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RUNNING HEAD: Suppression and subsequent intrusions

**The Relationship between Suppression and Subsequent Intrusions. The Mediating Role of
Peritraumatic Dissociation and Anxiety**

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Abstract

Background and objectives: Although previous studies showed that thought and emotion suppression represent risk factors for intrusions development, the mechanisms that explain these relations were less explored. This study aims to examine the relationships between thought and emotion suppression and the symptoms of intrusion following the exposure to a trauma-related event. Moreover, we explored if these relationships would be mediated by peritraumatic state dissociation and state anxiety. *Design and Methods:* The trauma film paradigm was used and the participants were students ($N = 148$) experimentally exposed to an aversive film to model a traumatic experience. Thought and emotion suppression were measured before the trauma exposure. After exposure, the participants completed scales for measuring state dissociation and state anxiety. Intrusive images and thoughts of the film were recorded in the subsequent week using an intrusion diary. *Results:* Thought suppression predicted intrusive thoughts frequency, and this effect was mediated by the peritraumatic anxiety. State anxiety predicted both intrusive images and thoughts, while state dissociation only predicted intrusive images. *Conclusions:* Intrusive images and intrusive thoughts are different phenomena and they are predicted by different variables. The practical implications of these results for posttraumatic stress disorder (PTSD) treatment and secondary traumatization are discussed.

Key words: thought suppression, emotion suppression, state dissociation, peritraumatic anxiety, intrusive images, intrusive thoughts

Introduction

Most people are exposed, directly through personal experience or indirectly through other people's experience, to at least one life-threatening situation during the course of their lives (Burri & Maercker, 2014; Elwood, Mott, Lohr, & Galovski, 2011). Posttraumatic stress disorder (PTSD) is one of the most common psychological responses to traumatic events that have significant psychological consequences (Powers, Cross, Fani, & Badley, 2015; Seligowski, Lee, Bardeen, & Orcutt, 2015). One of the primary symptoms of PTSD includes re-experiencing the trauma in the form of intrusions, defined as involuntary, spontaneous retrieval of traumatic memories (American Psychiatric Association, 2013; Berntsen, 2009). Although these manifestations seem to be the most frequently endorsed PTSD symptoms and can take different forms, like visual images or thoughts, not all the people who experience a trauma develop such symptoms. This fact has led researchers to investigate possible vulnerability factors for PTSD. In previous studies, individual differences in terms of thought and emotion suppression, as well as peritraumatic states have been considered risk factors that have been linked to PTSD development (Bardeen, Kumpula, & Orcutt, 2013; Cutuli, 2014; McCanlies, Sarkisian, Andrew, Burchfiel, & Violanti, 2014). However, the mechanisms that link suppression with PTSD symptoms are not clearly understood. The aim of the present study is to identify the relationship between both thought and emotion suppression and peritraumatic states (dissociation and anxiety) with two different types of intrusions, images and thoughts. Moreover, the study also aimed to assess whether the direct relation between suppression and intrusion is mediated by peritraumatic dissociation and anxiety.

Suppression and peritraumatic states as predictors of intrusions

Under difficult situations, people often try to regulate their intense negative cognitive and emotional reactions, in order to reduce the intensity of distress caused by these situations

(Rottenberg & Gross, 2003). The suppression of ongoing thoughts and emotions associated with a personal experience leads to an increase in the intensity of negative thoughts and emotions (Bardeen & Fergus, 2014). Moreover, it is assumed that they can lead to the development of different mental disorders including depression, anxiety disorders, eating disorders, borderline personality disorders etc. (Dixon-Gordon, Chapman, Lovasz, & Walters, 2011; Ehling & Quack, 2010; Werner, Goldin, Ball, Heimberg, & Gross, 2011). More recent studies also emphasize the paradoxical effect of both thought and emotion suppression, that is its potential to increase, and not decrease, as expected, the PTSD symptoms, particularly posttraumatic intrusions (see Cutuli, 2014, for review; Beck, Gudmundsdottir, Palyo, Miller, & Grant, 2006; Seligowski et al., 2015; Shepherd & Wild, 2014).

Despite the individual differences in the way a person deals with their own cognitive and emotional experiences, in general, peritraumatic emotions (e.g., anxiety, dissociation) may play a decisive role in determining the frequency of intrusions after trauma exposure (Brunet et al., 2013; Clark, Mackay, & Holmes, 2014; Hagenaars et al., 2010; Maia et al., 2011; McCanlies et al., 2014). Extreme emotions affect the way information about traumatic events is processed and stored in our memory system. As a consequence of these emotional states, trauma memories are not integrated into autobiographical memories and are hypothesized to remain in a disorganized, fragmented form that leads to ongoing intrusive images and thoughts (Ehlers & Clark, 2000). In support of this idea, previous reviews and meta-analyses showed that dissociation as a state, occurring during or shortly after trauma exposure, is an important risk factor for the development, severity and continuity of PTSD symptoms (Breh & Seidler, 2007; Lensvelt-Mulders, van Der Hart, van Ochten, van Son, Steele, & Breeman, 2008). These results were obtained both in clinical settings (Kobayashi & Delahanty, 2014; Price, Kearns, Houry, &

Rothbaum, 2014) and in laboratory-based analogue trauma research (Holmes, Brewin, & Hennessy, 2004; Kindt, Van den Hout, & Buck, 2005). Despite the above presented findings, the role of peritraumatic dissociation is not free of controversy since there are studies and systematic reviews that refute the fact that state dissociation is an independent predictor of PTSD (see Van der Velden & Wittmann, 2008 for a review; see also Hagenaars & Krans, 2011; Otis, **Marchand**, & Courtois, 2012; Van der Velden et al., 2006). Certain contradictions can also be explained by some methodological shortcomings (Hagenaars, van Minnen, Holmes, Brewin, & Hoogduin, 2008). Several studies in the field based their conclusions on retrospective investigations, measuring peritraumatic dissociation and PTSD symptoms at the same time, based on remembering previous traumatic experiences (Marshall & Schell, 2002). As these reports may be influenced by many factors, like forgetting, attribution of symptoms, and over-reporting (Candel & Merckelbach, 2004), the reliability of retrospective reports is questionable. Due to these limitations, a proper perspective is to study the role of peritraumatic dissociation using experimental designs.

Peri-traumatic anxiety also plays an important role in the development of intrusions (see Clark et al., 2014 for a review; see also Laposa & Alden, 2008; Gershuny, Cloitre, & Otto, 2003). The period after trauma exposure is particularly anxiety-provoking due to both emotional reactions and conditioned responses to threat stimuli (Brewin, Dalgleish, & Joseph, 1996). Since individuals with high levels of anxiety catastrophize their own physical sensations during a traumatic event, any attempt at processing the traumatic material during this period leads to increased PTSD symptoms (Gittins, Paterson, & Sharpe, 2015; Olatunji & Fan, 2015).

The present study

Based on previous findings, the question remains as to whether individual differences in thought and emotion suppression have different implications in the development of different types of posttraumatic intrusions. Moreover, despite a growing body of literature indicating a connection between thought and emotion regulation and PTSD symptomatology, there are few studies on the mechanisms that explain these relations. In order to fill this gap, the first aim of the present study is to assess the relationship between thought and emotion suppression and intrusive images and thoughts. Our second aim is to assess the relationship between state dissociation and peritraumatic anxiety on the one hand and intrusions on the other. Furthermore, the third aim of the present study is to assess whether peritraumatic dissociation and anxiety mediate the relationship between thought and emotion suppression, on the one hand, and subsequent intrusions, on the other hand. Since peritraumatic dissociation and anxiety play an important role in the development of traumatic stress and based on the fact that suppression facilitates the occurrence of secondary negative emotions and thoughts such as guilt, fear, anxiety, or shame (Tull, Barrett, McMillan, & Roemer, 2007), it can be assumed that peritraumatic emotions could represent one possible mechanism that links thought and emotion suppression with intrusions.

As separate memory systems can account for symptoms of re-experiencing (Brewin, Gregory, Lipton, & Burgess 2010; Conway & Pleydell-Pearce, 2000; Ehlers & Clark, 2000), the relationship between suppression, peritraumatic dissociation, anxiety, and subsequent intrusion could be dependent on the nature of the intrusions (Hagenaars et al., 2010). Although the existence of both intrusive images and intrusive thoughts is recognized by DSM-5 (2013) and by previous studies (Ehlers, Hackmann, Steil, Clohessy, Wenninger, & Winter, 2002; Hagenaars, Brewin, van Minnen, Holmes, & Hoogduin, 2010), it is not clear which factors lead

to different types of recollection. Therefore, we assessed the development of both intrusive images and intrusive thoughts. The assessment of both types of intrusive recollections of traumatic material is important in order to find out if the mechanisms that explain the development of intrusions are similar for any type of intrusion.

Based on previous results reported above, we hypothesize that: a) emotion and thought suppression are positively associated with intrusions; b) state dissociation and peritraumatic anxiety are positively associated with intrusions; c) the relationship between suppression and intrusion is mediated by emotional states. Specifically, the participants with a high level of thought and emotion suppression will manifest a greater tendency to report peritraumatic anxiety and state dissociation, which in turn will lead to a higher frequency of intrusions. Concerning the possibility that intrusive images and intrusive thoughts are predicted by different variables, we cannot anticipate specific results, due to the lack of previous studies on this topic.

Insert Figure 1 about here

Method

Participants

The participants were invited to take part in the study in exchange for course credits. The study was completed by a total of 155 participants. As part of informed consent, all participants confirmed to the experimenter in writing that they had not previously received any treatment for a mental health problem, in the form of psychological therapy or medication. Exclusion criteria for participants were related to a history of road-traffic accidents, because the intrusions caused by the film may interfere with the intrusions of personal experiences. Seven participants failed to complete the task required by the study and were excluded from the

dataset. Specifically, they did not return the diary after one week. The final sample of 148 participants consisted of 85.1% women and 14.9% men. The participants were students aged between 19 and 36 (mean age of 21.19 years, $SD = 3.28$).

Materials and Measures

Pre-test pilot

We conducted a pre-test with 33 participants to choose the film. During the pre-test, after viewing five clips selected, the participants reported their affective state using ten items from Positive Affect Negative Affect Schedule (Watson, Clark, & Tellegen, 1988) scale, on an 11-point scale, ranging from 0 (sad affective states) to 10 (happy affective states). We selected the film that had received the lowest mean score. The film selected was used as part of a campaign to stop texting while driving (not in the country where this study was developed).

Trauma Film used in the study

A 4.16-minute trauma video depicting traumatic scenes of real-life footage of the horrible aftermath of road traffic accidents was used to model a traumatic experience. It was projected on a 200x200 cm screen using an audiovisual LCD projector. The film consisted of scenes of horrific content, including injured victims, emergency service personnel working to free trapped victims, dead bodies being moved, and children crying. In the first part (the first two minutes), we kept the original film soundtrack, comprised by a happy music on the radio, laughter in the car that caused the accident, then the cars crash, the sounds of people (including children) crying and the sounds of ambulances. For the second part of the film, we replaced the film soundtrack with sad music (a fragment from Tomaso Albinoni, Adagio in Sol Minor for Strings and Organ), in order to enhance its negative nature. The participants were asked to mention if they had seen the film. No participant had seen the film until then. With respect to

the ethical issues of showing a film with traumatic content, it has to be noted that previous studies using other trauma films (e.g., Brewin & Saunders, 2001; Davies & Clark, 1998) found that no participants reported ongoing subsequent distress until the end of the experiment.

The *Dissociative Experiences Scale, revised* (DES-II; Bernstein & Putnam, 1986) was used to measure trait dissociation. The DES-II contains 28 items and the participants have to indicate how often (from 0 to 100%) specific dissociative symptoms occur to them compared to others. In our sample the Cronbach alpha for this scale was .89.

The *Dissociative States Scale* (DSS; Bremner et al., 1998) was used to measure state dissociation. The questionnaire contains 19 items and answers are rated on a 5-point scale from 0 (not at all) to 4 (very much). The Cronbach alpha for the current sample was .81.

Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) was used to measure expressive suppression (four items) to regulate emotions. Each item consists of a seven-point Likert scale (1 - strongly disagree; 7 - strongly agree). In the present study, the Cronbach Alphas was .72.

The White Bear Suppression Inventory (WBSI; Wegner & Zanakos, 1994) is a 15 item self-report inventory measuring the individual's propensity to suppress negative thoughts. Respondents indicated the degree of agreement with the items by using a 5 point Likert-scale ranging from "strongly disagree" to "strongly agree," with neutral (don't know) in the middle. The Cronbach alpha for the current sample was .85.

The Positive Affect Negative Affect Schedule (PANAS; Watson et al., 1988) consists of a 10-item scale for positive affect (PA) and another 10-item scale for negative affect (NA). Participants rated all the items on a 5-point scale (1 = *very slightly or not at all*, and 5 = *very*

much) with the “in this moment” time frame. The internal Cronbach alphas were .82 for PA and .88 for NA.

The state anxiety scale (STAI-S; Spielberger, Gorsuch, & Lushene, 1970) consists of 20 items arranged on a six-point scale of intensity (from ‘not at all’ to ‘very much so’) and measures the subjective feelings of apprehension, nervousness and anxiety at the moment. The Cronbach alpha for the current sample was .83.

The participants recorded intrusive memories of the film for seven days using an *Intrusion Diary*, the standard method to measure intrusions in film-paradigm research (e.g., Holmes et al., 2004). For each intrusive memory, participants wrote down a brief description of its content and rated the distress associated with it on an 11-point scale anchored with 0 (*not at all distressing*) and 10 (*extremely distressing*). They also rated whether their intrusion was an image, a thought, or a combination of both. The total number of intrusive images and intrusive thoughts was calculated from the diary entries. A total score of distress for each type of intrusion was also calculated. Diary compliance was checked in the follow-up stage (Davies & Clark, 1998); the participants rated how true the following sentence was from 0 (“not at all true”) to 10 (“extremely true”): “I have often been unable (or have forgotten) to record my intrusions in the diary”. Clear verbal and written instructions were given about the nature of unwanted intrusions and about how to keep the diary. As in previous studies (Clark & Rhyno, 2005), intrusions were defined as “spontaneously occurring” (not deliberate) memories of the film.

Paying attention during the film was rated on an 11-point scale from 0 (not at all) to 10 (completely).

Demand question. In order to check for demand characteristics, an open-ended question was asked about the purpose of the study.

Procedure

The study was approved by the Research Ethics Committee of Al. I. Cuza University. Before starting the study, the participants were informed that the film contains graphic scenes of the aftermath of a road traffic accident. They were also informed that their participation is voluntary and that they could withdraw from the experiment at any point. All participants were encouraged to contact the experimenter before the follow-up session if they felt distressed. The participants signed an informed consent form and filled in the DES-II, ERQ, WBSI, STAI-S, and PANAS scales, in order to identify the film's impact on their emotional state, and then the film was shown. Post-film questionnaires (PANAS, STAI-S, DSS, the attention rating) were then completed and the Intrusion Diary was explained. The dependent variables were the number of intrusive memories of the film over the next week and the distress caused by these intrusions. After one week, the participants returned for follow-up and completed the diary compliance rating and the open-ended question about the purpose of the study. Finally, the participants were debriefed and the experimenter thanked them for their involvement.

Overview of the Statistical Analyses

Firstly, preliminary analyses were conducted in order to assess the mood and distress ratings after the film exposure, the attention paid to the film, diary compliance, the overall number of intrusions, and their relationship with distress. The independent samples *t*-test comparing the male and female participants' means of the number of intrusive images and intrusive thoughts were also computed, as well as the correlations between the study' variables. Secondly, multiple linear regressions were conducted in order to assess the predictive role of

both suppression and emotional states in determining intrusions after trauma exposure. Thirdly, the mediational model was assessed, using a structural equation model (SEM) framework in AMOS Graphics 20. Thought and emotion suppression, peritraumatic anxiety and state dissociation, as well as image and thought intrusions were entered in the model. The influence of trait dissociation was controlled.

Results

Preliminary analysis

In order to assess mood and distress ratings, a paired sample *t*-test with PANAS as the within-subject factor showed a significant increase in the negative mood from pre- ($M = 15.92$, $SD = 6.50$) to post-test ($M = 22.44$, $SD = 7.97$), ($t_{(147)} = -10.59$; $p < .001$) and a significant decrease in the positive mood from ($M = 31.90$, $SD = 6.88$) to post-test ($M = 25.83$, $SD = 7.36$), ($t_{(147)} = 12.73$; $p < .001$). Moreover, state anxiety showed a large increase from pre- ($M = 9.69$, $SD = 2.84$) to post-test ($M = 17.49$, $SD = 3.84$), $t_{(147)} = -21.40$; $p < .001$. These results indicate that the film was distressing and led to a negative mood change.

The attention paid when watching the film and the diary compliance were checked; the participants' ratings indicated that they had paid good attention to the film ($M = 9.37$, $SD = 1.93$). Also, the participants believed they had recorded intrusions accurately ($M = 1.73$, $SD = 1.21$). Overall, the mean number of intrusive images recorded by participants is 2.50 ($SD = 3.65$), and the range was 0 to 26 intrusions. For intrusive thoughts, the mean number was 2.20 ($SD = 2.90$), and the range was 0 to 14 intrusions. The paired samples *t*-test suggested that there were not significant differences between the frequency of intrusive images and intrusive thoughts ($t_{(147)} = 0.93$; $p = .352$). Both intrusive images and intrusive thoughts were associated with a high level of distress (images: $r = .75$; $p < .001$; thoughts: $r = .80$; $p < .001$). We

conducted an independent samples *t*-test comparing the male and female participants' means on the number of intrusive images and intrusive thoughts. The results showed no significant differences on any of the aforementioned study variables (all $p > .05$).

Table 1 presents the descriptive statistics and correlations of all variables from the present study. Preliminary analyses, using the Pearson correlation, showed that thought suppression is positively associated with the frequency of intrusive thoughts ($r = .17, p = .036$). There were no significant associations between emotion suppression and any type of intrusion. State dissociation was positively associated with intrusive images ($r = .19, p = .048$). Moreover, anxiety was positively associated with both types of intrusions (images: $r = .20, p = .012$; thoughts: $r = .22, p = .007$). There was a strong association between intrusive images and intrusive thoughts ($r = .61, p < .001$).

Insert table 1 about here

Thought and Emotion Suppression, Peritraumatic Dissociation, Anxiety and Subsequent Intrusions

Multiple linear regression indicated that only thought suppression significantly predicted intrusive thoughts. Emotion suppression did not significantly predict either intrusive images or intrusive thoughts (see Table 2). Moreover, multiple linear regression indicated that state dissociation significantly predicted intrusive images. State anxiety significantly predicted both types of intrusions. These results are presented in Table 3.

Insert table 2 about here

Insert table 3 about here

Mediation Analyses

To test whether intrusive images and thoughts could be predicted by thought and emotion suppression and to test the role of peritraumatic dissociation and anxiety as mediators in the relationship between these variables, when controlling trait dissociation, a structural equation analysis was used.

For the SEM model of direct and mediation effects, estimates were derived using maximum likelihood estimations and an overall model fit was assessed with the normative fit index (NFI), goodness of fit (GFI), the comparative fit index (CFI) and the root mean square residual (RMSEA). Acceptable model fit indices were indicated by a $\chi^2/df < 3$, a GFI, NFI and CFI $> .90$ and an RMSEA $< .08$ (Hu & Bentler, 1999). The fit for our overall model was good (Figure 1): $\chi^2(9) = 7.83$, $p = .551$; $\chi^2/df = 0.87$; NFI = .97; CFI = .97; GFI = .98, RMSEA = .02 (.01 - .08).

The control for trait dissociation was not significant ($p > .090$). Thought suppression was significantly related to intrusive thoughts. Moreover, state anxiety mediated the relationship between thought suppression and intrusive thoughts. The participants with a high level of thought suppression had a greater tendency to report peritraumatic anxiety, which in turn was correlated with a higher frequency of intrusive thoughts. Similarly, the participants with a high level of emotion suppression tended to report a high level of peritraumatic anxiety, but this relationship did not go further. Emotion suppression was not associated with any type of intrusion.

Insert Figure 2 about here

Discussion

The aim of the present study was to explore the direct relationships between emotion suppression, thought suppression, state dissociation and anxiety, on the one hand, and subsequent intrusive images and thoughts, on the other hand. Moreover, we explored the role of peritraumatic anxiety and state dissociation in the relationship between suppression and intrusions, using a trauma film paradigm. The findings support the role of both suppression and peritraumatic dissociation and anxiety in predicted intrusions.

The first goal of the present study was to explore the relationship between thought and emotion suppression and intrusion frequency. Firstly, our results showed that thought suppression significantly predicted intrusive thoughts. This result was not surprising, knowing that it was also confirmed by previous studies (Seligowski et al., 2015). Although most people use suppression in order to protect themselves from the harmful effect of unwanted thoughts and from distress generated by these thoughts, it seems that the effect of this regulation strategy is contrary to the expectations. Specifically, as our study confirmed, thought suppression resulted in a paradoxical effect, consisting of an increase in the unwanted trauma-related thoughts. Therefore, one explanation for these results is that the effort to suppress thoughts backfires and increases their frequency (Beck et al., 2006). However, recent studies suggest an alternative explanation, consisting in the fact that suppressing trauma-related thoughts may only increase the likelihood of people becoming aware of and reflecting upon them, not their frequency (Takarangi, Strange, & Lindsay 2014). Future studies are needed in order to test this explanation or to assess whether perhaps both mechanisms explain this paradoxical phenomenon. Secondly, emotion suppression did not predict any type of intrusions. The experimental nature of the study could explain this non-significant result. The event may not have been perceived as central to one's life, and this evaluation explained the fact that it was

not associated with secondary emotions developed after trauma exposure (Berntsen & Rubin, 2007). Therefore, emotion suppression could not account for the occurrence of subsequent intrusions. The film was perceived as negative and it was followed by a decrease in positive affect and an increase in negative affect and anxiety. However, these emotions were transient, situational-specific, and they disappeared after a short time following trauma exposure. Therefore, if these strong emotional reactions did not accompany subsequent intrusion, the manifestation of individual differences in terms of emotion suppression was limited. Moreover, the fact that the variance of thought suppression was much greater than the variance of emotion suppression could explain why we did not find associations between emotion suppression and any type of intrusions.

The second aim of this study was to assess the relationship between peritraumatic dissociation and anxiety in the development of intrusive images and thoughts. The results showed that peritraumatic dissociation predicted only intrusive images, while peritraumatic anxiety predicted both types of intrusions. This result stresses the importance of these peritraumatic states in the development of PTSD. Moreover, as it was suggested in previous studies (Hagenaars et al., 2010; Hagenaars & Krans, 2011; Olatunji & Fan, 2015), it seems that strong emotional reactions specific to trauma situations (e.g. anxiety) have a greater predictive power than state dissociation. Anxiety symptoms can lead to posttraumatic symptoms because they reflect high levels of worry and threat-related processing that are linked to deficits in the inhibition of unwanted thoughts or stimuli (e.g., Berggren & Derakshan, 2013; Gorlin, Lambert, & Teachman, 2016). Moreover, our results confirmed the fact that different peritraumatic states may be differently associated with different type of intrusions (Holmes & Matthews, 2005). However, regarding the last issue, there is little research that analyzes both

intrusive images and thoughts, therefore it is difficult to compare our results with those reported in previous studies. However, some studies suggest that intense peritraumatic states are more likely to generate intrusive images than thoughts (Hagenaars et al., 2010; Hellowell & Brewin, 2004). Further research is needed in order to assess the association between various peritraumatic states and subsequent intrusion and to explore what characteristics of these states dictate whether they lead to intrusive images or intrusive thoughts.

Thirdly, another aim was to assess whether the relationship between thought and emotion suppression and intrusions is mediated by peritraumatic dissociation and anxiety. The results showed that state dissociation was not a significant mediator of intrusion frequency, while peritraumatic anxiety mediated the relationship between thought suppression and intrusive thoughts. Therefore, these results support the conclusion of previous studies according to which peritraumatic dissociation is not an independent predictor of PTSD and it is not a necessary condition for the development of this disorder (Otis et al., 2012). Considering previous studies, these findings may also indicate that the effect of state dissociation is overestimated and it could be possibly explained by the variance shared with other variables, like emotional responses to trauma life events (Hagenaars et al., 2008).

These results have several theoretical and practical implications. From a theoretical perspective, they illustrate the fact that thought suppression is associated with a higher vulnerability to stress. However, based on the results of the present study, suppression is not by definition a negative factor. Moreover, our results support the fact that separate memory systems can account for symptoms of re-experiencing (Ehlers & Clark, 2000). For clinical practice, the direct negative effects of suppression should be considered in relation to emotional responses related to trauma exposure, since these emotions represent one mechanism that links

suppression with subsequent traumatic stress symptoms. These findings may also have implications in the field of secondary traumatization, since the results showed that people develop intrusion from indirect exposure to a traumatic life event. Therefore, as earlier survey research suggested, physicians and other professionals working with traumatized individuals may be at risk of developing intrusive images and thoughts of their patients or clients' trauma (Măirean, 2016). Recognizing and finding factors to prevent the intrusion development is an important step in making people understand their personal risk and take self-protective measures.

The present study has a number of limitations. Firstly, the sample mainly included female participants, so for a broad generalization of the results further research should openly include both men and women. A second limitation of this study is the way the intrusions were measured. The diary methodology does not fulfil the standards imposed by psychometric theory, giving the fact that the measures of reliability are not appropriate (Holmes et al., 2004). However, the diaries have been regularly used in clinical psychology research attempting to explore the consequences of trauma exposure. Despite their limitations, diaries represent the best way to measure intrusion frequency, being considered an ecological way of assessing intrusions frequencies, compared to other measures, such as retrospective self-report questionnaires (see James, Lau-Zhu, Clark, Visser, Hagenaars, & Holmes, 2016, for a review). If we use overall ratings of intrusion frequency administered at follow-up, more sources of error can account for the responses we collect (such as forgetting and over-reporting). However, future studies should consider applying psychophysiological measures or neuro-endocrinological measures to objectify the stress induction of the film (Chou, La Marca, Steptoe, & Brewin, 2014). Thirdly, the instruments used to assess both thought and emotion

suppression measure the way the participants rated their usual style of coping. However, this is not the same as how much the participants actually use these strategies in response to a trauma film. Fourthly, future research should consider more maladaptive cognitive strategies, like rumination, in order to extend the knowledge about individual vulnerability factors for different types of intrusive recollections. For example, previous studies suggested the possibility that rumination could have similar effects to suppression on unaware intrusive memories (Takarangi et al., 2014). A fifth limitation is that the type of trauma exposure we adopted in this study limits our ecological validity. However, this is a common limitation for studies using a trauma film paradigm. The fact that the film was associated with high distress and it generated a high number of intrusions suggests that it can be a reliable method to study different peritraumatic and posttraumatic psychological reactions. Moreover, clinical theories were advanced based on trauma film paradigm (Lazarus, Opton, Nomikos, & Rankin, 1965). We should also mention that according to DSM-5, viewing traumatic footage through electronic media or movies is one type of work related trauma exposure that can lead to a diagnosis of PTSD (American Psychiatric Association, 2013). Therefore, the studies using the trauma film paradigm can be useful for understanding and assessing ways of alleviating traumatic stress at first responders indirectly exposed to trauma, like police officers who have to look at traumatic footage.

Despite these limitations, the present study has provided three important findings. Firstly, thought suppression proved successful in predicting intrusion frequency. Secondly, and most importantly, we found evidence to suggest that the impact of thought suppression on intrusion development may not be due to suppression per se but to its association with negative emotional states. Thirdly, the results showed that intrusive images and intrusive thoughts are different phenomena and they are predicted by different variables. Similarly to previous studies

(Ehlers et al., 2002), our results showed that the frequency of intrusive images is higher than the frequency of intrusive thoughts, but this difference was not significant. More research can clarify if different personality traits or peritraumatic states have the same effect on different types of intrusions. Understanding the basic processes that lead to PTSD is crucial in planning effective and scientifically based treatments for PTSD.

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Table 1

Means, standard deviations, and bivariate correlations for all study variables

	1	2	3	4	5	6	7
1. TD	1						
2. TS	.36***	1					
3. ES	.27**	.08	1				
4. SD	.41**	.19*	.03	1			
5. Anxiety	.07	.30**	-.16*	.29***	1		
6. Int_images	.04	.04	-.04	.19*	.20*	1	

7. Int_thoughts	.04	.17*	-.02	.13	.22**	.61***	1
M	506.12	49.72	12.53	21.74	17.49	2.50	2.20
SD	295.27	11.13	3.91	7.80	3.84	3.65	2.90

Note. TD = trait dissociation, TS = thought suppression, ES = emotion suppression, DS = state dissociation, Int_images = intrusive images, Int_thoughts = intrusive thoughts; $N = 148$; * $p < .05$; ** $p < .01$; *** $p < .001$

Table 2

Regression models of thoughts and emotions suppression on intrusive images and thoughts

	B	S.E	β	t	R^2_{adj}
Outcome: Intrusive images					.04
Thoughts suppression	-.15	.32	-.04	-0.46	
Emotion suppression	.06	.11	.04	0.50	
Outcome: Intrusive thoughts					.13
Thoughts suppression	.20	.10	.17	1.99*	

Emotion suppression	-.11	.28	-.03	-0.42
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Table 3

Regression models of state dissociation and anxiety on intrusive images and thoughts

	B	S.E	β	t	R ² adj
Outcome: Intrusion images					
State dissociation	.22	.16	.11	1.32*	.14
State anxiety	.69	.33	.17	2.06*	
Outcome: Intrusion thoughts					
State dissociation	.11	.14	.07	.84	.12

State anxiety	.67	.28	.20	2.37*
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