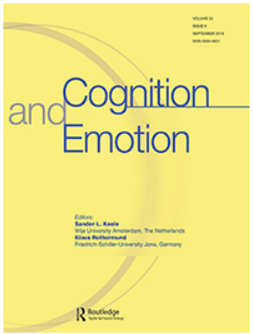

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BRIEF ARTICLE

Vantage perspective in analogue trauma memories: an experimental study

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ABSTRACT

Vantage perspective during recall is thought to affect the emotionality and accessibility of distressing memories. This study aimed to test the effects of vantage perspective during recall on memory associated distress and intrusion development. An adapted version of the trauma film paradigm was used in an experimental design with three conditions. Participants were asked to listen to eyewitness reports of car accidents (e.g. Trauma Analogue Induction) and imagine the scenes vividly using mental imagery. Afterwards, they were asked to recall the most distressing scene from field perspective, observer perspective, or to recall a neutral image from observer perspective (control condition) (e.g. Trauma Analogue Recall). Recall from field perspective resulted in higher negative mood, state-anxiety, and a higher number of short-term intrusions compared to the observer perspective condition and control condition. Negative mood and state-anxiety were mediators in the relationship between vantage perspective and intrusions. In comparison to observer perspective, field perspective increased the amount of short-term intrusions as a result of higher levels of negative mood and state-anxiety after memory retrieval. Future research on the interaction between vantage perspective at recall and negative mood and anxiety effects is warranted.

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Vantage perspective; trauma; posttraumatic stress disorder; mental imagery; autobiographical memory; trauma film paradigm

After a traumatic event, people can re-experience the event in the form of distressing intrusive memories, or intrusions (APA, 2013). Intrusions are defined as "recurrent, involuntary, and intrusive distressing memories of the traumatic event" (APA, 2013) and more specific as "multi-modal mental pictures of highly detailed sensory impressions of an event including sights, sounds, feelings, and bodily sensations that come into consciousness uncontrollably and unwanted" (Krans, Näring, Holmes, & Becker, 2009). One can recall (trauma) memories from different "vantage perspectives". In an observer or third-person perspective, you see yourself in the memory, as if you are a spectator. In a field or first-person perspective, you recall a memory as seen through your own eyes (Nigro & Neisser, 1983).

The presence of intrusions is a prominent symptom of Posttraumatic Stress Disorder (PTSD) (APA, 2013). Studies have attempted to assess the exact relationship between vantage perspective and intrusion development. It has been theorised that recall from observer perspective leads to fewer intrusions because it reduces the emotional impact of the memory, whereas recall from field perspective increases it (e.g. Berntsen & Rubin, 2006; McIsaac & Eich, 2002). PTSD patients who recalled a traumatic memory from field perspective indeed reported higher emotional distress associated with the memory than in observer perspective (McIsaac & Eich,

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2004). Interestingly, adopting an observer perspective was associated with reduced physiological reactivity during retrieval (Wisco et al., 2015).

According to the Self-Memory-System model of autobiographical memory (SMS model) (Conway & Pleydell-Pearce, 2000), vantage perspective influences the self-relevance of autobiographical memories. Recalling a memory from an observer perspective is viewed as a strategy to disconnect the event from the self (Robinaugh & McNally, 2010). As a result, memories become less accessible (i.e. fewer intrusions). As such, it is possible that observer perspective leads to fewer intrusions because it makes the memory less self-relevant. Indeed, encoding a(n imagined) stressful event from observer perspective was shown to be related to less self-relevance compared to encoding in field perspective (Mooren, Krans, Näring, Moulds, & van Minnen, 2016). Yet, results are mixed. For example, recalling a trauma memory from an observer perspective has also been found to result in higher avoidance and PTSD symptoms (Kenny et al., 2009). Also, avoidant individuals were more likely to remember their traumatic memories from an observer perspective (Kenny & Bryant, 2007). Yet, other studies found no difference at all in PTSD symptoms (Mooren et al., 2016; Robinaugh & McNally, 2010) or in emotional distress (Robinaugh & McNally, 2010; Wisco et al., 2015) related to vantage perspective of trauma memories.

One possible explanation for these mixed findings may be methodological. Retrospective methods of assessing vantage perspective can lack reliability and preclude causal conclusions. Therefore, the present study experimentally manipulated vantage perspective during recall to assess the effect of vantage perspective on emotional distress and intrusions. This way, it was also possible to control for the content of the memory. An analogue trauma paradigm based on mental imagery was used to induce intrusions (Krans, Näring, Holmes, & Becker, 2010). This method is effective in manipulating vantage perspective and inducing temporary analogue trauma symptoms (Mooren et al., 2016). Although this method might be less ecological valid than other analogue trauma inductions (e.g. virtual reality or film clips), it has been shown to be effective in manipulating vantage perspective when recalling a stressful event (Mooren et al., 2016). Possibly, this manipulation might even be stronger than the film induction (Krans et al., 2010).

In the present study we manipulated vantage perspective during memory consolidation (i.e. in the first hours after the event). This allowed us to study which vantage perspective is most adaptive when retrieving distressing images directly after the encoding. As such, our study is specifically relevant in the context of mental health prevention settings and acute psychological help directly after trauma (e.g. debriefing procedures). Previous studies have demonstrated the detrimental effects of certain types of debriefing directly after trauma (Mayou, Ehlers, & Hobbs, 2000). Perhaps the perspective that is applied during the debriefing determines whether it prevents the development of PTSD symptoms. Observer perspective may be functional during memory consolidation, but dysfunctional after the memory has already been consolidated and is being retrieved for further emotional processing (e.g. by serving an avoidant function; Kenny & Bryant, 2007).

In the current study, the effect of vantage perspective on negative mood, state-anxiety, self-relevance and intrusions was investigated in three experimental conditions (field, observer, and control). A condition was added to control for the use of observer perspective, because it was expected that maintaining an observer perspective would place a different demand on the participant than adopting a field perspective (e.g. possibly a higher cognitive load, which can affect recall quality; Kearns & Engelhard, 2015). Based on the studies of McIsaac and Eich (2002) and Berntsen and Rubin (2006), it was predicted that recalling distressing memories from field perspective would elicit the highest levels of negative mood, state-anxiety, and intrusions in the short term, compared to the observer perspective and control groups (hypothesis 1). In terms of the underlying mechanism, we theorised that field perspective would result in more intrusions compared to the observer perspective because it makes the memory more self-relevant (hypothesis 2) and increases the emotional impact of the memory (hypothesis 3). In order to test this, a mediation analysis was conducted. It was hypothesised that negative mood, state-anxiety, and self-relevance would mediate the relationship between vantage perspective (field and observer) and intrusions.

Method

We report how we determined our sample size, all data exclusions, all manipulations, and all measures in the study.

Participants

Eighty-five female university students volunteered for participation. The following exclusion criteria were

assessed with the M.I.N.I. (Sheehan et al., 1998): panic attacks (current), panic disorder (current/lifetime), PTSD (current/lifetime), major depressive episode (current/lifetime), psychotic episode (current/lifetime), blood phobia, history of fainting, and significant experience with road traffic accidents either themselves or by close family members or friends (Krans et al., 2010). These exclusion criteria were adhered to for ethical reasons in relation to the content of the Trauma Analogue Induction. Participants received course credit for participating. All participants were informed about the procedure by a written informed consent prior to the experiment, but were kept naive with respect to the hypotheses. Their age ranged from 18 to 36 years ($M = 21.27$ years, $SD = 2.98$). The study was approved by the ethics committee of the Radboud University (ECG20120910055).

Materials

Trauma analogue induction

Participants listened to an eyewitness report of four scenes (11 min 42 sec) of real-life road traffic accidents, developed by Krans et al. (2010). The report consisted of background sounds of the original film clips and a verbal description by an actress playing a journalist at the scene taking notes with a voice-recorder. The report contained explicit descriptions of the injured victims, the setting in which the accidents took place, and emotional responses of the journalist.

Trauma analogue recall

Participants in the observer perspective condition were instructed to recall their most distressing scene from an observer perspective (" … as if you are watching yourself take part in the situation") and verbally describe the image from a third-person account ("I see myself … "). Participants in the field perspective condition were instructed to recall the scene " … as if you are there, seeing what is happening, looking through your own eyes" and verbally describe the image from a first-person account ("I see the car … "). Participants in the control condition were asked to recall a neutral memory of having dinner the previous day from an observer perspective. This neutral-observer condition controlled for the demands of holding observer perspective in mind.

Control measures

Individual differences

To assess individual differences in the use of mental imagery in daily life, the 12-item Spontaneous Use of Imagery Scale was administered (SUIS; Reisberg, Pearson, & Kosslyn, 2003). Answers were rated on a 5-point Likert scale (1 = never appropriate, 5 = always completely appropriate). Internal consistency of this questionnaire is satisfactory (Reisberg et al., 2003; $\alpha = 0.63$ in our sample). The Dutch version of the State-Trait-Anxiety Inventory (STAI-T; 20 items each, 4-point scale from 1 to 4) was administered to assess trait-anxiety (van der Ploeg, 1980). Internal consistency of the STAI-T is satisfactory ($\alpha = .76$ in our sample).

Demand and compliance

The statement "I have often been unable (or forgotten) to report my intrusions in the diary" was rated on an 11-point scale from 0 (not at all) to 10 (completely) (Holmes, Brewin, & Hennessy, 2004) to assess compliance with the intrusion diary instructions. In addition, participants were asked about the perceived goal of the study with an open-ended question.

Manipulation checks

Trauma analogue induction

Subjective vividness, distress, and attention in regards to the eyewitness report were rated on 11-point Likert scales (from 0 to 10).

Trauma analogue recall

Vantage perspective of the recalled memory was assessed with a 6-item questionnaire using a 7-point scale (1 = not at all, 7 = extremely; McIsaac & Eich, 2002). Questions were: (1) What percentage of the total recall time were you able to maintain the vantage perspective? (2) How strongly did you maintain the vantage perspective? (3) How easy was it for you to maintain the vantage perspective? (4) To what degree did the vantage perspective influence your recollections? (5) How rich in detail is your memory? (6) How rich in emotion is your memory?

Experimental measures

Emotional impact

The effect of recalling a stressful memory of the eyewitness report (e.g. Trauma Analogue Recall) (field

and observer perspective condition) or a neutral memory (control condition) on negative mood and state-anxiety was examined. Negative mood was assessed with a 5-item questionnaire (MoodQ; 11-point scale from 0 to 10; Holmes et al., 2004) measuring happiness (reversed), fear, horror, depressed mood, and anger. The Dutch version of the STAI-S was administered to assess state-anxiety. Internal consistency of the STAI-S is satisfactory ($\alpha = .76$ in our sample).

Self-relevance

Participants rated how self-relevant they considered their recalled image (e.g. Trauma Analogue Recall) on an 11-point scale from 0 (not at all) to 10 (completely), with the question "Please indicate the relevance of your recollection for you as a person".

Intrusions

Intrusions of the Trauma Analogue Induction were recorded in a diary during the seven days after the experiment (Holmes et al., 2004). Intrusions were defined as "spontaneously occurring images that can take the form of words and phrases ('verbal'), or mental pictures ('visual')". In this study, only intrusions with a visual component were analysed since verbal intrusions do not contain vantage perspective.

The 15-item Impact of Event Scale self-report version was included (IES; Horowitz, Wilner, & Alvarez, 1979) as an additional measure of intrusions (8 items). Items were rated on a 5-point scale from 0 (not at all) to 4 (very much). Internal consistency has been reported as satisfactory (Sundin & Horowitz, 2002; in our sample $\alpha = .74$).

Procedure

Participants first read and signed an informed consent form and were screened for exclusion criteria. Participants who were eligible to participate were presented with a demographic questionnaire and the MoodQ, STAI-S, STAI-T, and SUIS. Next, all participants received a short imagery training in applying field perspective (procedure by Holmes, Coughtrey, & Connor, 2008). Then, all participants listened to the eyewitness report (e.g. Trauma Analogue Induction) whilst imagining the scenes from the trained field perspective. Afterwards, participants rated the distress and vividness of, and attention for their imagery, and completed the MoodQ and STAI-S. Next, participants were asked to close their eyes and recall a specific scene from the report that they found the most distressing in their instructed vantage perspective, and to verbally describe this image to the experimenter (e.g. Trauma Analogue Recall). Participants in the control condition were asked to recall a neutral memory of having dinner the previous night from an observer perspective. The MoodQ, STAI-S, self-relevance rating and the vantage perspective questions were administered. Next, participants received instructions on how to use the intrusion diary. They were required to write down each intrusion the moment that it occurred and to check the diary at a fixed time every day for missing entries. After one week, participants returned for a follow-up session in which they were asked to hand in the diary, fill in the diary compliance rating, the IES- intrusion scale, and the question about the perceived goal of the study. Finally, all participants were debriefed and thanked for their participation.

Results

Statistical approach

There were no multivariate outliers but one univariate outlier (more than three standard deviations from the mean) in the diary measure of intrusions (field perspective condition) was identified and adjusted (Tabachnick & Fidell, 1996). One participant was excluded from the analyses because she experienced a car-accident two days after the first session. Seven participants were excluded from all the analyses because their attention rating was extremely low (score of ≤ 3) or their diary compliance was low (≥ 4). Scores of ≤ 5 on attention and compliance were excluded (see Mooren et al., 2016). An a priori power analysis using G-power indicated that a sample size of 90 participants was required to obtain a statistical power of 0.8 with an effect size of .30. In total, we included data of 24 participants in the field perspective condition, 26 in the observer perspective condition, and 27 in the control condition.

Intrusions (diary) were analysed using negative binomial regression with log link because of positively skewed distributions. The remaining variables were analysed with analysis of variance (ANOVA). A mediation analysis (Hayes & Preacher, 2014) was performed to predict intrusions with vantage perspective, self-relevance, negative mood, and state-anxiety. The indirect effects were calculated with the PROCESS macro function of SPSS. Accordingly, separate

mediation models were run for each mediator. One dummy variable was created to represent the experimental conditions of field and observer perspective (1 = field, 0 = observer). The control condition was left out of this analysis because participants in the control condition recalled personal memories instead of memories of their trauma imagery. So their memories were per definition highly self-relevant. Testing how self-relevance mediates the relationship between perspective and intrusions in the control condition in comparison to the other conditions would therefore have introduced a methodological confound. The level of significance was set at $\alpha = 0.05$. Pairwise comparisons following significant *F*-test results were corrected for multiple comparisons using Bonferroni adjusted alpha levels (dividing the threshold of 0.05 by the number of comparisons). The effect sizes reported are Cohen's *f*. See Table 1 for descriptive statistics.

Control measures

Individual differences

The three conditions did not statistically differ with respect to age, $F(2, 74) = 0.14$, $p = .87$, educational level, χ^2 $(2) = 4.78$, $p = .31$, trait-anxiety (STAI-T), $F(2, 74) = 0.96$, $p = .38$, spontaneous use of imagery in daily life (SUIS), $F(2, 74) = .72$, $p = .49$, baseline negative mood (MoodQ), $F(2, 74) = 1.13$, $p = .33$, or state-anxiety (STAI-S), $F(2, 74) = 1.37$, $p = .26$.

Demand and compliance

The diary compliance was good ($M = 1.86$, $SD = 2.23$; reversed score) and did not differ between conditions $F(2, 74) = 1.24$, $p = .29$. None of the participants suspected the goal of the study.

Manipulation checks

Trauma analogue induction

There were no significant differences between the conditions in the level of distress and vividness of the eyewitness report, $F(2, 74) = .69$, $p = .51$, and $F(2, 74) = 1.36$, $p = .26$, respectively. The attention ratings for the report were overall high ($M = 8.30$, $SD = 1.10$) and this did not differ significantly between conditions, $F(2, 74) = 2.46$, $p = .09$.

Trauma analogue recall

A Bonferroni adjusted alpha level of .008 was used. Participants in the field perspective and control conditions were significantly better at maintaining the instructed perspective during recall, $F(2, 74) = 10.46$, $p < .001$, $f = 0.53$, and also found this easier than participants in the observer perspective condition, $F(2, 74) = 7.81$, $p \leq .001$, $f = 0.46$. The mean scores show that the percentage of time participants were able to maintain their perspective during recall was lowest in the observer condition. However statistically, there was no difference between the conditions $F(2, 74) = 2.46$, $p = .09$. There were no significant differences between conditions in the extent to which participants believed that their perspective affected the content of the recall, $F(2, 74) = 4.23$, $p = .02$, and the emotional richness of the image, $F(2, 74) = 4.48$, $p \leq .02$. No significant differences between the conditions were found in richness of detail of the image, $F(2, 74) = 1.31$, $p = .28$.

Experimental measures

Emotional impact

A Bonferroni adjusted alpha level of .025 was used. The effect of the Trauma Analogue Recall on negative mood (MoodQ) was assessed with a 3 Time (baseline, post-induction, post-recall) × 3 Condition (field, observer, control) mixed ANOVA with Time as within-subject factor and Condition as between-subjects factor, and the MoodQ score as the dependent variable. There was a significant main effect of Time, $F(2, 74) = 83.12$, $p < .001$, $f = 1.06$, Condition $F(2, 74) = 10.55$, $p < .001$, $f = .53$, and a significant Condition × Time interaction effect, $F(4, 74) = 15.13$, $p < .001$, $f = .64$. A similar analysis with state anxiety (STAI-S) as dependent variable showed a significant main effect of Time, $F(2, 74) = 36.18$, $p < .001$, $f = .70$, a significant main effect of Condition, $F(2, 74) = 6.09$, $p < .005$, $f = .41$, and a significant Time × Condition interaction effect, $F(4, 74) = 5.05$, $p < .005$, $f = .37$. Between groups there were no significant effects for the baseline and post-induction measures on negative mood and state-anxiety, all $F(2, 74), \geq 0.44$, all $p \geq .260$. However, for the post-recall, field perspective significantly yielded the highest levels of negative mood and state-anxiety in comparison to observer and control conditions, respectively, $F(2, 74) = 24.77$, $p < .001$, $f = 0.82$, and $F(2, 74) = 9.46$, $p \leq .001$, $f = 0.51$.

Self-relevance

There was a significant difference between conditions in the self-relevance of the recalled image, $F(2, 74) = 3.23$, $p = .05$, $f = 0.29$. Contrasts showed that

Table 1. Descriptive statistics of control and experimental measures across and within conditions.

Measure		Field condition *M*	*SD*	Observer condition *M*	*SD*	Control condition *M*	*SD*	Total *M*	*SD*
Age		21.04	2.19	21.27	2.62	21.48	3.88	21.27	2.98
Education	University	24	–	25	–	25	–		
	HBO*	0	–	0	–	1	–		
	Other	0	–	1	–	1	–		
STAI-T		39.21	4.84	37.19	4.41	38.00	6.07	38.10	5.17
SUIS		42.00	3.91	40.31	6.22	41.30	4.54	41.18	4.99
Distress of report		5.54	1.93	5.31	2.13	5.93	1.73	5.60	1.93
Vividness of report		7.54	1.06	7.08	1.32	7.56	1.16	7.39	1.19
Self-relevance		5.04	2.37	3.73	3.11	5.41	1.93	4.73	2.58
Attention		8.13	0.99	8.23	1.18	8.52	1.19	8.30	1.10
Diary compliance		2.04	2.16	1.31	2.02	2.22	2.45	1.86	2.23
MoodQ	Baseline	7.79	4.28	6.19	3.66	7.52	4.23	7.16	4.07
	Post-induction	16.91	3.55	16.03	2.74	17.15	6.35	16.70	4.51
	Post-recall	19.71	7.09	12.46	5.99	7.33	5.76	12.92	8.00
STAI-S	Baseline	35.67	4.86	33.46	4.15	34.44	5.06	34.49	4.73
	Post-induction	42.71	3.76	42.88	4.05	41.89	8.28	42.48	5.77
	Post-recall	42.04	8.40	36.04	8.26	32.07	7.96	36.52	9.07
IES-Intrusion		5.65	2.79	2.96	2.90	3.89	3.57	4.11	3.27
Visual intrusions diary		2.43	3.31	1.08	2.73	.70	1.24	1.36	2.60
Combination intrusions diary		3.04	5.47	1.38	4.88	1.70	2.35	2.00	4.37
Visual and combination intrusions diary		5.48	6.62	2.46	7.36	2.41	3.20	3.36	6.03
Percentage of time the perspective was maintained		81.25	11.54	72.12	15.50	78.89	17.61	77.34	15.51
Strength of the vantage perspective		5.58	0.78	4.50	0.95	5.44	1.01	5.17	1.03
Ease of maintaining the perspective		5.42	0.93	4.00	1.33	4.93	1.52	4.77	1.40
Degree to which vantage perspective influenced the content of the image		4.92	1.41	4.35	1.65	3.63	1.67	4.27	1.65
Richness of details of recalled image		4.92	1.02	4.46	1.42	4.37	1.33	4.57	1.28
Richness of emotions of recalled image		4.58	1.18	4.04	1.40	3.48	1.34	4.01	1.37

*Higher vocational education.

participants in the control condition rated their image as more self-relevant than participants in the observer perspective condition, $p = .02$. There were no other significant differences.

Intrusions

Because the count data of the intrusions displayed high overdispersion, a negative binomial regression with vantage perspective as predictor variable (with the control group as the reference group) and intrusion frequency (measured with the diary) as the dependent variable was performed (Anscombe, 1949). The dispersion parameter included in the model was default. The goodness of fit was good, X^2 (73) = 2.98. In comparison to a model without any predictors, this overall model was a significant improvement, X^2 (2, N = 77) = 8.92, $p = .01$. Overall, vantage perspective was a significant predictor of intrusions, X^2 (2, $N = 77$) = 8.44, $p = 0.15$. Compared to the control group, field perspective increased the frequency of intrusions with b = .82, X^2 (1, $N = 77$) = 6.51, $p = .01$. Compared to the observer group, field perspective also increased intrusions with $b = .80$, X^2 (1, $N = 77$) = 6.10, $p = .01$. However, there was no significant effect for the observer perspective in comparison to the control group, b = 0.22, $X^2(1, N = 77) = .005$, $p = .95$.

An ANOVA with vantage perspective as independent variable and the IES-Intrusion subscale as the dependent variable also showed a significant difference between conditions, $F(2, 74) = 4.71$, $p = .02$, f = 0.36. Contrasts showed that participants in the field perspective condition scored significantly higher on the IES-Intrusion scale than participants in the observer perspective and control conditions, $p = .05$. There was no significant difference between the observer perspective and the control condition, $p = .28$.

Mediation analysis

Following the procedure by Hayes and Preacher (2014), it was tested if negative mood (post-recall), state-anxiety (post-recall), and self-relevance mediated the relationship between vantage perspective and

intrusions measured with the IES-intrusions subscale and the diary. Confirming step 1 of the mediation analysis, vantage perspective significantly predicted IES-intrusions, $b = 2.66$, $t(48) = 3.33$, $p < .01$, but not intrusions measured with the diary, $b = 1.62$, $t(47) = 1.50$, $p = .14$. In line with step 2, vantage perspective was a significant predictor of negative mood, $b = 7.25$, $t(48) = 3.91$, $p < .001$, and state-anxiety, $b = 6.00$, $t(48) = 2.55$, $p < .01$, but not of self-relevance, $b = 1,31$, $t(48) = 1.67$, $p = .10$. This means that self-relevance was not a mediator.

Confirming step 3, negative mood and state-anxiety were significant predictors of IES-intrusions, respectively, $b = .21$, $t(47) = 3.71$, $p < .001$, and $b = .12$, $t(47) = 2.65$, $p < .05$. The indirect effects were tested using the effect method with 95% bias-corrected bootstrap confidence intervals (CI) for the relative indirect effects (based on 5.000 bootstrap samples). The indirect coefficient for negative mood was significant, $b = 1.49$, SE = .58, CI = .581 to 2.906. For state-anxiety the indirect coefficient was significant, $b = .73$, SE = .40, CI = .154 to 1.829. Consistent with full mediation, vantage perspective was no longer a significant predictor of intrusions when taking into account negative mood as a mediator, $b = .17$, $t(47) = 1.43$, $p = .16$. Vantage perspective was still significant when taking into account state-anxiety as a mediator, $b = 1.92$, $t(47) = 2.40$, $p < .05$. In a multiple mediation model with state-anxiety and negative mood simultaneously entered in the model, negative mood was the only significant predictor, $b = .18$, $t(47) = 2.51$, $p = .02$, and state-anxiety was not, $b = .04$, $t(47) = 0.68$, $p = .50$. This means that field perspective was associated with higher levels of negative mood, and state-anxiety and this subsequently resulted in higher levels of intrusions. See Figure 1 for a graphic illustration.

Discussion

Our first hypothesis was that distressing memories from field perspective would elicit the highest levels of negative mood, state-anxiety, and intrusions in the short term, compared to the observer perspective and control groups (hypothesis 1). Our results indeed show that recalling a distressing image from field perspective resulted in higher levels of negative mood, state-anxiety, and intrusions, relative to using observer perspective. This is consistent with the earlier findings of the studies of McIsaac and Eich (2002) and Berntsen and Rubin (2006). We observed that participants in the observer perspective condition, showed comparable levels of negative mood, state-anxiety, and intrusions as participants in the control perspective condition. The control condition controlled for adopting observer perspective.

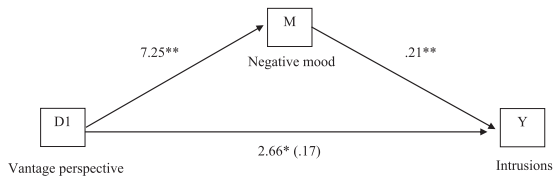

Figure 1. Standardized regression coefficients for the relation between vantage perspective and intrusions as mediated by negative mood, * $p < .01$, ** $p < .001$

In terms of the underlying mechanism, we theorised that field perspective would result in more intrusions compared to the observer perspective because it makes the memory more self-relevant (hypothesis 2) (Conway & Pleydell-Pearce, 2000) and increases the emotional impact of the memory (hypothesis 3). Our second hypothesis was not confirmed, as recall in the control condition was rated as most self-relevant, with no significant differences between the field and observer perspective. Also, in contrast to our expectations, self-relevance did not mediate the relation between vantage perspective and intrusions. Interestingly, a previous study on memory encoding, revealed that imagery experienced from observer perspective was rated as less self-relevant (Mooren et al., 2016). So perhaps the interaction between vantage perspective and self-relevance acts differently at different moments of encoding and retrieval.

Our third hypothesis was that the emotional impact of recall (which was higher in the field perspective condition) results in more intrusions in the short-term. For this hypothesis we found evidence since negative mood (post-recall) fully, and state-anxiety (post-recall) partially, mediated the relation between vantage perspective and intrusion frequency (measured with IES-intrusions scale). That is, field perspective increased the emotional distress associated with the image relative to observer perspective, which subsequently increased intrusion frequency. This finding is in line with cognitive models of PTSD (Brewin, Dalgleish, & Joseph, 1996; Ehlers & Clark, 2000) proposing that negative affective responses post-trauma predict intrusion development. This suggests that field perspective, relative to observer perspective, results in more intrusions, not because it makes the memory more self-relevant, but rather

because it increases negative mood and state-anxiety. It should be noted that our effects were only found for intrusions measured with the IES-intrusions subscale and not with the diary measures. This suggests that the effects are primarily applicable to the overall experience of intrusions, rather than visual intrusions in specific (as measured with the diary).

In clinical practice, recall from observer perspective is often seen as an emotional avoidance strategy. Indeed, recall from observer perspective after trauma in patients can result in more PTSD symptoms such as intrusions over longer periods of time (Kenny et al., 2009). Recalling from observer perspective might therefore only result in fewer intrusions in the short-term, whereas in the long-term it could become an avoidant coping strategy resulting in the maintenance of PTSD symptoms. Another possibility is that using observer perspective is dysfunctional in real-life trauma but not necessarily in experimental analogue trauma, where the memory is not necessarily self-relevant or threatening and could more easily be forgotten without consequence. In support of this idea, it was found that a clinical population of PTSD patients naturalistically use observer perspective when recalling their traumatic memories, whereas non-clinical participants recalled their traumatic memories from field perspective (Berntsen, Willert, & Rubin, 2003). Thus, observer perspective may only serve an avoidant distancing function in PTSD.

The present study has several limitations that are noteworthy. Although the imagery recall method we used (e.g. Trauma Analogue Induction) has proven successful in inducing analogue traumatic stress symptoms, we cannot generalise our results to actual trauma or clinical populations. It should be noted that an imaginary event, as opposed to a remembered traumatic event, may not translate to actual trauma PTSD. This limits the ecological validity of our study and the generalisation of our conclusions to clinical populations and autobiographical experiences. Also, it might be explored what kind of analogue trauma situations are easier to imagine (e.g. watching another person involved in an accident or being the victim). Furthermore, the timing of the experimental manipulation might have occurred during memory consolidation since there was only a brief time (± 5 minutes) between encoding and the experimental manipulation. As such, it cannot be ruled out that the manipulation influenced how the images of the report were encoded. Another potential issue is that all participants were trained in field perspective before listening to the recording. Afterwards, they were asked to adopt a specific vantage perspective as the experimental manipulation. Thus, participants in the field perspective condition were trained in their perspective but participants in the observer perspective condition and the control condition were not. Although the results indicate that the manipulation was successful for all instructed perspectives, future studies could consider a training in both perspectives for all participants. Finally, it should be noted that the mediation analysis was run with a sample size of only 50 cases. A small sample size can reduce the statistical power and the likelihood that a statistically significant result reflects a true effect.

Future research might investigate the interaction between negative mood, state-anxiety and vantage perspective on intrusion development in order to test predictions from cognitive models of PTSD (Brewin et al., 1996; Ehlers & Clark, 2000). An important question is when or in which context recalling distressing memories from field perspective is functional in order to regulate emotions and under what conditions it is better to use observer perspective. Our results might be relevant for trauma victims who receive some kind of debriefing directly after the event occurred. Victims of car-accidents who initially reported high intrusion and avoidance symptoms remained symptomatic when they received a debriefing (Mayou et al., 2000). It might be relevant to examine whether the instructions of the debriefing are stimulating either field or observer perspective, and how this affects trauma recovery. Given our results, we suggest that adopting an observer perspective directly after the traumatic event (i.e. during memory consolidation) might be effective in dampening initial emotional arousal and preventing intrusion development. However, when the memory is already consolidated, adopting an observer perspective might function as an avoidance strategy that eventually maintains PTSD symptoms such as intrusions. Based on our results, this is an empirically based suggestion. Further studies are required to find out a possible theoretical reason for this, possibly focusing on fundamental memory processes and meaning making.

In conclusion, our study showed that recalling a distressing image from field perspective resulted in more intrusions than recalling from observer perspective and a control condition. Negative mood fully mediated and state-anxiety partially mediated the

relation between vantage perspective and intrusions, where field perspective increased negative mood and state-anxiety relative to observer perspective, accounting for the difference in intrusion frequency. Replication of our findings is necessary to test their robustness, and more research into the interaction between vantage perspective at encoding/recall and emotional distress effects is warranted.

Disclosure statement

No potential conflict of interest was reported by the authors.

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