



Personal characteristics of World War Two survivor offspring related to the presence of indirect intrusions

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ABSTRACT

Background: A substantial proportion of clinical World War Two survivor offspring reports intrusions about war events they did not experience themselves.

Objective: To help identify factors that contribute to the development of such indirect intrusions (i.e. intrusions about non-self-experienced traumatic events), we examined the personal characteristics of survivor offspring that were related to the presence of indirect intrusions. To explore the specificity of these relationships, we compared characteristics related to the presence of *indirect* and *direct* intrusions (i.e. intrusions about self-experienced traumatic events).

Methods: Participants ($N = 98$) were post-war offspring of World War Two survivors in treatment in one of two clinics specialized in mental health services for war victims. We assessed the presence of indirect and direct intrusions as well as the following personal characteristics: gender, education level, trait dissociation, affect intensity, attentional control, mental imagery, fantasy proneness, and current psychopathology.

Results: Reports of *indirect* intrusions were more frequent in individuals high in fantasy proneness, trait dissociation, and current psychopathology. Reports of *direct* intrusions were more frequent in women, individuals scoring high on trait dissociation, affect intensity, and current psychopathology. Fantasy proneness was a unique correlate of indirect intrusions.

Conclusions: These findings are consistent with the idea that intrusions are the result of (re)constructive processes affected by several factors including personal characteristics.

Características personales de los hijos sobrevivientes de la Segunda Guerra Mundial relacionadas con la presencia de intrusiones indirectas

Antecedentes: Una proporción sustancial de los descendientes sobrevivientes clínicos de la Segunda Guerra Mundial reportan intrusiones sobre eventos de guerra que no experimentaron ellos mismos.

Objetivo: Para ayudar a identificar los factores que contribuyen al desarrollo de tales intrusiones indirectas (es decir, intrusiones sobre eventos traumáticos no-auto-experimentados) examinamos las características personales de los hijos sobrevivientes que estaban relacionadas con la presencia de intrusiones indirectas. Para explorar la especificidad de estas relaciones, comparamos las características relacionadas con la presencia de intrusiones indirectas y directas (es decir, intrusiones sobre eventos traumáticos auto-experimentados).

Métodos: Los participantes ($N = 98$) fueron hijos de sobrevivientes de la Segunda Guerra Mundial que estaban en tratamiento en alguna de las dos clínicas especializadas en servicios de salud mental para víctimas de guerra. Se evaluó la presencia de intrusiones indirectas y directas, así como las siguientes características personales: sexo, nivel educativo, disociación de rasgos, intensidad afectiva, control atencional, imaginación mental, propensión a la fantasía y psicopatología actual.

Resultados: Los informes de intrusiones indirectas fueron más frecuentes en individuos con alta propensión a la fantasía, disociación de rasgos y psicopatología actual. Los informes de intrusiones directas fueron más frecuentes en mujeres, individuos con puntajes altos en disociación de rasgos, intensidad afectiva y psicopatología actual. La propensión a la fantasía fue un correlato único de las intrusiones indirectas.

Conclusiones: Estos hallazgos son consistentes con la idea de que las intrusiones son el resultado de procesos (re)constructivos afectados por varios factores, incluidas las características personales.

第二次世界大战幸存者后代与间接闯入存在相关的的个人特征

背景: 很大一部分临床二战幸存者后代报告了他们自己没有经历过的战争事件的闯入。

目的: 为了帮助识别导致此类间接闯入（即非自身经历创伤事件的闯入）的因素，我们考

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关键词

创伤后应激障碍 (PTSD); 闯入性记忆; 代际创伤; 心理创伤

HIGHLIGHTS

- Offspring of World War Two survivors often experience indirect intrusions.
- We examined personal characteristics related to indirect and direct intrusions.
- Fantasy proneness was the best predictor of indirect intrusions.
- Gender was the best predictor of direct intrusions.

查了与间接闯入存在相关的幸存者后代的个人特征。为了探索这些关系的特殊性，我们比较了与存在间接和直接闯入（即对自我经历创伤事件的闯入）相关的特征。

方法：参与者（ $N = 98$ ）是第二次世界大战幸存者的战后后代，他们在两个专门为战争受害者提供心理健康服务的诊所之一接受治疗。我们评估了间接和直接闯入的存在以及以下个人特征：性别、教育水平、特质分离、情感强度、注意力控制、心理意象、幻想倾向和当前精神病。

结果：在幻想倾向、特征分离和当前精神病高的个体中，间接闯入的报告更为频繁。报告直接闯入在女性和在特征分离、情感强度和当前精神病方面得分较高的个体更为常见。幻想倾向是间接闯入的独特相关因素。

结论：这些发现与闯入是受包括个人特征在内多个因素影响的（重新）建设性过程的结果观点一致。

1. Introduction

Involuntary, distressing memories have been associated with various mental disorders including posttraumatic stress disorder (PTSD) and depression (Michael, Ehlers, Halligan, & Clark, 2005; Williams & Moulds, 2007). Clinical observations, as well as empirical studies, have demonstrated that these intrusive memories do not only appear after *directly* (i.e. self) experienced traumatic events but may also occur in response to *indirectly* (i.e. not self) experienced nor personally witnessed traumatic events (Dashorst et al., 2020). Indirect intrusions were, for example, described by those whose loved ones were murdered or suffered from severe burn injuries although these relatives were not present at the time (Cella, Perry, Kulchycky, & Goodwin, 1988; Rynearson & McCreery, 1993). Another example includes paramedics who reported intrusions related to thoughts or fantasies about the cause of serious threat or injury of a traumatized patient (Michael, Streb, & Hällner, 2016). Intrusions may also be present as imagined future events. These flashforwards are defined as an intrusion of a self-experienced traumatic event with an imagined altered ending, for example among those who did a suicide attempt (Holmes, Crane, Fennell, & Williams, 2007). Flashforwards have been reported by people with general anxiety disorder, obsessive-compulsive disorder, and addiction disorders (Berntsen, 2019). The current study, however, is about non-self-experienced traumatic events. Finally, the last example of indirect intrusions, and the topic of the current study, concerns intrusions referring to parental war events in offspring of World War Two survivors (e.g. Dashorst et al., 2020; Wiseman, 2008; Yehuda, Schmeidler, Giller Jr., Siever, & Binder-Brynes, 1998a; also see Dashorst, Mooren, Kleber, de Jong, & Huntjens, 2019). These intrusions can have different forms: Offspring may report indirect intrusions of situations in which their parents were the ‘actors’ (i.e. victims of World War Two events), but they may also report intrusions in which these events ‘apply’ to themselves (i.e. they perceive themselves as an actor in the scene) (Yehuda, Schmeidler, Wainberg, Binder-Brynes, & Duvdevani, 1998b).

Most research on posttraumatic intrusions has been conducted in samples of participants who were diagnosed with PTSD according to the DSM-IV categorization (American Psychiatric Association [APA], 2000, p. 463), stating that ‘a person has experienced, witnessed, or has been confronted with either an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others’. In the DSM-5 (American Psychiatric Association [APA], 2013, p. 274) this criterion for PTSD has been extended to ‘learning that the traumatic event(s) occurred to a close family member or close friend... Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g. first responders collecting human remains; police officers repeatedly exposed to details of child abuse)’. In spite of the implication that also indirect experiences may give rise to intrusions, dominant cognitive models of intrusions have focused on explaining intrusions in PTSD related to directly experienced traumatic events (Brewin & Holmes, 2003; Brewin, Gregory, Lipton, & Burgess, 2010; Dalgleish, 2004; Ehlers & Clark, 2000). These cognitive models have in common that they postulate a special memory mechanism to explain intrusive memories (i.e. aberrant memory encoding of traumatic events). Trauma memories are considered to be poorly elaborated and inadequately integrated in their spatial and temporal context and intrusions are triggered by perceptual cues associated with the traumatic event.

Because these models focus on factors operating at the time of encoding of directly experienced events, they seem less applicable to explain the development of intrusive memories referring to indirectly experienced events. These intrusions might be better explained by applying a basic mechanism approach such as the mnemonic model (Rubin, Berntsen, & Bohni, 2008a, 2008b, 2011). The basic mechanism approach does not assume a special memory mechanism for the encoding of traumatic events but refers to general memory mechanisms involved in the encoding of emotional events. The model emphasizes factors operating at the time of retrieval of the traumatic event, at which time the memory is (re)constructed. The (re)constructive processes may be affected by

several factors including personal characteristics such as gender, education, aspects of personality (traits), and symptoms of mental disorders (Berntsen, 2009, 2010; Berntsen & Rubin, 2007; Rubin et al., 2008a). Such (re)constructive memory processes may not only help to understand the development of indirect intrusions but may similarly help to explain the development of direct intrusions. As a first step to shed light on the factors involved in the development of indirect intrusions, we compared several personal characteristics of participants with and without indirect intrusions.

2. The present study

The present study was designed to identify which personal characteristics are related to reports of indirect intrusions among World War Two survivor offspring. We conducted a cross-sectional study in a clinical sample of adult offspring of World War Two survivors. The parents of these offspring were survivors of the German or Japanese occupation during World War Two and the offspring sample was in treatment in one of two mental health centres specialized in war related problems in The Netherlands. In a previous publication, we reported on the frequency and characteristics of indirect intrusions in this sample, such as triggers, moods, kind of content, sensory characteristics, and physical sensations. These were found to be comparable to the frequency and characteristics of direct intrusions referring to offspring's direct (i.e. self-experienced) traumatic events (Dashorst et al., 2020).

In the current study, we systematically compared several personal characteristics of those World War Two survivor offspring patients who reported *indirect intrusions* versus those who did not report indirect intrusions. We also selected participants who reported personally experienced traumatic events, and compared their personal characteristics to those who did not report *direct intrusions*. We focused on the following seven characteristics as delineated in the mnemonic model as well as in several previous empirical studies of intrusions related to directly experienced events: (1) *Gender*; This factor was selected given that women have been found to react with more PTSD symptomatology (including intrusions) in response to negative events compared to men (Berntsen & Rubin, 2006; Cahill, 2003); (2) *Education*, given that a lower education level has been found to be a risk factor for developing PTSD symptomatology. Education is considered to provide more cognitive resources for problem-solving in order to conceptualize traumatic events with less anxiety and contribute to reducing non-helpful emotions associated with intrusions (e.g. Brewin, Andrews, & Valentine, 2000); (3) *Current psychopathology*, particularly (3a)

anxiety, depression and (3b) *PTSD symptoms of arousal and avoidance* have been found to be related to the maintenance and enhancement of memories of stressful events (cf., Engelhard, Arntz, Hout, & A, 2007, 2003; Rubin et al., 2008a); (4) *Dissociation*. Trait dissociation is a predictor of intrusions and is also associated with a vulnerability to stress and avoidant processing of negatively valenced memories (Hagenaars & Krans, 2011; Rubin, Boals, & Berntsen, 2008b); (5) *Affect intensity* (i.e. the emotional responsiveness of an individual). Individuals with high affect intensity tend to respond with stronger emotions to daily life events than individuals with lower affect intensity (Larsen & Diener, 1987); (6) *Attentional control*, (i.e. the ability to focus and maintain attention on thoughts and events in daily life). Weakened attentional control has been related to the occurrence of intrusive memories after a stressful event (e.g. Verwoerd, de Jong, & Wessel, 2008); (7) *Mental imagery and fantasy proneness* (i.e. the inclination to be immersed in daydreams and fantasies with mental imagery). Fantasy proneness has been associated with false recall and recognition of neutral and trauma-related material (Geraerts, Smeets, Jelicic, van Heerden, & Merckelbach, 2005; Merckelbach, Horselenberg, & Muris, 2001).

3. Methods

3.1 Participants

The study sample consisted of adult World War Two survivor offspring ($N = 98$) in treatment at one of two Dutch centres specialized in war-related mental health problems. Both male and female offspring participated. The inclusion criteria were: (1) At least one of the biological parents or caretakers was a survivor of the German or Japanese occupation in World War Two; (2) Participants were born after the liberation (either May 5th 1945 in the Netherlands or August 15th 1945 in the Former Dutch East Indies).¹ Exclusion criteria were: (1) Current (comorbid) diagnosis of schizophrenia and other psychotic disorders, and (2) Current alcohol or drug dependence as recorded in their personal file at the treatment centre. The mean age of the participants was 55.64 years ($SD = 6.92$) and 57% was female. The median education level was bachelor degree, with a range from primary school to university. This study is part of a larger research project (Dashorst et al., 2020).

3.2 Measures

The *Offspring Intrusive Memory Instrument* was developed for the purpose of this study and was based on the Autobiographical Memory Questionnaire (AMQ) developed by Rubin et al. (2008b; Rubin, Dennis, &

Beckham, 2011). The AMQ has been used by several research groups for over 30 years in various samples including trauma survivors. For the current study, the relevant items refer to the assessment of the indirect intrusions about World War Two events experienced by parents, the direct intrusions about self-experienced traumatic events, and the offspring's demographic data (e.g. age, gender, education). A broad definition of intrusive memories was included referring to images and/or thoughts that suddenly and involuntarily pop up in consciousness when awake without the intention to retrieve a memory.

The *PTSD Symptom Scale Self-Report* (PSS-SR; Foa, Riggs, Dancu, & Rothbaum, 1993) was used to assess posttraumatic stress symptoms. The scale consists of 17 items consistent with the 17 DSM-IV criteria for PTSD (Engelhard et al., 2007). The items are scored on a 4 point-scale range from 0 (not at all) to 3 (five or more times a week/almost always). For the purpose of this study, we included only the arousal and avoidance subscales. The PSS-SR Dutch version has good psychometric properties (Engelhard et al., 2007). In the current study, the Cronbach's alpha coefficient was .75 for the avoidance scale and .72 for the arousal scale.

Trait dissociation was assessed with the *Dissociative Experiences Scale* (DES) (Bernstein & Putnam, 1986; Carlson et al., 1993). The DES consists of 28 items describing dissociative experiences such as derealization and depersonalization. Participants indicate on a scale ranging from 0% (never) to 100% (always) the degree to which the experiences apply to them. The individual item scores were averaged to calculate the overall total DES score. The DES has good psychometric properties (Van IJzendoorn & Schuengel, 1996). In the current study Cronbach's alpha coefficient was .91.

Fantasy proneness was assessed using the *Creative Experiences Questionnaire* (CEQ; Merckelbach, Muris, Schmidt, Rassin, & Horselenberg, 1998). The CEQ is a 25-item self-report questionnaire with descriptions concerning developmental antecedents of fantasy proneness, profound involvement in fantasy and daydreaming, and consequences of daydreaming (e.g. 'As a child I had imaginary friends or toys' and 'When I think of something cold, I actually get cold'). Participants have to state whether they agree or not with the statements. The total score has a range of 0–25, with higher scores indicating higher levels of fantasy proneness. The CEQ has good psychometric properties (Merckelbach et al., 2001). In the current study Cronbach's alpha coefficient was .82.

The level of mental imagery was assessed using the *Vividness of Visual Imagery Questionnaire – 2* (VVIQ-2; Marks, 1995). The VVIQ-2 consists of 32 items. Participants are instructed to describe

the images of the intrusive scenes that come to their mind and to rate the vividness and clarity of each image on a five-point scale (1 = no image at all to 5 = perfectly clear and as vivid as normal vision). Higher scores on the total scale reflect higher vividness (range 32–160). The VVIQ-2 has shown to be a valid and highly reliable measure of self-reported vividness of visual imagery (Campos & Ferez-Fabello, 2009). In the current study Cronbach's alpha coefficient was .97.

Affect intensity, for instance emotional responsiveness (how strongly people experience both their positive and negative emotions), was assessed with the *Affect Intensity Measure* (AIM; Larsen & Diener, 1987). The AIM consists of 40 items. Participants have to rate themselves on how they would react to the described events on a six-point scale 1 (never) to 6 (always). Scores are summed to get a total subscale score (range 40–240). Differences in affect intensity are related to affective, cognitive, and behavioural responses in different situations. It is proposed that affect intensity may have an arousal regulation function. The measure of affect intensity possesses adequate reliability and validity (Geuens & De Pelsmacker, 2002). In the current study Cronbach's alpha coefficient was .89.

Psychopathology was assessed using the *Brief Symptom Inventory* (BSI; de Beurs & Zitman, 2006; Derogatis, 1975; Derogatis & Melisaratos, 1983) a 53-item self-report measure with various subscales. Respondents have to indicate the frequency of each symptom during the past week on a five-point scale from 0 (not at all) to 4 (a lot). Higher mean total scores indicate more severe psychopathology. The BSI has good psychometric qualities (Derogatis & Melisaratos, 1983). In the current study, only data on the depression and anxiety subscales are reported. In the current study, the Cronbach's alpha coefficient was .88 for the anxiety subscale and .90 for the depression subscale.

The level of attentional control was assessed using the *Attentional Control Scale* (ACS; Derryberry & Reed, 2002). The ACS consists of 20 items measuring attentional control. Participants have to score each item on a four-point scale 1 (almost never) to 4 (always). The total score on the ACS is the sum of all the items (after reversing the reverse-scored items; range 20–80). A higher score indicates better attentional control. The ACS has been shown to have adequate test-retest reliability and internal consistency (Fajkowska & Derryberry, 2010). In the current study, the Cronbach's alpha coefficient was .88.

3.3 Procedure

We obtained written informed consent to obtain the participants' psychiatric diagnoses from their personal

file at the treatment centre and to use participant questionnaire data. All procedures were approved by the Medical Ethical Committee of University of Groningen Medical Centre. The participants completed the questionnaires in written form at home in the following order: (1) Offspring Intrusive Memory Instrument; (2) PTSD Symptom Scale Self-Report (PSS-SR); (3) Dissociative Experiences Scale (DES) (4) Creative Experiences Questionnaire (CEQ); (5) Vividness of Visual Imagery Questionnaire-2 (VVIQ-2); (6) Affect Intensity Measure (AIM); (7) Brief Symptom Inventory (BSI); (8) Attentional Control Scale (ACS).

3.4 Statistical methods and results

3.4.1 Intrusions related to indirectly experienced events referring to World War Two

Table 1 shows the demographic characteristics of the participants. All participants ($N = 98$) indicated that their father and/or mother experienced traumatic events during World War Two, and 49% ($n = 48$) reported that they had intrusions referring to World War Two events. We compared these last-mentioned participants to participants who did not report indirect intrusions ($n = 50$). A Chi-square test for independence with Yates' continuity correction indicated that the groups with and without intrusions did not differ significantly in gender, $X^2(1, n = 98) = 0.19, p = .66, phi = -.07$, and the independent sample t -tests indicated that the groups did not differ significantly in age, $t(96) = -1.09, p = .28$, or level of education, $t(96) = 1.10, p = .28$.

To explore the potential overlap between the group of individuals reporting direct intrusions with the group reporting indirect intrusions, we computed a cross-tab (see Table 2). A chi-square test for independence (with Yates' Continuity Correction) indicated a significant association between reports of indirect and direct intrusions, $X^2(1, n = 98) = .38, p < .001, phi = .38$. This finding indicates that people reporting indirect intrusions also tend to report direct intrusions (medium effect). However, the overlap between participants who indicated direct and indirect intrusions is far from complete (11% only indirect intrusions; 20% only direct intrusions).

Table 3 shows the scores of the various other characteristics of participants with and without intrusions about parental World War Two events. We conducted independent samples t -tests to investigate differences between the groups for these variables. The results indicated that, compared to participants without indirect intrusions, participants with World War Two related intrusions showed significantly higher scores on the DES, CEQ, the BSI anxiety subscale, and the PSS-SR avoidance and arousal subscales (all medium effect size).

3.4.2 Intrusions related to directly self-experienced traumatic events

We performed the same analysis to examine personal characteristics related to those who reported intrusions of *self-experienced* traumatic events versus those who did not. A subsample of 91% ($n = 89$) of the total sample reported that they had experienced or directly witnessed one or more personal traumatic events.² The most often reported events were physical assault, unwanted sexual experiences, sudden unexpected death of loved one, and motor vehicle accidents. Of these participants, 64% indicated that they had experienced one or more direct intrusions (Table 1). A Chi-square for independence with Yates' continuity correction indicated that statistically significant more women than men reported direct intrusions (medium effect size), $X^2(1, n = 89) = 4.21, p = .04, phi = -.24$. An independent samples t -test indicated that the participants with and without direct intrusions did not differ significantly in age, $t(87) = 0.68, p = .50$, or education level, $t(87) = 0.14, p = .89$ (Table 1).

Table 4 shows the scores on the characteristics of participants with and without direct intrusions. We conducted independent samples t -tests to investigate

Table 2. Number of participants reporting indirect and direct intrusions.

	With indirect intrusions <i>n</i>	Without indirect intrusions <i>n</i>	Total <i>n</i>
With direct intrusions <i>n</i>	37	20	57
Without direct intrusions <i>n</i>	11	30	41
Total	48	50	98

Table 1. Demographic characteristics of participants.

Variable	Parental event <i>N</i> = 98		Personal event <i>N</i> = 89	
	With intrusions (<i>n</i> = 48)	Without intrusions (<i>n</i> = 50)	With intrusions (<i>n</i> = 57)	Without intrusions (<i>n</i> = 32)
Gender				
Female <i>n</i> (%)	29 (60)	27 (54)	39 (68)	14 (44)
Male <i>n</i> (%)	19 (40)	23 (46)	18 (32)	18 (56)
Age				
Mean years (SD)	56.42 (6.19)	54.90 (7.51)	54.95 (7.02)	55.97 (6.52)
Education	5.71 (1.24)	5.68 (1.19)	5.65 (1.11)	5.69 (1.40)
1 (low, primary school) – 7 (high, university)				

Table 3. Characteristics of Participants Reporting Intrusions Referring to Parental World War Two Events ($N = 98$).

Variable	With indirect intrusions ¹		Without indirect intrusions ²		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i> (<i>n</i> = 48)	<i>M</i>	<i>SD</i> (<i>n</i> = 50)				
DESmean	18.35	11.54	12.97	9.70	93	2.46	.016	0.51
CEQtot	8.79	4.62	6.25	3.81	94	2.94	.004	0.61
VVIQlltot	111.36	26.05	103.98	26.41	89	1.34	.183	0.29
AIMtot ³	3.64	0.48	3.48	0.64	86.88	1.38	.172	0.30
ACStot	50.47	10.46	48.27	9.62	93	1.07	.289	0.22
BSI subscales								
Depression	10.23	7.01	8.31	5.99	94	1.44	.153	0.30
Anxiety	8.91	5.78	6.19	5.78	92	2.29	.025	0.48
PSS-SR subscales								
Avoidance	9.63	4.30	6.96	4.98	94	2.81	.006	0.58
Arousal	9.48	3.78	6.96	3.92	94	3.21	.002	0.66

Note: Missing variable data.

¹VVIQ (four participants), ACS (one participant), BSI anxiety (one participant).

²DES (three participants), CEQ (two participants), VVIQ (three participants), AIM (two participants), ACS (two participants), BSI depressions (two participants), BSI anxiety (three participants), PSS-SR avoidance (two participants), PSS-SR arousal (two participants).

³AIM Levene's test for equality of variances indicated violations of the assumption of equal variances ($p = .017$). For this variable, the equal variances not assumed *t*-value is reported.

BSI, Brief Symptom Inventory; PSS-SR, PTSD Symptom Scale Self-Report; DES, Dissociative Experiences Scale; CEQ, Creative Experiences Questionnaire; VVIQ, Vividness of Visual Imagery; AIM, Affect Intensity Measure; ACS, Attentional Control Scale.

Table 4. Characteristics of Participants Reporting Intrusions Referring to Self-experienced Traumatic Events ($n = 89$).

Variable	With direct intrusions ¹		Without direct intrusions ²		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i> (<i>n</i> = 57)	<i>M</i>	<i>SD</i> (<i>n</i> = 32)				
DESmean	18.26	10.95	12.68	10.67	84	2.25	.027	0.52
CEQtot	8.11	4.35	7.13	4.70	85	0.96	.338	0.22
VVIQlltot	109.04	25.56	104.93	25.64	80	0.70	.486	0.16
AIMtot	3.63	0.55	3.37	0.59	85	2.06	.043	0.46
ACStot	49.88	11.11	48.50	8.17	85	0.96	.540	0.34
BSI subscales								
Depression ³	10.49	6.80	6.97	5.34	72.325	2.65	.010	0.58
Anxiety ³	9.38	6.00	4.34	4.63	70.616	4.28	<.001	0.94
PSS-SR subscales								
Avoidance	10.09	4.56	5.50	4.20	85	4.58	<.001	1.17
Arousal	9.91	3.42	5.57	3.79	85	5.43	<.001	1.20

Note: Missing variable data.

¹VVIQ (four participants), BSI anxiety (one participant)

²DES (three participants), CEQ (two participants), VVIQ (two participants), AIM (two participants), ACS (three participants), BSI depressions (two participants), BSI anxiety (three participants), PSS-SR avoidance (two participants), PSS-SR arousal (two participants).

³Levene's test for equality of variances indicated violations of the assumption of equal variances for BSI depression ($p = .041$) and anxiety ($p = .047$) subscales. For these variables, the equal variances not assumed *t*-value is reported.

DES, Dissociative Experiences Scale; CEQ, Creative Experiences Questionnaire; VVIQ, Vividness of Visual Imagery; AIM, Affect Intensity Measure; ACS, Attentional Control Scale. BSI, Brief Symptom Inventory; PSS-SR, PTSD Symptom Scale Self-Report.

differences between the groups on these variables. Participants with direct intrusions showed significantly higher scores on the DES, AIM, BSI depression subscales (medium effect sizes) and BSI anxiety subscale, PSS-SR avoidance and arousal subscales (large effect sizes) than participants without these intrusions.

3.5 Discussion

The major aim of the present study was to identify personal characteristics that are associated with reports of intrusions related to *indirectly* experienced traumatic events in a sample of World War Two survivor offspring. As a comparison, we determined personal characteristics associated with reports of intrusions related to personal (i.e. directly) experienced traumatic events. The results indicated that participants with indirect intrusions reported more trait

dissociation, fantasy proneness, and current psychopathology including general anxiety, trauma-related avoidance and trauma-related arousal than those who did not report indirect intrusions. These characteristics were also associated with reports of direct intrusions, except for fantasy proneness. Fantasy proneness thus seemed a unique correlate of indirect intrusions. Noteworthy is the finding that a part of the participants reported indirect as well as direct intrusions (37 out of 98). This could be an indication that the same mechanism contributes to both types of intrusions with the mnemonic model as a possible candidate model. However, the overlap between participants who indicated direct and indirect intrusions is far from complete (11% only indirect intrusions; 20% only direct intrusions) so both types of intrusions seem also worthwhile to study as relatively independent phenomena.

We also found several variables to be associated with *direct* but not *indirect* intrusions. These included gender (i.e. participants who reported direct intrusions were more often female), current depression (the presence of direct intrusions was related to higher levels of depression) and affect intensity (presence of direct intrusions related to higher levels of affect intensity). Finally, level of education, imagery ability, and attentional control were neither associated with reports of indirect nor with reports of direct intrusions.

Fantasy proneness is referring to a disconnection from reality and creatively reshaping it (Weibel, Martarelli, Häberli, & Mast, 2018). Previous research has linked fantasy proneness to psychopathology. For example, Bacon and Charlesford (2018) found that fantasy proneness was related to emotional distress. They identified two subtypes of fantasizing, creative fantasy (the activity of using fantasy to create new ideas) and imaginative fantasy (the activity of vividly imagining and ease of becoming absorbed in images and daydreams), which were found to be differentially associated with emotional distress. Creative fantasy was linked to adaptive and maladaptive coping but showed in contrast to imaginative fantasy no relation with emotional distress. Unfortunately, the fantasy measure used in the current study (CEQ; Merckelbach et al., 1998) does not differentiate between both types of fantasy proneness. It remains therefore to be examined in future research whether the presence of indirect intrusions would be especially related to high imaginative fantasy (e.g. by using the Fantasy Questionnaire; Weibel et al., 2018).

Other characteristics related to reports of indirect intrusions included trait dissociation and current psychopathology, specifically general anxiety and post-traumatic avoidance and arousal. A possible mechanism explaining the link between trait dissociation and indirect intrusions is hyper-associativity (i.e. enhanced automatic activation of associations in memory). In hyper-associativity, in contrast to adaptive associativity, activated associations in memory are more emotion-driven and less semantically related to the cue. A recent study has shown a positive association between depersonalization (i.e. an aspect of trait dissociation), hyper-associativity, and fantasy proneness (Huntjens, Janssen, Merckelbach, & Lynn, 2021). With regard to current psychopathology, it may be that these intrusions, although unrooted in reality, are perceived as real and cause fear and stress. Alternatively, current psychopathology may contribute to reports of intrusions (cf. Engelhard et al., 2007). As the current study is a cross-sectional study, we cannot derive the direction of the relationship between these factors.

Gender, affect intensity, and current depression were not related to indirect intrusions, but, consistent

with previous research, were related to the occurrence of direct intrusions. It is well documented that women are more prone to depression than men (e.g. Hankin & Abramson, 2001; Kuehner, 2003). Gender differences in emotional autobiographical memories are also well-documented. For example, Davis (1999) showed that women recalled more childhood memories about emotional events and had faster access to such memories than men. Seidlitz and Diener (1998) found that women recalled more memories than men when requested to recall as many positive and negative experiences as possible within a short time period. Because of these gender differences in autobiographical memory, and related differences in affect intensity, women have been suggested to be more likely than men to develop PTSD symptoms following a similarly negative event (Rubin et al., 2008a). However, previous studies did not indicate gender differences in fantasy proneness. Neither did we find differences in fantasy proneness between men and women in the current study, [$t(46) = 0.44, p = .65$], which may explain why females were not more likely to report indirect intrusions in the current study.

Finally, level of education, imagery ability, and attentional control were not associated with either indirect or direct intrusions. An explanation for the lack of a hypothesized association between the presence of intrusion and level of education or attentional control could be that our sample was homogeneous with regard to these variables. In the absence of realistic information about the circumstances of the past, gaps in knowledge may be filled by imagination in an attempt to make sense of the past and present. In contrast, in the case of direct intrusions, the lack of association between imagery and intrusions indicates that imagining possible events is not sufficient to develop intrusions. In the case of indirect intrusions, the element of creatively coming up with adding elements to form a new coherent picture or story in the mind (i.e. fantasy proneness imaginative fantasy pathway) may be essential. In the case of direct intrusions, vivid imagery does not seem to add to the image based on the events as they were self-experienced.

It should be acknowledged, however, that the partial overlap in outcomes of trait dissociation and current complaints (Tables 3 and 4) may be partly due to the fact that both direct and indirect intrusions were reported by the same participants. Yet, this overlap cannot explain all of the results. Especially the role of fantasy proneness as a predictor appeared specific for reports of indirect intrusions.

The current finding that the presence of indirect intrusions is related to individual differences in fantasy proneness, is consistent with the mnemonic model of PTSD (Rubin et al., 2008a). Rather than

focusing on aberrant encoding processes operating at the time of experiencing the negative event, this model emphasizes the (re)constructive nature of memory retrieval. This model states that it is the interaction between memory (re)construction and the many factors influencing this process (e.g. individual differences and a person's current attitudes and goals) that determines whether intrusions will develop.

3.6 Limitations

In the current sample 50% of the participants reported indirect intrusions. A limitation of the current study is, however, that participants were recruited from a *clinical* sample of World War Two survivor offspring, which limits the external generalizability of the results. It can therefore not be ruled out that the current findings do not apply to non-treatment seeking World War Two survivor offspring.

A further limitation is that we did not examine the content of the reported indirect intrusions. A qualitative analysis concerning the content of this indirect intrusions may be helpful in providing a more in-depth understanding of the impact of parental World War Two events on offspring (Braga, Mello, & Fiks, 2012). An interesting aspect to investigate would, for example, be the perspective of the reported scenes: this may vary from scenes in which parents are the 'actors' to scenes in which the offspring performs as one of the actors in the scene (cf. Yehuda et al., 1998b).

Another interesting area for future research is the possible role of direct trauma in the development of indirect intrusions. In the current study, the majority of the participants reported some form of personal trauma (e.g. car accidents, physical violence, sexual assault, unexpected death of a relative). This characteristic of the sample may be unrelated or alternatively be related to their upbringing by sometimes traumatized parents, rendering them more vulnerable to experience future traumatic events and corresponding direct intrusions (Leenfeldner et al., 2013). Alternatively, personal trauma and related PTSD complaints may play a role in the development of indirect intrusions of World War Two events. This hypothesis would be in line with the mnemonic model suggesting that current complaints influence the construction of past event memories. Indirect intrusions of the war atrocities experienced by their parents, may, for example serve the function of explaining the difficulties experienced by the offspring while growing up, such as anxiety, agitation with sudden outbursts of parental anger or difficulties associated with their parents being often distracted and not available for them. Whereas the current study was

a necessary first step, future (longitudinal) studies are necessary to disentangle the exact mechanism(s) involved.

3.7 Clinical implications

The outcomes of this study may have clinical implications for the treatment of intrusions. Fantasy proneness was a unique correlate of indirect intrusions. The capacity to construct images in the mind can be used to an advantage in the clinical setting, for example by applying the imagery rescripting technique in patients with indirect intrusions. With the help of these techniques, the stress-provoking content of (threatening) indirect memories can perhaps be more easily reconstructed to non-threatening content meeting the basic needs of the patient (e.g. safety) for those with relatively high fantasy proneness (Hackmann, 2011).

In sum, this study demonstrated that partly different personal characteristics were associated with the occurrence of indirect versus direct intrusions among World War Two survivor offspring. These findings are consistent with the mnemonic model of PTSD, which emphasizes that intrusions are the result of (re)constructive processes that can be affected by several factors including personal characteristics such as fantasy proneness.

Notes

1. The offspring did not experience World War Two themselves, although in the Former Dutch East Indies a liberation war (1945-1949) took place after the Japanese capitulation.
2. The subsample who reported parental World War Two events and did not report self-experienced events was small ($n = 9$) and was therefore not analysed separately.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

Data availability statement

Due to the nature of this research, participants of this study did not agree for their data to be shared publicly, so supporting data is not available.

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