Based on the interaction of these two scores, four groups were formed: 1. Individuals who had high scores in both disorder and growth (20 subjects); 2.Individuals who had low scores in both disorder and growth (17 subjects); 3. Those who had high disorder scores and low growth scores (18 subjects); and 4.subjects who had low disorder scores and high growth scores (19 subjects). In order to compare different groups of post-traumatic stress disorder and post-traumatic growth, we used multivariate analysis of variance of self-compassion, self-control, integrative self-knowledge, mature defense mechanisms, immature defense mechanisms, and neurotic defense mechanism.

**Table 1.** Mean, SD & Cronbach's alpha of research variables

| Variables | Mean | SD | Cronbach's alpha |
|---|---|---|---|
| PTSD | 2.34 | 0.48 | 0.85 |
| PTG | 3.18 | 0.82 | 0.90 |
| Self-compassion | 3.04 | 0.45 | 0.78 |
| Self- knowledge | 2.99 | 0.72 | 0.75 |
| Self-control | 3.36 | 0.63 | 0.74 |
| Mature defenses | 6.02 | 1.28 | 0.70 |
| Immature defenses | 5.23 | 1.01 | 0.70 |
| Neurotic defenses | 6.14 | 1.23 | 0.70 |

After calculating the mean of the groups (Table 2), we used multivariate analysis of variance to determine the difference between the research variables in the four groups. The Pillai's trace in this test shows that there is a significant difference between the four groups in terms of their self-compassion, self-control, integrative self-knowledge, mature defenses, immature defenses and neurotic defenses (F(3,70)=3.06; P=0/9; sig=0/0001). This significant difference was found in the multivariate analysis of variance of self-compassion (F(3,70)=3.10; P=0/03), mature defense (F(3,70)= 2.77; P=0/04) and neurotic defenses (F(3,70)=3.97; P=0/01).

Paired comparisons in the LSD follow up test showed that only some differences between groups were significant. The results are presented in Table 3. Based on this test, Self-compassion for people without

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experience of PTSD and PTG (group II) was higher than those with PTG (Group IV), and this group was also higher than those with PTSD (third group). The mean score of mature defensive mechanisms in groups with high PTG scores (groups 1 and 4) was higher than those without the experience of PTSD and PTG (group II). In the neurotic defense case, the mean score of the second group (without the experience of PTSD and PTG) was lower than all other groups.

**Table 2.** The mean score of groups in research variables

| Variables | Group I | Group II | Group III | Group IV |
|---|---|---|---|---|
| Self-compassion | 3.02 | 3.87 | 2.92 | 3.29 |
| Self- knowledge | 3.05 | 2.78 | 2.94 | 3.19 |
| Self-control | 3.39 | 3.18 | 3.44 | 3.44 |
| Mature defenses | 6.18 | 5.36 | 6.11 | 6.51 |
| Immature defenses | 5.36 | 4.79 | 5.39 | 5.21 |
| Neurotic defenses | 6.30 | 5.32 | 6.27 | 6.71 |

**Table 3.** Post-hoc test for multivariate analysis of variance

| Independent variables | Group | Groups | Sig. level |
|---|---|---|---|
| Self-compassion | nPTSD, nPTG | PTG | 0.00 |
| | PTSD | PTG | 0.01 |
| Mature defenses | PTSD, PTG | nPTSD, nPTG | 0.04 |
| | nPTSD, nPTG | PTG | 0.00 |
| Neurotic defenses | PTSD, PTG | nPTSD, nPTG | 0.01 |
| | nPTSD, nPTG | PTSD | 0.02 |
| | | PTG | 0.00 |
| | nPTSD, nPTG | | |

*nPTSD,: not PTSD*
*nPTG: not PTG*

## Discussion

According to the findings, the four groups were significantly different in terms of the self-compassion, mature defense mechanisms, and neurotic defense mechanisms. However, there was no significant difference among them regarding self-control, integrative self-knowledge, and immature defensive mechanisms. Self-compassion was higher for the people without the experience of PTSD and PTG (group II) compared to those with PTG (Group IV), and this group had also higher experience than those with PTSD (third group). These findings are consistent with some previous research findings. Mikaili, Eini, and Taghavi (33) showed that, self-compassion has a positive relationship with the psychological well-being of the patients with PTSD. Accordingly, Neff (11), Gorbani, Watson, Chen, and Norbala (34) and Thompson and Waltz (35) all confirmed this, and suggested that this construct can be adapted. In explaining this finding, it can be argued that, those people with high self-compassion allow themselves to undergo a natural exposure process and correct emotion processing without blame, without conflict in avoiding strategies, and finding a meaning for reducing anxiety (35). They considered their failure and harm experience, as a universal experience that may occur to anyone (11). Consequently, they do not engage in rumination about the event, and can quickly free their minds out of negative mental experiences (9). Therefore, self-compassion helps the person in faster returning to equilibrium and early adaption after the traumatic experience (10).

On the other hand, finding a meaning during and after trauma shows that a person needs some strategies for reducing the anxiety and emotional catharsis to achieve an initial equilibrium (36). This can lead to the PTG experience. Therefore, it can be concluded that, the people without experiences of PTSD and PTG have a higher self-compassion than the fourth group. This is because, without a significant increase in the level of anxiety and the need for finding a meaning to reduce it, the individual can return to the initial equilibrium faster through the natural exposure with trauma (8). However, attempting to find a meaning in the fourth group may indicate that, they have not been able to assimilate and understand the incident, and have used some strategies to reduce the anxiety of the trauma, which were also confirmed by Tedeschi and Calhoun (3). At the same time, due to less focus on the negative aspects of the events by the fourth group, they have shown a better response to stressors (33); and also, to reduce their anxiety, they used many strategies to experience less negative emotions than the third group (3). Therefore, it can be inferred that, the people of the fourth group were anxious in treating the trauma and may have blame themselves (they have lower self-compassion than the second group). Then, to reduce this anxiety, they used more constructive strategies than the third group, and this could be the reason for their higher self-compassion scores than the third group.

These findings mean that, the people in the second group can more easily accept the trauma and may not deny it. Seeing the differences among the groups in the defense mechanisms also confirms this. Defense mechanisms put some painful thoughts and feelings outside consciousness to reduce the level of anxiety (37). The people in the second group, who have been able to incorporate and assimilate trauma in their life story (38), need no defense mechanisms to reduce their anxiety. In fact, an individual without the long-term experience of anxiety has the incentive to act in reducing the distance between the current and previous experience (39). For this reason, both people in mature

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defenses and neurotic defenses scored lower than other groups. Basharat (32), Waqas et al. (40), and Kafi, Atashkar, Amir-al-Vali, and Rezvani (41) also confirmed these findings.

It is also important to note that, the individuals with a PTG experience (group I & IV) had higher scores in their mature defenses. People rely on a set of beliefs and assumptions on the world, such as invulnerability (3). These beliefs and assumptions can help people in understanding the causes of what happens to them, and give them a meaning and purpose. When trauma is experienced, this assumption is shaken and leads to anxiety. Therefore, people are looking for some ways to heal themselves and restore equilibrium to their lives. Accordingly, this process can lead to individual growth (3). Regarding the above-mentioned definitions of the defensive mechanisms, and also due to the fact that PTG affects the reduction of anxiety, it can be assumed that, PTG itself is a defensive mechanism. Studies have also shown that, this growth has been temporary and has not led to the adoption and emotion processing of trauma (23, 24, 25). On the contrary, the individual experiences and reports some degrees of psychological distress. On this basis, and also based on the findings of this research, if PTG is a mature defense, the average scores for the first and fourth groups in this defense, will naturally be higher than the scores belonged to the individuals of the second group. In previous studies, the relationship between mature defense mechanisms and post-traumatic growth has been confirmed (42, 41).

Based on the performed literatures on self-control and integrative self-knowledge, these constructs are adapted constructs and correlated with mental health in individuals (19, 43, 44, 45). However, in this study, there was no significant difference among the four study groups in terms of these two variables. Also, there are several reasons for this insignificance. For example, in several previous studies, these two variables interact with each other, and when both interact, they can highly affect the mental health of individuals (17, 46). According to Saeedi et al. (47), self-control can create some differences in groups when it is combined with integrative self-knowledge. However, this study indicated that, there was no difference among the four groups of research in integrative self-knowledge. Accordingly, one can expect that, there is no difference in the self-control among these four groups. Therefore, the combination of these two variables is important.

Furthermore, the insignificance of integrative self-knowledge in this study may be due to that, this construct is deeper; and therefore, the paper-pencil assessment is not valid. Considering the educational level of most people in the sample group and also the difficulty in understanding the questions of the questionnaire, it may be necessary to more precisely measure it using other methods.

There was also no significant difference among the research groups in terms of the immature defensive mechanisms. In justifying this finding, Freud's perspective on defense mechanisms can be articulated. Accordingly, he believed that, we rarely use one kind of defense mechanism, and usually defend ourselves against anxiety by simultaneously using multiple defenses (48). In fact, we all are prepared to use a variety of defenses, some of which are primitive in terms of stress or in group communication with others. On the contrary, some people with serious psychiatric disorders can also use more mature defenses in some circumstances (49). Accordingly, those who are immediately assessed after happening an accident in this area, may use all defense strategies consistent with lower mental health such as immature defenses, due to the initial severity of the trauma. Therefore, it is not far from the expectation that, there was no significant difference among the different research groups in terms of the immature defense mechanisms. For this reason, it can be suggested that, in the follow-up of the patients for evaluating the symptoms of PTSD and PTG, the defensive mechanisms should be reassessed, as the extent and the manner of using the defenses may vary at the beginning of the accident and by passing sometimes later.

The research limitations included higher number of men in the sample group due to the nature of the trauma, the low level of literacy and lack of understanding the questions, sample drop in the second phase and the sample selection among patients who were not seriously injured (due to the inability of injured people to respond). The present study focused on accident trauma. The nature of other traumas, such as rape, disease and natural disaster, may vary. To investigate and generalize these findings in the female population, it is suggested to work on traumas that are more common in this population. It is also suggested that in future research, this issue should be considered why most accident victims have a low level of literacy.

## Conclusion

In general, the findings of this research showed that, self-compassion, mature defense mechanisms, and neurotic defense mechanisms are the factors that can differentiate the reactions of individuals to trauma. High self-compassion and adaptation without distortion and denial of trauma and the emotions associated with it, can return the person to equilibrium faster (50). Moreover, the findings of this study suggest that, PTG can be considered as a kind of mature defense mechanism.

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**Compliance with Ethical Standards**

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**Conflict of interest**

Author A declares that she has no conflict of interest. Author B declares that he has no conflict of interest. Author C declares that she no conflict of interest.

**Ethical approval**

All procedures performed in studies involving human participants were following the ethical standards of the institutional or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed consent**

informed consent was obtained from all individual participants included in the study

**Authors contribution**

The author contributed to the data analysis. Drafting, revising and approving the article, responsible for all aspects of this work.

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