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# The experience of intrusions scale: A preliminary examination

Kristalyn Salters-Pedneault[a]*, Vera Vine[a], Mary Alice Mills[b], Crystal Park[b] and Brett T. Litz[a]

[a]*National Center for PTSD, VA Boston Healthcare System, Boston, MA, USA;* [b]*University of Connecticut, Storrs, CT, USA*

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Intrusive thoughts (i.e., unwelcome, distressing, involuntary thoughts) are prevalent in a variety of clinical conditions and are increasingly a focus of translational research. The goal of this study was to develop and preliminarily examine a brief self-report measure designed to assess clinically relevant aspects of the experience of intrusive thoughts related to a particular target. The Experience of Intrusions Scale (EIS) is a five-item measure that assesses the frequency, unpredictability, and unwantedness of intrusive thoughts, as well as the interference and distress caused by the intrusions, each on a five-point Likert-type scale. Five times over a four-day period, female undergraduates ($N = 160$) completed the EIS in response to intrusive thoughts regarding a film clip depicting a sexual assault. On the first and last days, participants completed the EIS five minutes after watching the clip. In between film clip viewings, participants completed the EIS once per day. The EIS demonstrated good internal consistency, good to excellent test–retest reliability using both immediate post-stimulus and 24-hour time intervals, and convergent validity with two existing measures of intrusive phenomena: the White Bear Suppression Inventory (Wegner & Zanakos, 1994) and the Post-traumatic Stress Disorder Checklist-Civilian Version (Weathers, Litz, Herman, Huska, & Keane, 1993).

**Keywords:** anxiety; intrusions; trauma; cognitive processing; cognition; information processing

The experience of intrusive thought (or any "distinct, identifiable cognitive event that is unwanted, unintended, and recurrent," Clark & Rhyno, 2005, p. 4) is remarkably common clinically and normatively (see Wegner & Pennebaker, 1993, for a review). Intrusive thoughts are a hallmark feature of post-traumatic stress disorder (PTSD) and obsessive compulsive disorder (OCD), and are present and relevant in other disorders, including generalized anxiety disorder (GAD), phobias, depression, and substance use and eating disorders. Because clinically significant intrusive thoughts are central in a variety of conditions, are often distressing, and can interfere significantly with functioning, the experience of intrusive thoughts is frequently studied experimentally (e.g., Brewin & Saunders, 2001; Holmes, Brewin, & Hennessy, 2004; Laposa & Alden, 2006; Nixon, Nehmy, & Seymour, 2007).

Unfortunately, the measurement of intrusive thoughts is difficult, both in and outside of the laboratory. Intrusive thoughts in the laboratory are typically assessed

*Corresponding author. Email: kristalyn.salters@ va.gov

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by monitoring and overt event marking, usually in the form of a ringing bell or buzzer (e.g., McNally & Ricciardi, 1996) or "streaming" (verbal stream of consciousness reporting; e.g., Roemer & Borkovec, 1994). The researchers have noted that such obtrusive methods repeatedly draw attention to the target thought, which may artificially increase the frequency of the thought (e.g., Lavy & van den Hout, 1990; Rassin, Merckenbach, & Muris, 2000; Roemer & Salters, 2004). These methods also require ongoing vigilance (i.e., "automatic target search;" Wegner & Erber, 1992), which may make the target thoughts more accessible. Furthermore, these existing techniques for measuring intrusions are generally constrained to assessing the frequency of these thoughts, rather than their intensity, functional impact, the amount of distress they cause, or other aspects of the experience of intrusions which would have greater clinical relevance.

Outside of the laboratory, diary methods have typically been employed to measure intrusions. Diary methods may produce more ecologically valid data than event marking or thought streaming. They also have greater versatility, as they can be adapted to measure the distress associated with intrusions and any other variables of interest. For example, Wessel, Overwijk, Verwoerd, and de Vrieze (2008) asked subjects to record the trigger for each intrusion and whether the intrusion resembled a sound, image, or feeling, and to express how stressful and vivid it felt as a percentage. Holmes, Brewin, and Hennessy (2004) had subjects record whether each intrusion was an image, a thought, or a combination of the two, and rate how much distress was associated with it on a 0–10 scale. While the diary's versatility gives it great promise for the clinical study of intrusions, there is no validated format for the questions guiding diary ratings.

In order to promote our understanding of the clinical course of intrusions, some researchers have remarked on the need for developing validated intrusion measures that incorporate aspects beyond merely thought frequency (e.g., Abramowitz, Tolin, & Street, 2001). Ideally, such a measure would address frequency as well as other clinically relevant aspects of intrusions, demonstrate good psychometric properties, and be concise, to facilitate delivery both in and outside of the laboratory in repeated-measures designs. The goal of this study was to develop and preliminarily examine the reliability and validity of a brief self-report measure designed to assess clinically relevant aspects of the experience of intrusive thoughts (e.g., functional impact, distress) related to a particular target over short or longer time frames. We created the Experience of Intrusions Scale (EIS), a measure that assesses the frequency of intrusive target thoughts and the intensity of experiences related to those intrusive thoughts. Unlike overt event marking or similar methods, completion of the EIS does not require sustained vigilance for intrusive thoughts. While the EIS is subject to retrospective bias, its brevity makes it a feasible adjunct to a variety of study designs, including experience sampling methods (e.g., diaries) and research protocols conducted within the laboratory. Furthermore, it could be delivered easily via electronic technologies (e.g., over the internet, or on handheld computers).

As a preliminary test of the reliability and validity of the EIS, participants completed the scale with regard to intrusive thoughts related to an emotionally evocative trauma-related film clip. This design is not without precedent. The trauma film paradigm, in which a traumatic event is simulated in a non-clinical sample, has been used extensively to induce intrusions in laboratory settings and identify associated pre-, peri-, and post-traumatic risk factors (for a review, see Holmes &

Bourne, 2008). Although some recent trauma film studies have used film clips consisting of live footage of horrific events such as traffic accidents and deaths (e.g., Holmes et al., 2004; Laposa & Alden, 2006), a variety of other clinical studies have been able to elicit emotional experiences in the laboratory effectively and reliably using fictional movie clips (e.g., McLaughlin, Mennin, & Farah, 2006; Salters-Pedneault, Gentes, & Roemer, 2007; Tull & Roemer, 2007). One advantage of using the trauma film paradigm is that it allows trauma-related phenomena to be studied using a prospective design, in a controlled, laboratory setting; in this case, it allowed for the measurement of intrusive reactions in the moments and days following the index event.

Participants completed the EIS immediately after viewing the clip, over the course of the next three days, and again after viewing the clip a second time, allowing us to examine internal consistency, test–retest reliability, and convergent validity of the scale (with other administered questionnaires). While the EIS does not distinguish between the types of intrusive thoughts being experienced by the respondent (e.g., image-based, verbal-linguistic, or perceptual) the image-based stimulus used in this study served as an analogue for a traumatic experience, allowing us to examine experiences of intrusive thoughts relevant to PTSD. However, the EIS may have utility in measuring a variety of other conditions associated with negative imagery, including agoraphobia (Day, Holmes, & Hackmann, 2004), bulimia (Somerville, Cooper, & Hackmann, 2007), social phobia (Hirsch, Clark, Mathews, & Williams, 2003), depression (Reynolds & Brewin, 1999), and OCD (Rachman, 2007).

## Method

### *Participants*

One hundred sixty female participants, ranging from 18 to 26 years of age, with a mean age of 19.01 years, were recruited via the psychology participant pool website at the University of Connecticut. One hundred and thirty participants identified themselves as White, 10 as African American or Black, eight as Latino, seven as Asian, four as Biracial or "Other," and one as Native American or Alaskan Native. Potential participants were provided with a description of the study and, if they expressed interest, were scheduled for two laboratory sessions: an initial session, and a second session three days following the first. Only women were recruited, in order to reduce between-subject variability in responses to the film clip stimulus (see below). Participants provided consent at the beginning of the first laboratory session.

Attrition was very low ($N = 147$ for the second experimental session). There were no differences between completers and drop-outs on any of the key study variables. Furthermore, drop-outs were no more likely than completers to have experienced a physical or sexual assault. For descriptive purposes, participants completed the Depression, Anxiety, and Stress Scales, 21-item version (DASS-21; Lovibond & Lovibond, 1995); study participants had a mean score of 4.94 ($SD = 4.53$) on the depression scale, 4.75 ($SD = 4.21$) on the anxiety scale, and 7.47 ($SD = 4.58$) on the stress scale. These scores are slightly higher than published norms for non-clinical samples but well below norms for clinical populations (e.g., Antony, Bieling, Cox,

Enns, & Swinson, 1998). There were no significant differences between completers and drop-outs on DASS-21 scores.

### *Stimulus*

The emotional stimulus used in this study was a brief (~2.5 minute) film clip depicting a woman being raped. The clip was taken from a popular film (*The Accused*) featuring a highly recognizable actress (Jodie Foster). This clip was chosen because it was judged by the research team to be highly emotionally evocative for most viewers, and therefore likely to induce intense short-term emotional discomfort, but also easily distinguishable from a recording of actual events. This clip has been used successfully in a previous study using a similar sample (Salters-Pedneault et al., 2007).

### *Measures*

*Experience of intrusions related to target material.* We rationally derived the EIS, a five-item measure that assesses the frequency of intrusive target thoughts, as well as the intensity of experiences related to those thoughts (i.e., unpredictability and unwantedness of the intrusive target thoughts, and interference and distress caused by the intrusions; see Table 1). Items were chosen for their representativeness of common concerns regarding intrusions endorsed by patients with PTSD. Most experimental designs assess intrusions as they relate to a target, rather than the general experience of intrusions. Language was included in the scale to allow the researcher to specify which target thoughts are to be assessed (in this case, thoughts of the rape scene). Respondents rate items on five-point Likert-type scales. The frequency item is rated such that 0 = "almost never," 1 = "infrequently," 2 = "occasionally," 3 = "frequently," and 4 = "very frequently;" intensity items are rated

Table 1. Experience of intrusions scale items and factor loadings.

| Item | Factor loading |
|---|---|
| 1. How often have you found yourself thinking to any degree about the rape scene since seeing the film?[a] | .73 |
| 2. On average, how distressed were you when these thoughts came to mind? | .81 |
| 3. On average, to what degree did the thoughts about the rape scene[a] come out of the blue? | .77 |
| 4. On average, when you've had these thoughts, how unwanted were they? | .72 |
| 5. On average, when you've had these thoughts, how much did they interfere with what you were doing at the time?[b] | .84 |

Note: This version of the EIS was administered during the 24-hour intervals in between film viewings. The instructions read, "Please circle the answer that corresponds with your experience in the last 24 hours." When administered five minutes post-film, subjects were instructed to respond with respect to the last five minutes.

[a]Underlined text is specific to the target event and thus is meant to be adapted to the target thoughts being assessed.

[b]When administered five minutes post-film, the last question read, "On average, when you've had these thoughts, how much did they interfere with your ability to sit quietly and relax?"

such that 0 = "not at all," 1 = "a little," 2 = "moderately," 3 = "quite a bit," and 4 = "extremely."

*Physical or sexual assault history.* The Life Events Checklist (LEC; Gray, Litz, Hsu, & Lombardo, 2004) is a 17-item self-report checklist of potentially traumatic events, originally developed for use in conjunction with the Clinician Administered PTSD Scale (Blake et al., 1990). Participants rate whether they have directly experienced 17 high base-rate traumatic events, including physical assault, assault with a weapon, and sexual assault. The LEC has good psychometric properties (Gray et al., 2004). It was included in this protocol to assess participants' experiences of physical or sexual assault, given the nature of the emotional stimulus and the possibility that assault survivors would be more reactive to it.

*Reexperiencing symptomatology.* The PTSD Checklist-Civilian Version (PCL-C; Weathers et al., 1993) is a 17-item self-report scale that assesses each of the DSM-IV diagnostic criteria for PTSD. The PCL-C has demonstrated good internal consistency and test–retest reliability in undergraduate samples (Ruggiero, Del Ben, Scotti, & Rabalais, 2003). For the purposes of this study, items from the Cluster B (or "reexperiencing") subscale were utilized to establish concurrent validity between the EIS and the tendency to experience intrusive mental events. Internal consistency of the PCL-C Cluster B items in this sample was good (Cronbach's $\alpha = .83$).

*Tendency to experience intrusions.* The White Bear Suppression Inventory (WBSI: Wegner & Zanakos, 1994) is a 15-item self-report measure initially designed to measure individual differences in thought suppression. However, a subsequent study concluded that the WBSI actually assesses two factors: thought suppression and intrusion (Muris, Merckelbach, & Horselenberg, 1996). The scale has good internal consistency, test–retest reliability, and convergent and predictive validity (Muris et al., 1996). The WBSI was included in the present study to establish convergent validity between the tendency to experience intrusive thoughts as measured by the WBSI intrusions subscale and the EIS. The internal consistency of the WBSI intrusions subscale in this sample was good ($\alpha = .80$).

*Self-reported distress.* The Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) is a 20-item self-report measure specifically designed to assess state and trait positive and negative affect (PA and NA). Because this project explored distressing thoughts following a film clip meant to evoke negative emotionality, data from the positive affect scale were not utilized. Internal consistency estimates for the NA scale are good to excellent ($\alpha = .84$–$.87$). The PANAS-NA was administered with short time frame instructions to measure state negative affectivity prior to participants' exposures to the film stimulus, and again after the initial and second viewing of the film clip to assess the impact of the stimulus. In this sample, internal consistency of the NA scale was good at every administration ($\alpha = .81$–$.89$).

### *Procedure*

The EIS was administered five times over a four-day period as part of a repeated-measures analogue study. The laboratory sessions on Day 1 and Day 4 took place in a large university lecture room with video and audio projection capabilities. Two female research assistants administered the sessions. No more than 25 participants were scheduled for any given time slot, so as to ensure that

participants were seated separately from one another. Participants first completed a questionnaire packet containing the LEC, PCL-C, DASS-21, WBSI, PANAS-NA, and other measures not relevant to the present study. Then they watched the short, emotionally evocative film clip depicting a sexual assault. Participants completed the PANAS-NA and EIS five minutes after viewing the film clip. They completed the EIS remotely via the Internet once per day on the following two days (Days 2 and 3). On Day 4, participants returned to the laboratory, where they completed the EIS and PANAS-NA, then viewed the film clip a second time, and completed the PANAS-NA and EIS once more. On Days 2, 3, and 4 (before reviewing the clip) participants completed the EIS with respect to intrusions experienced over the last 24 hours; at the two time points immediately following a viewing of the film clip (laboratory sessions on Days 1 and 4), they completed it with respect to intrusions experienced over the last five minutes.

### *Data transformation*

The PANAS-NA variables violated assumptions of normality in one or more periods. Square root transformations were performed to reduce skewness and kurtosis (Tabachnick & Fidell, 2007), and the transformed variables were used in subsequent analyses (although results are comparable to those using the untransformed variables). For clarity, the means and standard deviations of the untransformed variables are shown in Table 2.

### *Preliminary analyses*

*Stimulus check.* In order to establish the impact of the film, paired *t*-tests comparing baseline and post-film values of PANAS-NA scores were conducted for the initial

Table 2. Means and standard deviations of key study variables ($N = 160$)

| Variable | M | SD |
|---|---|---|
| PANAS-NA | | |
| Day 1 pre-film | 14.17 | 4.64 |
| Day 1 post-film | 25.47 | 8.39 |
| Day 4 pre-film[a] | 13.64 | 4.73 |
| Day 4 post-film[a] | 23.23 | 7.90 |
| WBSI intrusions | 16.47 | 4.12 |
| PCL-C, cluster B | 10.64 | 4.25 |
| EIS | | |
| Day 1 post-film[b] | 12.19 | 4.29 |
| Day 2[c] | 8.74 | 4.51 |
| Day 3[d] | 6.05 | 4.23 |
| Day 4[a] | 7.33 | 4.20 |
| Day 4 post-film[e] | 11.16 | 4.66 |

Note: PANAS-NA, Positive and Negative Affect Scale-Negative Affect; WBSI, White Bear Suppression Inventory, intrusions subscale; PCL-C, Post-traumatic Stress Disorder Checklist-Civilian Version, cluster B subscale ("reexperiencing"); EIS, Experience of Intrusions Scale.
[a]$n = 147$; [b]$n = 157$; [c]$n = 130$; [d]$n = 137$; [e]$n = 144$.

and the second viewing of the film clip. PANAS-NA showed a significant increase from baseline to post-film after the initial ($t = 19.26$, $p < .01$, $d = 3.05$) and second viewing ($t = 19.13$, $p < .01$, $d = 3.17$), indicating that the stimulus had the intended effect of creating an emotional response.

*Physical or sexual assault history.* To examine whether participants who reported having experienced an assault were differentially impacted by the film stimulus, *t*-tests compared participants who endorsed at least one physical or sexual assault event on the LEC ($N = 35$) to those who did not report assault experiences ($N = 125$). The results demonstrated no differences between these groups on post-film PANAS-NA or EIS scores (all $t$'s $< 1.52$, $p$'s $> .10$, $d$'s $< .26$).

## Results

### *Factor analysis*

To demonstrate that the EIS forms a single factor, the five items (from the first administration of the EIS) were subjected to principal components analysis. This analysis revealed the presence of only one factor with an eigenvalue exceeding one, explaining 60.3% of the variance. Cattell's (1966) screen test revealed a clear break after the first component. The results of a parallel analysis (performed with the RanEigen software; Enzmann, 1997), which showed only one factor with an eigenvalue exceeding the criterion values for a randomly generated data matrix of the same size, confirmed the single factor solution. Analyses of the subsequent EIS administrations supported the single factor solution.

### *Reliability*

The EIS demonstrated good internal consistency at each administration, with all Cronbach's $\alpha$'s $> .83$. Test–retest reliability was analyzed by examining the relationships between EIS scores on Days 1 and 4 (five minute post-film time frame) and Days 2, 3, and 4 (24-hour time frame); Spearman-Brown coefficients indicated good to excellent test–retest reliability (Day 1 post-film to Day 4 post-film, $r = .83$; Day 2 to Day 3, $r = .87$; Day 3 to Day 4, $r = .90$).

### *Validity*

To examine the convergent validity of the EIS we compared total EIS scores from each time point with total scores on the WBSI intrusions subscale and total reexperiencing symptom (Cluster B) scores on the PCL-C. Correlations between the PCL-C Cluster B scores and the EIS were significant ($p$'s $< .05$) at all administrations (Day 1 post-film $r = .22$, Day 2 $r = .20$, Day 3 $r = .20$, Day 4 $r = .29$, Day 4 post-film $r = .22$). Correlations between the WBSI intrusions subscale and the EIS were not significant on Day 1 ($r = .11$, $p > .10$); however, a trend was evident on Day 2 ($r = .16$, $p < .10$), and the correlations were significant ($p < .05$) on Days 3 ($r = .17$) and 4 ($r = .23$) and at the post-film administration on Day 4 ($r = .17$).

**Discussion**

In this preliminary study, the EIS demonstrated good internal consistency across all administrations and good to excellent test–retest reliability. The EIS also had adequate convergent validity with two existing measures of intrusive phenomena. These results indicate that the EIS may be a reliable and useful tool for evaluating the experience associated with intrusive thoughts of target material, using both short and longer time frame instructions. Because of its brevity, the EIS places minimal burden on subjects and can be easily integrated into research protocols.

The EIS demonstrated modest convergent validity with two measures assessing the tendency to experience intrusive mentation (the WBSI intrusions subscale and the reexperiencing cluster of symptoms on the PCL-C). Correlations between the EIS and these measures were significant, but they were of small to medium size, which may be due to differences between the constructs involved. The EIS is expected to measure the experience of intrusions related to a particular target event, whereas the WBSI and the PCL-C reexperiencing symptom scale are more likely to tap the trait-like tendency for intrusive thoughts. Although the EIS was not significantly correlated with the WBSI on Day 1, it was associated on subsequent administrations. This suggests that the EIS may be better at predicting more clinically relevant or trait-like experience of intrusions after some time elapses since the index event. It may be that the EIS, if administered some time after the exposure to the target material, could help to identify those people for whom intrusions do not subside naturally.

A limitation of this study is its reliance on a non-clinical, college student sample, and the fact that the intrusive sequelae of trauma were assessed using an analogue to trauma exposure. A number of studies have used the trauma analogue film paradigm with success (e.g., Holmes et al., 2004; Nixon et al., 2007), and the stimulus check data suggest that the film excerpt used in this study was impactful, as it was in a previous study (e.g., Salters-Pedneault et al., 2007). However, it is possible that intrusive thoughts measured in this study do not generalize to intrusions following real life trauma, and that the reliability of the EIS in those situations would be lower. Future research could clarify the utility of the EIS further by using clinical samples and ideographic stimuli.

An additional limitation of the current study is the reliance on other self-report measures of intrusions to establish validity. It is possible that the relationships between the EIS and the WBSI intrusions subscale and PCL-C Cluster B subscale were due to response bias. Convergence with psychophysiological indicators of distress, or measures of thought accessibility (e.g., the modified emotional Stroop task; Roemer & Salters, 2004), would address the response bias issue. The future research must also establish convergence with other existing measures of thought intrusion, including diary and overt event marking methods.

Finally, it is important to note that because we were ethically required to inform potential participants about the nature of the film clip, it is possible that the sample was biased by self-selection; perhaps only those individuals who were less likely to experience distress chose to participate upon hearing the description of the study. This may account for our finding that while some of our participants did report a history of physical and/or sexual assault, these individuals did not report greater reactivity to the film clip.

Because the EIS was designed with brevity in mind, it does not capture the full range of experiences related to intrusions. For example, the EIS focuses on aspects of intrusions that are relevant for anxiety and mood disorder conditions (e.g., PTSD), but not positive emotions elicited by intrusive thoughts that may be relevant for other psychological conditions (e.g., paraphilias or attentional disorders). Also absent from the EIS is language evaluating important aspects such as reactions to intrusions and attempts to modulate intrusions, both of which likely help determine the maintenance of intrusions. In addition, the EIS does not assess what type of intrusive thought is being experienced by the individual (e.g., an image, a verbal-linguistic thought, a sound). It will be important for future research to develop and validate measures that can capture these phenomena. For example, trait measures of attempts to control thoughts (e.g., as assessed by the Thought Control Questionnaire; Wells & Davies, 1994 ) might be adapted to be used in conjunction with the EIS.

Despite these limitations, the EIS appears to be a viable option for measuring clinically relevant intrusive phenomena. Whereas, some existing methodologies (e.g., overt event marking) measure the frequency of intrusions, the EIS measures other aspects of the experience of intrusions, including their intensity, unexpectedness, distressingness, unwantedness, and functional impact. Because the EIS is a concise measure, it may be used alongside other measures of intrusive thoughts (e.g., diaries) that are more difficult to validate but may capture broader information regarding experiences of intrusions. The EIS is appropriate for use in laboratory-based experimental studies and non-laboratory-based repeated-measures designs (e.g., experience sampling methods). In addition, this measure may have utility in intervention research; for example, the EIS may be used to measure the impact of treatments designed to alter intrusive imagery, for example, imaginal exposure (Foa, Hembree, & Rothbaum, 2007) or imagery rescripting (Holmes, Arntz, & Smucker, 2007).

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