



Universiteit Utrecht

Witnessing the Homicide of a Loved One: The Effect of Witnessing a Homicide on PTSD
Symptom Severity and the Moderating Role of Relationship to Victim

Master Thesis

by

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April, 2019

Abstract

Although grief is a natural reaction after losing someone close, violent and unexpected deaths like suicides can lead to posttraumatic stress disorder (PTSD). Many risk factors for PTSD were identified in the past; yet, there is still no complete framework to understand PTSD following a homicide. This study aimed to investigate the predictive effect of witnessing on PTSD symptom severity and the possible moderating role of relationship to the victim on this association. It was hypothesized that witnessing would increase PTSD and intrusive symptom severity, and losing someone closer would increase the strength of this relationship. 901 individuals (680 females, 220 males) from the United Kingdom participated in the study. Participants were assigned to either witnessing or not witnessing group. Likewise, for relationship to the victim, there were two groups as nuclear family members and others. Their PTSD symptom severity was measured with the Impact of Event Scale. Results showed that witnessing did not predict intrusive symptom severity, and did predict PTSD symptom severity with a small effect size. Similarly, closeness to the victim did not moderate the relationship between witnessing and intrusive symptom severity whereas it could moderate the association between witnessing and PTSD symptom severity, but in the opposite direction of what was expected; the association was stronger for losing a more distant person with a small effect size. In light of these results, limitations and implications were discussed, and several suggestions for future studies were shared. Since this study is the first in the literature looking at these associations, it has an important contribution to the literature of PTSD following a homicide.

Keywords: PTSD, homicide, witnessing, relationship to the victim, PTSD symptom severity, intrusive symptom severity

Preface

After several months which I spent with lots of reading, thinking and writing, here I am at the end of this amazing process. Creating something has always been valuable for me, and this, as my first thesis, is the most precious work of mine. It was not easy. It required a great amount of effort and commitment. I spent days and nights to make a good work, not to complete a level for the degree, but to be able to share scientific knowledge with people.

Thankfully, I was not alone in this journey. I had a very enthusiastic and encouraging supervisor, Suzan Soydaş, who helped me through learning how to think and write scientifically. She always gave me the opportunity to share my ideas, to look for and find my own solutions, and to be able to discuss them openly. I am grateful that I had her support.

My friends, from Turkey and here, the ones who had the same process with me and the ones who had no idea what writing a thesis is like, shared their kindness, help, patience, and empathy. Having them is one of the most wonderful things in my life.

My dear professors, Nuray Karancı and Canan Sümer, shared their time, wisdom, and experiences with me. I was very lucky since I could learn from them and had their guidance.

All my family, from the youngest to the eldest, showed a great encouragement. My lovely grandparents; they always made me feel that I have them, and they will be there for me whenever I need them. My father, at the very beginning of my journey, made me sure about my choices, and supported me whatever it takes. My brother did not hesitate to share his compliments and criticism, and helped me notice who I am. My mother, whom I share every part of my life, shared this whole process with me, and wrote her PhD thesis in the meantime. She listened, helped and encouraged when she felt that I needed. I thank every one of them since they believed that I can.

And finally, I would like to thank Bawer who has always faith in me. Whenever I felt tired or overwhelmed, he repeated that I have the strength to achieve. He gave me the time I needed, and never hesitated to support me to dream freely about the future. I appreciate his presence in my life.

Once more, I would like to thank all the people who did not make me feel alone in this process. Even though we were not physically together, I always sensed their support and love. This thesis is therefore dedicated to people who are in my life and contributed to who I am.

Introduction

Grief after losing someone close is a common and expected reaction. Following a natural loss, many people can adjust well and cope (Stroebe, Schut, & Stroebe, 2007). However, sometimes deaths can be unexpected. In these cases, the grief process can become prolonged and more complicated, and for some, develop into a disorder such as a prolonged complex bereavement disorder or posttraumatic stress disorder (PTSD) (Boelen, 2015; Smid et al., 2015).

Since murder is a violent form of an unexpected death, bereavement after homicide can be more traumatic than expected or non-violent deaths for the individuals who have intimacy or closeness with the homicide victims (Rynearson, 1984). A study showed that more than 20% of the family members of homicide victims developed PTSD following the homicide, and almost half of them had PTSD symptoms (Amick-McMullan, Kilpatrick, & Resnick, 1991). Moreover, parents whose children had died due to an accident, suicide or homicide were compared in terms of acceptance and PTSD symptoms, and it was found that parents who lost their children due to homicide had significantly more PTSD symptoms and lower acceptance level compared to suicidal or accidental losses (as cited in da Costa, Njaine, & Schenker, 2017). Therefore, it can be argued that homicidal loss is a significant risk factor for developing PTSD.

The Office for National Statistics (2019) reports that the homicide rate in England and Wales reached the highest rate for a decade in 2018 with 726 homicides. Research indicates that each homicide affects 7 to 10 family members (Zinzow, Rheingold, Hawkins, Saunders, & Kilpatrick, 2009). In addition, more distant family members, friends, co-workers, and neighbors can experience significant psychological and physiological effects after a homicide, such as psychological distress, PTSD, complicated grief, sleep disturbances, or immune system deficiencies (Buckley et al., 2012; Stroebe et al., 2007; Zinzow et al., 2009). Due to its health implications on large populations, complicated grief and PTSD following a homicidal loss have been an important topic of interest (Streets, 1990; van Denderen, de Keisjer, Kleen, & Boelen, 2015).

Intrusive symptoms following a traumatic event can be seen in all individuals regardless of the presence of PTSD; yet, for the ones who do not develop PTSD, the intrusions decrease by time (Ehlers, 2010) whereas individuals who develop PTSD keep

having those symptoms (Shalev, Peri, Canetti, & Schreiber, 1996). Amick-McMullan and colleagues (1989) found that family members of homicide victims reported higher intrusive symptoms compared to the participants in the previous studies which were conducted with individuals who had been raped, had lost their parents or significant others. The intrusions following homicide may include dreams about the victim being saved or recurrent thoughts about the pain which the victim might have felt (Connolly & Gordon, 2015). Therefore, it can be stated that, as more specific than PTSD, intrusive symptoms are distinctive for and significantly affect individuals' lives after losing someone close due to homicide.

Research has identified several risk factors for developing PTSD; including low education, poor social support, previous traumatic experiences, adverse childhood experiences, and insufficient living conditions (Brewin, Andrews, & Valentine, 2000; Steel et al., 2009). Another risk factor for PTSD is exposure to violence (Buka, Stichick, Birdthistle, & Earls, 2001). This includes victimization, indicating that the individual is the target of violence; eye-witnessing, hearing and learning about a violent act such as homicide or a serious injury which happened to another person; and all these versions can lead to a higher risk for developing PTSD (as cited in Buka et al., 2001). Moreover, being exposed to multiple occasions of violence leads to having a cumulative effect in terms of symptomatology (Bell & Jenkins, 1993). A study conducted by Fitzpatrick and Boldizar (1993) in the United States (US) showed that 27% of the individuals who were either victims or witnesses to violence met PTSD criteria whereas lifetime PTSD ratio in the general adult population in the US is 7-8% (US Department of Veteran Affairs, 2018).

As a more specific form of exposure to violence (Buka et al., 2001), witnessing homicide or a seriously injuring attack can lead to PTSD, too (Breslau et al., 1998). Sareen (2014) identified witnessing someone being killed or severely injured as one of the most common traumatic events associated with developing PTSD. Furthermore, a study conducted with rats showed that when rats witnessed a traumatic event, although they were not the direct victims of violence, they began to experience behavioral impairments similar to PTSD symptoms (Patki, Solanki, & Salim, 2014). Similarly, humans may develop PTSD after witnessing a traumatic event independent of whether they were a potential victim or not (Alisic, Krishna, Groot, & Frederick, 2015). Therefore, in addition to that exposure to violence may put individuals at risk for PTSD, witnessing may be another risk factor independent from continuous exposure to violence.

It is also possible that an individual losing a loved one due to homicide can develop PTSD without witnessing it (American Psychiatric Association [APA], 2013; Amick-McMullan et al., 1991; Karabekiroğlu, Akbaş, Taşdemir, & Karakurt, 2008). Rynearson (1984) stated that his patients had very vivid intrusive symptoms even though they did not witness the homicide of someone close. Thus, witnessing is not a prerequisite for developing PTSD symptoms or intrusive symptoms. Although it was included in diagnostic criteria (APA, 2013), studies in the literature revealed contradictory results about the effect of witnessing on PTSD. Furthermore, hardly any research has focused on the relationship between being a direct witness of a homicide and PTSD symptom severity. To the best knowledge of the author, a possible differentiation between individuals who have witnessed a homicide and who have not witnessed in terms of PTSD symptoms has not been investigated. Therefore, there remains a gap in the literature about whether witnessing is a risk factor for PTSD and can predict it.

Another risk factor of PTSD following a homicidal loss is individuals' relationship with the victim. A closer relationship to the victim can predict more enduring and severe symptoms in bereavement and a more severe PTSD (van Denderen, 2017). A recent study showed that losing a child or a spouse predicts PTSD more than losing other acquaintances or relatives, independent from the type of death (Atwoli et al., 2017). Research conducted by Newson and colleagues (2011) revealed that the rates of losing a child or spouse, or several people including spouse differed in between complicated and normal grievers whereas loss of another family member or friend did not differ. Similarly, Holland and Neimeyer (2011) showed that individuals who lost an immediate family member developed more complicated grief symptoms. Since PTSD and complicated grief share some similar symptoms (Smid et al., 2015), it is likely that different losses may lead to a difference in the rates of PTSD or the severity of PTSD symptoms. Therefore, relationship to the victim is an important factor in terms of developing PTSD and PTSD severity. In this article, to emphasize the relationship between victim and the participants of the study, victims will be referred to as "close ones" of the participants.

Although the relationship to the victim was more frequently studied than the effect of witnessing, there are still some gaps in the literature. First of all, studies used different categories for relationship to the victim, and when evaluated together, their results did not provide a comprehensive understanding of the relationship between closeness to the victim and PTSD. This study aims to differentiate these relationships into two groups and have a

more precise base for understanding their association with the relationship between witnessing and PTSD. Another gap in the literature is that, so far, relationship to the victim was considered to be only a main effect for PTSD. Its potential moderating role has never been investigated and whether it can moderate the relationship between other risk factors and PTSD symptom severity remained unknown. This study aims to provide an answer to this question.

There is a recent and growing literature on grief and PTSD following a homicidal loss. Yet, the literature on the risk factors for PTSD symptom severity is inconclusive and sometimes contradictory. This gap in the literature may lead to some deficiencies in defining the risk groups after a homicidal loss. The current study aims to fill this gap and contribute to traumatic grief literature and practice by making clearer definitions of risk groups. In light of the literature mentioned above and the gaps, four hypotheses were formulated in this study:

1. Individuals who are a direct witness to the homicide of their close ones will develop more severe PTSD symptoms.
2. Individuals who are a direct witness to the homicide of their close ones will develop more severe intrusive symptoms.
3. A closer relationship to the victim will increase the strength of the relationship between witnessing homicide of a close one and PTSD symptom severity.
4. A closer relationship to the victim will increase the strength of the relationship between witnessing homicide of a close one and intrusive symptom severity

Methods

Participants

Data from 901 individuals (680 females, 221 males) were used in this study. Participants of the study were the patients who were from the United Kingdom, lost someone due to homicide and were referred by Victim Support Fund to Assist Trauma Care, a specialist Third Sector Organization offering therapeutic help to adults and children, individuals and families, affected by a wide range of traumatic occurrence. At the referral date to the center, the participants' ages ranged from 18 to 86 ($M = 43.32$, $SD = 14.50$). Out of 901 participants, 172 individuals were present during the homicide and directly witnessed the death of the deceased, and 806 individuals lost their nuclear family members including

(step)parent, (step)child, (step)sibling, (ex)partner whereas 95 individuals lost a person who was a relative other than nuclear family members, friends, or neighbors. More detailed information about the participants can be seen in Table 1.

Table 1

Descriptive Statistics

| | | <i>N</i> | <i>%</i> | <i>M</i> | <i>SD</i> |
|----------------------------|---------------------|----------|----------|----------|-----------|
| Gender | Female | 680 | 75.47 | | |
| | Male | 221 | 24.53 | | |
| Age | | 791 | | 43.32 | 14.50 |
| Ethnicity | White | 781 | 86.70 | | |
| | Mixed | 13 | 1.40 | | |
| | Black | 58 | 6.40 | | |
| | Asian | 41 | 4.60 | | |
| | Other | 8 | 0.90 | | |
| Time since murder | | 787 | | 1.66 | 4.38 |
| Witnessing | Directly witnessing | 172 | 19.09 | | |
| | Not witnessing | 729 | 80.91 | | |
| Relationship to the victim | Nuclear Family | 806 | 89.50 | | |
| | Others | 95 | 10.50 | | |

Note. Age and time since murder were defined in years.

Measurements

Impact of Event Scale. The Impact of Event Scale (IES) (Horowitz, Wilner, & Alvarez, 1979) was used to assess intrusive symptom severity and PTSD symptom severity in adults from the age of 18. This self-report instrument has 15 items and two subscales which are intrusion (7 items, *example: Pictures about it popped into my mind*), and avoidance (8 items, *example: I tried to remove it from my memory*). Although there is a revised version of this scale, this version is widely used in the literature, and its two-factor framework is still valid, meaningful and clinically relevant (Sundin & Horowitz, 2002). Moreover, the literature's emphasis is mostly on intrusion and avoidance, but not arousal which is the additional factor in the revised version (Fearon & Mansel, 2001; Lyons-Ruth & Block, 1996; van Ee, Kleber, Jongmans, Mooren, & Out, 2016). Therefore, it can be said that IES can still

be used to assess PTSD symptom severity. It measures the presence and severity of problems which could be experienced after a potentially traumatic event and in the past seven days. The scoring ranges from 0 to 5 (0 = not at all, 1 = rarely experienced, 3 = sometimes experienced, 5 = often experienced) for each item; therefore, the maximum score which can be got from the whole scale is 75. Higher scores indicate higher severity of PTSD symptoms. Test-retest reliability is reported as .87; and the subscales have high levels of internal consistencies (Horowitz et al., 1979). In the current study, Cronbach's alpha values were found to be equal to .76 for intrusion, and .74 for avoidance. Moreover, IES has good clinical and convergent validity (as cited in Sundin & Horowitz, 2002). Intrusion and avoidance subscales have high correlations with the Clinician-Administered Posttraumatic Stress Disorder Scale ($r = .75$, $r = .79$, $p < .001$, respectively) (as cited in Sundin & Horowitz, 2002).

Procedure

The current study was designed as a retrospective study using a naturalistic sample. All data were gathered for the evaluation of the patients' treatments. Therefore, no ethical approval was required.

This study was part of a more extensive study including measures for complicated grief, depression, anxiety, and work and social adjustment. Scores were taken both before and after treatment. However, in this study, only the first measurements of PTSD symptom severity were taken into consideration. The treatment process and other measures were not in the scope of this study.

Design

Since the study was designed as a retrospective naturalistic observation, patients were recruited without basing on a prior research question. Participants with missing data on any variables other than the Impact of Event Scale scores were not included in the study. For this scale, participants who had more than one missing score on each subscale were excluded.

The current study investigated the impact of being a direct witness to the homicide on intrusive symptom severity and PTSD symptom severity, and the possible moderating role of the relationship to the victim on this association. Participants' witnessing status and their closeness to the victim were examined in relation to PTSD symptom severity.

For witnessing variable, participants were assigned to either of two groups: Those who were present at the homicide scene and directly witnessed homicide of their close ones, and

those who were not present at the homicide scene and did not directly witness the homicide. Participants who were exposed to the event or its details via media were included in the not witnessing group since the additional criterion in DSM-5 (APA, 2013) states that exposure via press media is not a valid criterion for developing PTSD.

For relationship to the victim variable, participants were assigned to the ‘nuclear family’ or ‘others’ group. Nuclear family members included (step)parents, (step)children, siblings, and (ex)partners. The group “others” included friends, neighbors, and more distant relatives such as grandparents, aunts, uncles, grandchildren, niece/nephews, cousins, and in-laws.

Since this study used a clinical sample, it was not obtained with the aim of being generalizable to the whole population.

Statistical Analyses

Gender and age variables were controlled during the analyses. Total scores were calculated for the intrusive symptom severity and total PTSD symptom severity. Linear regression was used to examine the effect of witnessing homicide of a close one on PTSD symptom severity. To assess the possible moderating effect, moderation analysis in the PROCESS Macro by Andrew F. Hayes (2019) was used.

Results

Age and gender variables were added to the models as control variables. In PROCESS Macro, relationship to the victim and witnessing variables were mean centered, and heteroscedasticity consistent standard error and covariance matrix estimator was used to alleviate the heteroscedasticity of residuals.

Overall, 95.12% of the participants were above the clinical threshold for PTSD. 857 participants had a total score of 26 or more and reached the clinical significance level. For total PTSD symptom severity, participants had a mean score of 3.36 out of 5 for each question ($SD = 0.90$). The average mean score for intrusive symptom severity was 3.81 out of 5 ($SD = 1.01$)

Witnessing homicide and symptom severity

Linear regression was used to assess the predictive value of being a direct witness to the homicide on intrusive symptom and total PTSD symptom severity.

Witnessing homicide and intrusive symptom severity. Participants who were present at the homicide scene and directly witnessed the homicide had scores between 3 and 35 ($M = 27.48$, $SD = 6.44$) whereas participants who were not direct witnesses had scores between 0 and 35 ($M = 26.47$, $SD = 7.23$). The difference between the mean scores was not statistically significant ($\beta = .06$, $t(901) = 1.83$, $p = .07$). Therefore, contradicting the first hypothesis, witnessing the homicide did not predict intrusive symptom severity (see Table 2).

Table 2

Regression Analyses for the Relationship between Witnessing and Intrusive Symptom Severity for Adults

| | | <i>B</i> | <i>SE</i> | β | <i>t</i> | <i>p</i> |
|---------|------------|----------|-----------|---------|----------|----------|
| Model 1 | Constant | 24.37 | 0.48 | | 51.27 | .000 |
| | Gender | 2.98 | 0.54 | .18 | 5.50 | .000 |
| | Age | -0.001 | 0.001 | -.03 | -0.87 | .386 |
| Model 2 | Constant | 24.15 | 0.49 | | 49.28 | .000 |
| | Gender | 3.00 | 0.54 | .18 | 5.54 | .000 |
| | Age | -0.001 | 0.001 | -.03 | -0.90 | .371 |
| | Witnessing | 1.08 | 0.59 | .06 | 1.83 | .067 |

Note. Model 1 represents the model with control variables.

R^2 change is equal to .004 ($F(1,897) = 3.36$, $p = .07$).

Witnessing homicide and PTSD symptom severity. For PTSD symptom severity, participants who witnessed the homicide had a mean score of 52.22 ($SD = 11.72$), and the scores ranged from 17 to 75. Scores of not witnessing group were between 7 and 75, and their mean was equal to 49.90 ($SD = 13.87$). The mean difference was found to be significant, and therefore, consistent with the second hypothesis, individuals who witnessed the homicide scored significantly higher on PTSD symptom severity compared to the ones who did not ($\beta = .07$, $t(901) = 2.16$, $p = .03$) (see Table 3). The proportion explained variance in PTSD symptom severity was small ($R^2 = .005$, $F(1, 897) = 4.66$, $p = .03$).

Table 3

Regression Analyses for the Relationship between Witnessing and PTSD Symptom Severity for Adults

| | | <i>B</i> | <i>SE</i> | β | <i>t</i> | <i>p</i> |
|---------|------------|----------|-----------|---------|----------|----------|
| Model 1 | Constant | 46.07 | 0.91 | | 50.87 | .000 |
| | Gender | 5.71 | 1.03 | .18 | 5.54 | .000 |
| | Age | 0.001 | 0.001 | .01 | -0.35 | .723 |
| Model 2 | Constant | 45.57 | 0.93 | | 48.85 | .000 |
| | Gender | 5.75 | 1.03 | .18 | 5.59 | .000 |
| | Age | 0.001 | 0.001 | .01 | 0.32 | .746 |
| | Witnessing | 2.43 | 1.13 | .07 | 2.16 | .031 |

Note. Model 1 represents the model with control variables.

R^2 change is equal to .005 ($F(1,897) = 4.66, p = .03$).

Relationship to the victim and witnessing homicide

Moderation analyses were conducted to search for the effect of closeness to the victim on the relation between being a direct witness to the homicide and symptom severity. In the PROCESS Macro, the interaction of witnessing and relationship to the victim was used to assess moderation.

Relationship to the victim as moderator in the witnessing-intrusive symptom severity relationship. The analyses revealed a non-significant interaction effect for the witnessing and relationship to the victim. Thus, contrary to the third hypothesis, closeness to the victim did not moderate the relationship between witnessing and intrusive symptom severity ($t(901) = -1.36, p = .17$) (see Table 4).

Relationship to the victim as moderator in the witnessing-PTSD symptom severity relationship. As a result of this analysis, relationship to the victim was found to be a moderator for the association of witnessing and PTSD symptom severity ($t(901) = -1.98, p = .048$). However, the direction of this relationship was the opposite of what was expected in the fourth hypothesis (see Figure 1). As can be seen from Table 5, the effect size of this model was small ($R^2 = .004$).

Table 4

Moderation Analyses for the Relationship between Witnessing and Intrusive Symptom Severity Moderated by Relationship to Victim for Adults

| | <i>B</i> | <i>SE</i> | <i>t</i> | <i>p</i> |
|--------------------------------------|----------|-----------|----------|----------|
| Constant | 24.32 | 0.55 | 44.44 | .000 |
| Witnessing (Centered) | 1.03 | 0.58 | 1.77 | .076 |
| Relationship to Victim (Centered) | -0.67 | 0.83 | -0.81 | .417 |
| Interaction | -2.03 | 1.50 | -1.36 | .175 |

Note. For SE, a heteroscedasticity consistent standard error and covariance matrix estimator (HC3) was used. Model contains age and gender variables as control variables. Results for interaction states moderation.

$R^2 = .002$

Figure 1

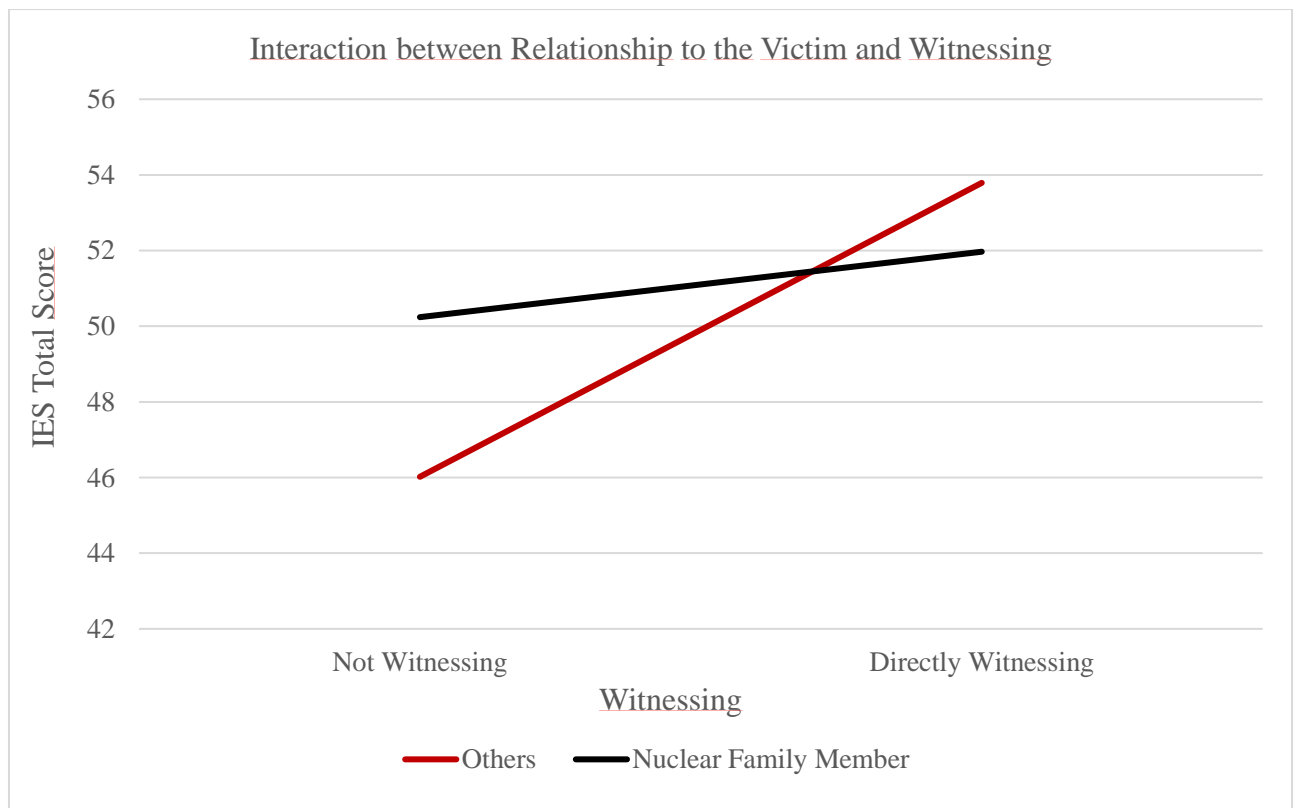


Table 5

Moderation Analyses for the Relationship between Witnessing and PTSD Symptom Severity Moderated by Relationship to Victim for Adults

| | <i>B</i> | <i>SE</i> | <i>t</i> | <i>p</i> |
|-----------------------------------------|----------|-----------|----------|----------|
| Constant | 45.96 | 1.01 | 45.50 | .000 |
| Witnessing (Centered) | 2.36 | 1.08 | 2.19 | .029 |
| Relationship to Victim (Centered) | 3.07 | 1.77 | 1.74 | .083 |
| Interaction | -6.05 | 3.05 | -1.98 | .048 |

Note. For SE, a heteroscedasticity consistent standard error and covariance matrix estimator (HC3) was used. Model contains age and gender variables as control variables. Results for interaction states moderation.

$R^2 = .004$

Discussion

The results of this study showed that being present at the homicide scene and directly witnessing it did not increase intrusive symptom severity. However, it led to more severe PTSD symptoms than not witnessing. While the relationship to the victim did not moderate the association between witnessing and intrusive symptom severity, it did moderate the relationship between witnessing and total PTSD symptom severity; yet, in the opposite direction to what was expected. This implies that when the victim is a nuclear family member, the effect of witnessing on PTSD symptom severity reduced; and a more distant relationship increased the strength of the association between witnessing and PTSD symptom severity. Consistent with previous studies on the risk factors of PTSD (Brewin et al., 2000), witnessing had a small effect size. Likewise, the model which included relationship to the victim as a moderator also had a small effect size, and could explain a small part of the variance.

In the light of the observed results, Hypotheses 1, 3 and 4 were rejected whereas Hypothesis 2 was accepted. Contrary to what was expected in Hypothesis 1, witnessing did not lead to an increase in intrusive symptom severity. A possible explanation for this might be that even if individuals do not witness a potentially traumatic event, they can still have

intrusions about it (Rynearson, 1984). Following this, individuals may fantasize about their close one's last moments and death, subsequently develop intrusive symptoms, and also the details which they were exposed during trials or testimonials may take part.

A striking result was that although the severity levels of intrusive symptoms were about the same for witnessing and not witnessing groups, total PTSD symptom severity scores were higher for the witnessing group. It can be inferred that avoidance symptom severity scores led to this difference, and it was higher for individuals who witnessed the homicide. Although this was not hypothesized and not evaluated in the study independently, it can still be important to understand the core of the issue. In addition, Shalev and colleagues (1996) found that intrusion symptoms occur immediately after the traumatic event whereas avoidance symptoms appear steadily in 6 months. In the current study, for 46% of the participants, the symptom severity was measured in a year after the traumatic event took place. Considering these, the question of whether witnessing precipitates the occurrence of avoidance symptoms arises. Contradicting the fourth hypothesis, losing a nuclear family member reduced the association between witnessing the homicide and PTSD symptom severity whereas losing a person who was someone more distant strengthened it. Considering that the literature in this field states that closer relationship to the victim is associated with more severe PTSD (Karabekiroğlu et al., 2008), this may indicate that losing someone close leads already a greater severity for PTSD symptoms. On the other hand, for individuals who lost someone more distant, it might be that being a witness to the homicide has a greater impact than the loss of someone more distant by itself.

The current study has several limitations. First of all, it was a naturalistic observation and not a designed study, which led to difficulties in gathering and assessing information. For instance, information related to the characteristics of the traumatic event, such as whether the homicide was preplanned or intended, whether it included multiple deaths, and whether the individuals were present at the scene and also were a target was not available. Intentional violence, as in the case of murder, increases the chances of developing PTSD and leads to poorer health consequences (Santiago et al., 2013), and losing multiple people can lead more PTSD (Keyes et al., 2014). Moreover, being present in the homicide scene and being a target can have an additive effect on PTSD caused by losing a close one. Therefore, it is likely that these issues might have affected the results of this study.

Another type of data that could not be considered was related to demographic factors such as socioeconomic status and education level. These factors were found to be slightly

predictive for PTSD (Brewin, et al., 2000; as cited in Chen, Zhang, Hu, & Liang, 2015). Therefore, they can have a small effect on the accuracy of the results. A comprehensive and important meta-analysis by Brewin and colleagues (2000) stated that psychiatric history, adverse childhood experiences including childhood abuse, other previous traumas, heightened life stress and lack of social support are other risk factors for PTSD. Although the dataset included information on these factors, they were not systematically asked and assessed. Therefore, the information was not sufficient to be incorporated into the analyses and the model. These factors have small and small to medium predictive effects on PTSD, and they might have had a small effect on the results of the current study.

Another point is that the relationship to the victim variable was handled in two groups. Decker (1993) states that more groups for relationship variables lead to more accurate results as it would become more distinctive. However, in this study, frequencies were not suitable to differentiate each type of relationship. Although they might have been handled in more than two groups, that use would lead to difficulties in making a distinction in closeness. For instance, separating the parents and children into two different groups would not have given any benefits since it is complicated to make a distinction in terms of closeness between them. Moreover, by using categories of kinship in order to define closeness to the victim, instead of a self-report questionnaire to estimate closeness might have led to misidentify the intimacy of some relationships. For instance, some people may feel closer to their friends than their siblings. Being unable to gather additional information, it was decided to create two main groups using the information at hand.

In addition, there were also a few limitations related to measurements and sampling. Since the two trauma centers used IES as a part of their internal procedure, this study was based on the original version of IES. The original version has good validity and reliability, and still is appropriate to use (as cited in Sundin & Horowitz, 2002). Yet, the revised version includes arousal subscale, and arousal is one of the main dimensions in diagnostic criteria. Therefore, lacking the information related to arousal was another limitation. Lastly, a clinical sample was used in the study. Since people with more severe symptoms applied for the therapy in the first place, it can be assumed that people with less severe symptoms or no symptoms at all were not in the scope of this study. Therefore, the interpretations can only be made for clinical samples, and not for the community in general.

In light of these limitations, several suggestions can be made for future studies in this field. First of all, the current study is the first study using this model and investigating the

predictive effect of witnessing and the moderating role of the relationship to the victim. Replicating this study would be meaningful in order to test the consistency of the results. In this regard, considering traumatic event characteristics, factors related to individuals' psychological history or social support systems, demographic variables; using more groups for the relationship to the victim and conducting the study with a non-clinical sample would lead both researchers and clinicians to more accurate and inclusive results. Children and adults may have different post-trauma processes. Therefore, it is not clear whether these results can be applicable to children. Testing a similar model by considering the different characteristics of child and adult populations can also be investigated.

Moreover, in a meta-analysis, Steel and colleagues (2009) stated that variation in the PTSD prevalence rates was caused by the difference in the methodologies. Thus, in future studies, different instruments measuring PTSD or PTSD symptom severity, and different statistical analyses can be used to test the consistency of the results. Another suggestion is to measure the predictive effects of witnessing and the moderating role of relationship to the victim for complicated grief in addition to PTSD. PTSD and complicated grief share some common symptoms (van Denderen, de Keisjer, Huisman, & Boelen, 2016); yet, they are not the same, and they have several differences (Smid et al., 2015). Therefore, it would be good to search for these variables' possible effects on complicated grief to have more comprehensive knowledge about post-homicide processes. A third suggestion would be to include arousal and negative changes in mood and cognitions as outcome variables since they are the other dimensions for PTSD which were included in DSM-5 (APA, 2013). Investigating how the risk factors will be shaped for arousal can provide a better understanding. Another suggestion for future studies, following the earlier described limitation concerning the way of defining closeness to the victim is to use a self-reported continuous measurement. A final suggestion would be to conduct a longitudinal prospective study since it can provide the opportunity to have more information about patterns and pathways related to disorder and risk factors, and thus, a more comprehensive conceptualization of PTSD.

These results have some implications for the practice field. Many countries have a waiting list for psychological and psychiatric treatments, and at some point, defining risk groups and making a prioritization among the patients would be necessary. After a potentially traumatic event, the severity of the symptoms is expected to reduce over time if the individual did not develop PTSD (Shalev et al., 1996). However, if they develop PTSD, the symptom severity and feelings of loss increase by time (Shalev et al., 1996; van Wijk, van Leiden, &

Ferverda, 2016). Thus, prioritization gains more importance. Since this study reveals, at least as preliminary results, that witnessing can be a risk factor, individuals who witnessed the homicide may be evaluated as at more risk, and prioritized in the treatment process. If they have a more distant relationship to the victim, witnessing might gain more importance in prioritization decisions. If individuals applying for therapy are the nuclear family members of the victim, then, it might be a good choice to prioritize them even if they did not witness the homicide directly.

Since the study is the first in the literature investigating the effect of witnessing and the moderating role of the relationship to the victim, it has an important contribution to existing literature. The results show that witnessing may be a risk factor for PTSD, especially for individuals who had a more distant relationship with the victim. It provided a preliminary model which can be added to the existing models to increase the explanatory value of risk factors of PTSD. Furthermore, using relationship to the victim as a moderator and showing that it has a role in this relationship may encourage investigating the moderators in the field of PTSD. With more controlled designs and prospective studies, this model may help us enhance our understanding of risk factors for PTSD.

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