

RESEARCH ARTICLE

Intrusive thoughts and memories in adolescents with major depressive disorder or post-traumatic stress disorder

Aleksandra Kralj | Alexandra Payne | Olivia Holzhauer-Conti |
Judith Young | Richard Meiser-Stedman 

Department of Clinical Psychology and
Psychological Therapies, Norwich Medical
School, University of East Anglia, Norwich, UK

Correspondence

Richard Meiser-Stedman, Department of
Clinical Psychology and Psychological Therapies,
Norwich Medical School, University of East
Anglia, Norwich, UK.
Email: r.meiser-stedman@uea.ac.uk

Abstract

Objectives: Research in adults suggests that intrusive memories and intrusive thoughts (often referred to as intrusive cognitions) are common in members of the general population and are often seen in clinical disorders. However, little is known about the experience of intrusive cognitions in adolescents, particularly in adolescents with major depressive disorder (MDD) and post-traumatic stress disorder (PTSD). The present study sought to gather fundamental data on these phenomena (i.e., frequency, characteristics and appraisals of intrusive cognitions) in adolescents with MDD and PTSD.

Methods: Adolescents aged 11–18 with MDD ($n=11$), PTSD ($n=13$) and a non-clinical control group ($n=25$) completed structured interviews concerning their intrusive memories and thoughts.

Results: Intrusive thoughts were common in all three groups but were particularly frequently experienced in the MDD group. Intrusive memories were expectedly very common in the PTSD group but also experienced by over half of the adolescents with MDD. Both clinical groups reported more negative emotions in response to their intrusive thoughts or memories and appraised these cognitions more negatively than the non-clinical group.

Conclusion: Intrusive memories and thoughts are common experiences in adolescents with MDD and PTSD. Emotions and appraisals relating to these cognitions may be targets for psychological intervention in this age group.

Aleksandra Kralj and Alexandra Payne are joint first authors.

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2024 The Author(s). *British Journal of Clinical Psychology* published by John Wiley & Sons Ltd on behalf of British Psychological Society.

However, small sample sizes limit the conclusions that can be drawn. Replication is needed with larger numbers of clinical participants.

KEYWORDS

adolescents, autobiographical memory, cognitive-behavioural therapy, depressive disorders, posttraumatic stress disorder, psychological factors/processes, psychological interventions, psychopathology/psychological disorders, special populations

INTRODUCTION

Intrusive cognitions – such as intrusive thoughts or memories – are experiences central to the diagnosis of certain emotional disorders (e.g., post-traumatic stress disorder [PTSD] and obsessive-compulsive disorder [OCD]). Moreover, a large literature has recognized the widespread experience of these phenomena in other conditions such as depression, other anxiety disorders and psychosis (Brewin et al., 2010), as well as individuals who would not meet threshold for any particular psychiatric diagnosis (Clark, 2005). The present study comprised an investigation of intrusive thoughts and intrusive memories in adolescents with major depressive disorder (MDD) and PTSD.

Intrusive memories

Defined as uninvited, spontaneously occurring memories that disrupt conscious thought, intrusive memories have received growing interest in recent literature as a transdiagnostic process and are increasingly recognized as common to many psychological disorders, as opposed to an experience unique to PTSD (Brewin et al., 2010; Harvey et al., 2004). The reported prevalence has varied across studies but is estimated at 76% in a recent meta-analysis, indicating that intrusive memories are a shared experience for the majority of adults with depression (Payne et al., 2019).

Many parallels have been highlighted between the experience of intrusive memories in depression and PTSD, with both groups reporting intrusive memories that are vivid (Birrer et al., 2007; Reynolds & Brewin, 1999); highly sensory in quality (Newby & Moulds, 2012); and associated with negative emotions and distress (Newby & Moulds, 2011, 2012). As in PTSD (Ehlers & Steil, 1995), negative appraisals of both the content of intrusive memories and of the intrusive experience itself have been linked to intrusion-related distress and subsequent avoidance in depression, in addition to depressive symptom severity (Newby & Moulds, 2010; Starr & Moulds, 2006). These findings indicate that the recall characteristics, associated negative appraisals and employed cognitive avoidance strategies recognized in the maintenance of re-experiencing symptoms in PTSD may also maintain intrusive experience in depression (Dunmore et al., 1999, 2001; Newby & Moulds, 2011).

Cognitive theories that address intrusive memories have typically focused on these experiences in the context of PTSD. Such theories include the cognitive model of PTSD (Ehlers & Clark, 2000), the emotional processing model (Foa & Rothbaum, 1998) and the dual representation model (DRT; Brewin, Dalgleish, & Joseph, 1996; Brewin et al., 2010). Such theories have often linked the experience of intrusive memories to individual differences in how autobiographical memories of traumatic experiences are stored. For example, DRT differentiates between *contextually* bound memory representations or C-reps (information attended to consciously during an event stored in coherent, voluntarily accessible form) and *sensory*-bound memory representations or S-reps (information outside of conscious awareness stored in sensory form with incoherent structure) of traumatic experiences (Brewin et al., 2010; Brewin, Dalgleish, & Joseph, 1996). Re-experiencing symptoms in PTSD are thought to be related to the result

from the formation of enduring S-reps in response to trauma, with weak or absent corresponding C-reps; outside of conscious control, intrusive memories are then experienced as though happening in the present (Brewin et al., 2010).

Intrusive memories in depression are understood to be processed as in regular autobiographical memory, with elevated distress associated with intrusive experience considered the result of attentional bias towards negative situational cues and negative appraisals of intrusive experience (Brewin et al., 2010; Ehlers & Clark, 2000). Negative life events are widely recognized as a risk factor in the development of depression and other emotional disorders, with the increased incidence of stressful life events observed in adolescence thought linked to the emergence of depressive disorders (Ge et al., 2001); intrusive memories of such negative life events provide one putative mechanism through which they exert an impact on depression. In their study of spontaneous mental imagery in older adolescents, Schwarz and Stangier (2023) found that negative images frequently comprised social themes, with images relating social conflict related to higher levels of emotional distress; the distress associated with such images was related to their frequency, vividness and controllability. Mirroring the adult literature, Meiser-Stedman et al. (2012) provided evidence that intrusive memories in adolescence are not unique to trauma-exposed youth but a relatively common experience for adolescents following negative life events. Moreover, this study indicated that the frequency and vividness of intrusions were related to depressive symptoms, highlighting intrusive memories as a potential target for cognitive intervention for depression in adolescents.

Intrusive thoughts

Intrusive thoughts are defined as ‘unwanted, unintended and recurrent’, an experience that ‘interrupts the flow of thoughts, interferes in task performance, is associated with negative affect and is difficult to control’ (Clark, 2005, p. 4). While often associated with OCD, intrusive thoughts have also been found to occur in depression, PTSD and other anxiety disorders (Purdon & Clark, 1993). Intrusive thoughts are also known to be experienced by the majority of the general population, although they are rarely bothersome for them (Purdon & Clark, 1993).

Cognitive theories suggest that it is the *appraisal or interpretation* of the thought that plays a fundamental role in whether the intrusive thought is distressing or not (Rachman, 1997). There is a breadth of research supporting this concept in the field of OCD (Rowa & Purdon, 2003), but less is known about the role of appraisal of intrusive thoughts in depression and PTSD in adolescents.

Recent cognitive models propose a major role for *evaluative* thoughts (also known as appraisals) in the maintenance of PTSD. Ehlers and Clark (2000) propose that PTSD becomes persistent when the trauma is processed in a way that leads individuals to feel a sense of current, serious threat. Several types of negative thoughts are believed to occur relating to feeling unsafe, PTSD symptoms themselves (e.g., emotional numbing and flashbacks), the consequences of the trauma and other people's reactions. Ehlers and Clark (2000) hypothesize that these appraisals maintain PTSD by producing negative emotions and encouraging individuals to engage in maladaptive coping strategies. While the notion that autobiographic memories are a core feature of PTSD is strongly supported (Brewin, Dalgleish & Joseph, 1996; Ehlers & Steil, 1995; Hackmann et al., 2004), less is known about how negative appraisals are experienced. There is evidence to suggest that adults with PTSD experience these negative thoughts *intrusively*, particularly in regard to evaluative thoughts such as self-blame and responsibility (Reynolds & Brewin, 1998). Further knowledge about the experience of these appraisals could highlight these as an area in need of greater clinical consideration in therapies such as cognitive-behavioural therapy (CBT) with adolescents with PTSD.

Childhood depression is frequently understood using the same models that are used when treating adults with depression. Perhaps the most widely recognized theory of depression is Beck's (1976) cognitive theory, which proposes that individuals have latent depressive schema that results in vulnerability to depression. This is believed to be because the depressive schema tends to be dysfunctional

beliefs and attitudes, which once activated trigger a pattern of negative automatic thoughts (NATs) and lead to depressive symptomology. Clark (1992) concluded that one can distinguish a type of intrusive, obsessive-like negative thought in depression, which is distinct from the NATs typically associated with depression, due to their ego-dystonic (i.e., inconsistent with one's fundamental beliefs) and obsessive-like nature (Clark, 1992). The literature on intrusive thoughts suggests they are associated with depression (Ciesla & Roberts, 2007; Tanaka et al., 2006) and are a significant predictor of depression scores (Ito et al., 2006; Starr & Moulds, 2006).

While CBT is recommended as a treatment for depression in adolescents (NICE, 2019), recent meta-analyses suggest its effects may only be moderate in size (Eckshtain et al., 2020). Improving the efficacy of treatments for depression in children and adolescents is therefore a priority. In adults, intrusive memories have been highlighted as a potential therapeutic target; it may be that the standard CBT treatment model is currently missing important features of depression in youth. To date, there remains little research exploring the experience of intrusive cognitions in adolescent depression.

Aims of study

This study aimed to investigate the experience of intrusive cognitions in adolescents with MDD and PTSD, evaluating their potential to be targeted in treatment. The study addressed the following questions:

1. How common are intrusive cognitions (i.e., intrusive memories and intrusive thoughts) in adolescents with PTSD and MDD, and non-clinical control adolescents?
2. Do clinical and non-clinical adolescents differ in terms of their intrusive cognition characteristics (i.e., duration, intrusiveness, quality, emotion, distress and content) and how they appraise intrusive cognitions?

METHOD

Participants

Individuals between 11 and 18 years were invited to participate in the study. Participants for the clinical groups (i.e., PTSD and MDD) were recruited from two UK NHS mental health trusts, via posters in general practitioner surgeries, charitable and professional support organizations and online advertising on social network sites. Individuals were approached by clinicians (in mental health settings) or invited to contact the research team. Adolescents were eligible to join the PTSD or MDD groups if they met DSM-IV criteria for PTSD or MDD on a structured interview. The PTSD group included adolescents who had a comorbid diagnosis of MDD. Participants in the control group were recruited from a secondary school in Norfolk with a lower-than-average socioeconomic status. Adolescents with clinically significant depression or PTSD were excluded from the control group as assessed via structured diagnostic interview and a self-report system; three youths were excluded as their depression scores were in the clinical range. Individuals were to be excluded if they had a current psychotic disorder, drug or alcohol misuse, intellectual disability or were not fluent in English; no participants were excluded for these reasons.

Ethics statement

Ethical approval was obtained from the Solihull NHS Research Ethics Committee (15/WM/0468). Participants and their parents provided informed consent prior to participation.

Measures

Anxiety disorders and depression

The Revised Child Anxiety and Depression Scale (RCADS; Chorpita et al., 2005) is a 47-item self-report questionnaire measuring the frequency of anxiety and depressive symptoms in children and adolescents between 8 and 18 years. It produces a Total Anxiety Scale and Total Internalizing Score. It has been found to have good internal consistency and showed convergent and divergent validity (Chorpita et al., 2005). The OCD subscale was used to screen out any participants with OCD.

Structured interview assessment of PTSD/MDD

The Anxiety Disorders Interview Schedule–child version (ADIS-C; Silverman & Albano, 1996) is a clinician-administered, structured interview used to assess the presence and severity of anxiety disorders and MDD in individuals aged 7–17 years based on the criteria set by the DSM-IV-TR (APA, 2000). The MDD and PTSD interview schedules were administered at the start of a telephone interview. The ADIS has been found to have excellent test–retest reliability (Silverman et al., 2001), excellent inter-rater reliability (Lyneham et al., 2007) and good concurrent validity (Wood et al., 2002).

Intrusive memory and intrusive thought interview schedule

An interview assessment of intrusive memory and intrusive thoughts was undertaken; for full interview, see Appendix S1. At the beginning of each interview, understanding of the relevant intrusive cognition was confirmed. This process was based on providing a definition of the relevant cognition (i.e., intrusive memory or thought) adapted from the definition used by Brewin, Christodoulides, and Hutchinson (1996). The relevant schedule was terminated if the participant was unable to identify an intrusive memory/thought, and the interviewer proceeded to the next part of the interview. If participants identified more than one intrusive memory or thought, they were asked to answer the subsequent questions on the thought that occurs most frequently. For intrusive thoughts, follow-up questions were used to confirm that the phenomena being described were indeed intrusive thoughts and not negative automatic thoughts (i.e., they occurred spontaneously and not in response to a specific event).

Participants were asked to report the frequency with which they experienced the intrusive memory or thought (once a week or less; several times a week; every day; or more than once a day) and the duration of the experience of the thoughts/memories (a few seconds, a few minutes, up to an hour or more than an hour). The content of each intrusive memory or thought was classified by the authors.

Participants rated each intrusive memory or thought in terms of its emotional quality. Seven emotions (anger, sadness, fear, guilt, helplessness, shame and anxiety) were rated on a scale of 0 (not at all) to 100 (very much). These emotions were identified as prominent within the adult PTSD and depression literature (Brewin, Dalgleish, & Joseph, 1996; Brewin, Hunter, et al., 1996; Reynolds & Brewin, 1999). Scores were summed to create a total score (possible range 0–700). Participants also rated how distressing they find their intrusive memory or thought on a scale from 0 (not at all) to 100 (very much).

Possible appraisals of each intrusive memory or thought were rated on a scale from 0 (*I don't believe this at all*) to 100 (*I am convinced that this is true*). The appraisal items were 10 statements adapted from the appraisal interview schedule developed by Newby and Moulds (2010). This schedule assessed perceived need to control the memory or thought (three items, e.g., 'I must gain control of this memory/thought'); the belief that the memory or thought signals psychological abnormality (four items, e.g., 'having this [memory/thought] means I'm going crazy'); and other negative self-evaluation (three items, e.g., 'having

this [memory/thought] means that I'm not good enough'). One item assessing perceived psychological abnormality was reverse scored. Scores were summed to create a total score (possible range 0–1000). Cronbach's alpha statistics suggested internal consistency was satisfactory for each subscale (control appraisals, $a = .75$ for intrusive memories, $.81$ for intrusive thoughts; appraisals of psychological abnormality, $a = .82$ and $.79$, respectively; negative self-evaluation, $a = .92$ and $.90$ respectively) and the total score ($a = .86$ and $.87$, respectively).

Two further scales were completed in relation to the intrusive memories only. The Children's Revised Impact of Events Scale (CRIES-13; Children and War Foundation, 2005) is a 13-item self-report measure completed with respect to an identified past event, assessing PTSD symptomology in children aged 8 years and above. The four-item intrusiveness subscale was only administered to assess intrusiveness of intrusive memories. The CRIES-13 possesses good overall internal consistency (Cronbach's $a = .80$) and good internal consistency for intrusion items alone (Cronbach's $a = .70$), with intrusion and avoidance considered separable constructs (Smith et al., 2003). The Trauma Memory Quality Questionnaire (TMQQ; Meiser-Stedman et al., 2007) is an 11-item self-report measure assessing trauma memory quality in individuals between 10 and 18 years. In particular, it examines visual quality and non-visual sensory features in addition to temporal context and verbal accessibility. The authors report good internal consistency (Cronbach's $a = .75$) and evidence that the TMQQ measures memory quality independent of frequency. The TMQQ was completed in relation to the memories identified as being intrusive.

Procedure

Participants first completed an online questionnaire battery assessing trauma history and self-reported symptoms of depression and anxiety. If they were eligible for the study, they then completed a structured interview conducted by telephone or video call. This interview involved assessment of PTSD and MDD, and interview items relating to their experience of intrusive memories and thoughts. The order of memory and thought schedules were counterbalanced across participants.

Data analysis plan

Between-group quantitative comparisons were performed using one-way analysis of variance (ANOVA) and post-hoc Tukey tests. Welch's F tests were undertaken where data violated the assumption of homogeneity of variance, with Games–Howell post-hoc tests. For all analyses, the α level was set at $.05$. Fisher's exact tests were used to address frequency data; adjusted residuals greater than 2 suggested cell sizes significantly different from the expected frequency for that cell. Given the small sample size and subsequently reduced power, effect sizes were calculated for all analyses including those that did not reach significance to inform future studies. Cohen's d was calculated for between-groups scores, where $.2$ is considered a small, $.5$ is considered a medium and $.8$ is considered a large effect size (Cohen, 1988).

RESULTS

Descriptive statistics

Forty-nine adolescents consented to participate in the study and met the study's inclusion and exclusion criteria. Eleven adolescents met diagnostic criteria for MDD only on the ADIS-C (hereafter referred to as the 'depressed group'). Six adolescents met criteria for PTSD alone, and seven met criteria for

TABLE 1 Participant characteristics by group.

	PTSD (N=13)	MDD (N=11)	Control (N=25)	Total (N=49)	Test
Age, M (SD)	15.1 (1.8)	15.7 (1.1)	14.6 (1.8)	15.0 (1.7)	$F_{2,48} = 1.944, p = .155$
Female sex, <i>n</i> (%)	10 (76.9%)	11 (100%)	18 (72.0%)	39 (79.6%)	$\chi_2 = 3.77, df = 2, p = .152$
Anxiety (RCADS), M (SD)	59.1 (30.1) ^a	71.5 (12.3) ^a	26.5 (14.7) ^b	45.2 (27.6)	$F_{2,22.08} = 45.17, p < .001$
Depression (RCADS), M (SD)	18.2 (6.7) ^a	20.7 (4.8) ^a	6.4 (2.6) ^b	12.8 (7.9)	$F_{2,17.34} = 55.01, p < .001$
Reported intrusive memories, <i>n</i> (%)	12 (92.3%) ^a	6 (54.5%)	7 (28.0%) ^b	25 (51.0%)	$\chi_2 = 14.22, df = 2, p < .001$
Reported intrusive thoughts, <i>n</i> (%)	10 (76.9%)	11 (100%) ^a	12 (48.0%) ^b	33 (67.3%)	$\chi_2 = 10.13, df = 2, p = .006$
Reported intrusive memories and thoughts, <i>n</i> (%)	9 (69.2%) ^a	6 (54.5%)	3 (12.0%) ^b	18 (36.7%)	$\chi_2 = 13.99, df = 2, p < .001$

Note: Different superscript characteristics indicate significant differences between groups. Welch tests were used for anxiety and depression. Abbreviation: RCADS, Revised Child Anxiety and Depression Scale.

PTSD and MDD; given the high rate of comorbid depression typically observed in PTSD (Kilpatrick et al., 2003), these groups were combined to form the ‘PTSD group’ ($n = 13$). There were 25 healthy control participants who did not meet criteria for PTSD or MDD. There were no significant differences between the three groups for age or gender (see Table 1).

The two clinical groups scored significantly higher on the RCADS anxiety and depression scales compared to the control group; there were no differences between the PTSD and depression groups on these subscales.

Prevalence of intrusive memories and thoughts

Twenty-five participants (51.0% of the total sample) reported experiencing intrusive memories, and 33 participants (67.3%) reported experiencing intrusive thoughts; 18 participants (36.7%) reported both intrusive memories and thoughts. Prevalence rates by group are reported in Table 1. Intrusive memories were significantly more common in the PTSD group (92.3%) compared to the control group (28.0%), but the MDD group did not differ from either other group; nevertheless, over half of the MDD group (54.5%) reported experiencing intrusive memories.

Intrusive thoughts were more common in the MDD group (100.0%) compared to the control group (48.0%). Experiencing both intrusive memories and intrusive thoughts was more common in the PTSD group (76.9%) compared to the control group. It is noteworthy that intrusive thoughts were a relatively common experience across all three groups; moreover, intrusive memories were more or less universal in the PTSD group while intrusive thoughts were present in all adolescents with MDD.

Characteristics of intrusive memories by group

Participants who endorsed experiencing intrusive memories were included in the analyses of intrusive memory characteristics. All between-group data are summarized in Table 2.

While there were no between-group differences with respect to intrusive memory frequency, the majority of adolescents with PTSD reported experiencing intrusive memories at least several times a week, while the majority of depressed and control participants endorsed experiencing intrusive memories

TABLE 2 Intrusive memory characteristics by group.

	PTSD (<i>n</i> = 12), <i>n</i> (%)	MDD (<i>n</i> = 6), <i>n</i> (%)	Control (<i>n</i> = 7), <i>n</i> (%)	Statistical test
Frequency				
Once a week or less	2 (16.7%)	5 (83.3%)	5 (71.4%)	FET <i>p</i> = .087
Several times a week	6 (50.0%)	1 (16.7%)	1 (14.3%)	
Every day	1 (8.3)	0 (.0%)	0 (.0%)	
More than once a day	3 (25.0)	0 (.0%)	1 (14.3%)	
Duration				
A few seconds	2 (16.7%)	0 (.0%)	2 (28.6%)	FET <i>p</i> = .487
A few minutes	3 (25.0%)	4 (66.7%)	3 (42.9%)	
Up to an hour	3 (25.0%)	1 (16.7%)	2 (28.6%)	
More than an hour	4 (33.3%)	1 (16.7%)	0 (.0%)	
Intrusiveness (CRIES-13), M (SD)	15.6 (3.7) ^a	13.0 (3.6)	8.9 (6.3) ^b	$F_{2,24} = 4.87, p = .018$
Memory quality (TMQQ), M (SD)	34.4 (3.2) ^a	28.0 (5.3) ^b	28.1 (4.5) ^b	$F_{2,24} = 7.27, p = .004$
Emotion total, M (SD)	454.5 (139.6) ^a	425.0 (120.1) ^a	190.00 (109.1) ^b	$F_{2,24} = 10.15, p < .001$
Distress, M (SD) [†]	87.9 (10.8) ^a	72.50 (13.3)	37.86 (30.5) ^b	$F_{2,24} = 9.97, p = .004$
Appraisal total, M (SD)	494.9 (237.6) ^a	449.8 (145.6)	193.0 (120.4) ^b	$F_{2,24} = 5.41, p = .012$
Content [‡]				
Death, illness, injury (other)	4 (36.4%)	1 (20.0%)	1 (16.7%)	FET <i>p</i> = .451
Illness/injury (self)	2 (18.2%)	1 (20.0%)	2 (33.3%)	
Assault	4 (36.4%)	1 (20.0%)	0 (.0%)	
Interpersonal difficulties	1 (9.1%)	2 (40.0%)	3 (50.0%)	

Note: Different superscript characters indicate significant post-hoc test differences between groups.

Abbreviations: CRIES-13, Child Revised Impact of Event Scale, 13-item version; FET, Fisher's exact test; TMQQ, Trauma Memory Quality Questionnaire.

[†]Welch test was used for distress.

[‡]Missing data for content: 1 PTSD, 1 MDD and 1 control.

once a week or less. Similarly, intrusive memory duration did not differ between groups; however, it is noteworthy that over half of the PTSD group reported that their intrusive memories lasted for 'up to an hour' or longer.

With respect to intrusiveness (as indexed by the intrusion subscale of the CRIES-13), adolescents with PTSD scored more highly than control participants; depressed adolescents did not differ from either other group. With respect to the quality of the intrusive memories (as measured by the TMQQ), adolescents with PTSD scored more highly than both the depressed and control groups, that is, their memories were more likely to comprise visual and non-visual sensory elements. The effect sizes of these differences were large ($ds > 1.46$; see Table S1).

With respect to emotions associated with intrusive memories, both the PTSD and MDD participants reported greater overall emotion severity compared to control participants. The PTSD group reported more distress around their intrusive memories compared to the control group. All these significant differences were associated with large effect sizes ($ds > 1.47$). While non-significant, the difference between the MDD group and the control for distress was large with respect to effect size ($d = 1.47$).

The PTSD group reported more negative appraisals around their experience of intrusive memories compared to control group, with a large effect size ($d = 1.60$). There was no difference between the clinical groups. While non-significant, there was again a large effect for the difference between the MDD

group and the control group ($d = 1.92$). The content of intrusive memories varied considerably. A Fisher's exact test did not suggest any significant differences; given the small cell sizes, meaningful comment on the distribution is not possible.

Characteristics of intrusive thoughts by group

Participants who endorsed experiencing intrusive thoughts were included in the analyses of intrusive thought characteristics. All between-group data are summarized in Table 3. With respect to frequency of intrusive thoughts, they were more likely to be rated as occurring once a week or less by participants in the control group, while the frequency for the PTSD group was significantly lower than might be expected. Adolescents with MDD were more likely than expected to report experiencing intrusive thoughts more than once a day, while for the control group, this frequency was endorsed less often than might be expected. With respect to duration, the control group was more likely than might be expected to experience intrusive memories lasting only a few seconds, while the PTSD group was more likely than might be expected to experience intrusive memories lasting more than an hour.

With respect to emotions associated with intrusive thoughts, both the PTSD and MDD participants reported greater overall emotion severity compared to control participants (both large effects, $d_s > 1.45$; see Table S2). The PTSD group reported more distress around their intrusive thoughts compared to the control group (large effect size). While not statistically significant, the difference between the PTSD group and the MDD group was medium in size ($d = .72$), as was the difference between the MDD and control groups ($d = .68$).

TABLE 3 Intrusive thought characteristics by group.

	PTSD ($n = 10$), n (%)	MDD ($n = 11$), n (%)	Control ($n = 12$), n (%)	Statistical test
Frequency				
Once a week or less	0 (.0%) ^a	2 (18.2%)	7 (58.3%) ^b	FET $p = .001$
Several times a week	5 (50.0%)	1 (9.1%)	5 (41.7%)	
Every day	2 (20.0%)	3 (27.3%)	0 (.0%)	
More than once a day	3 (30.0%)	5 (45.5%) ^a	0 (.0%) ^b	
Duration				
A few seconds	0 (.0%)	0 (.0%)	4 (33.3%) ^a	FET $p = .049$
A few minutes	2 (20.0%)	4 (36.4%)	4 (33.3%)	
Up to an hour	4 (40.0%)	6 (54.5%)	4 (33.3%)	
More than an hour	4 (40.0%) ^a	1 (9.1%)	0 (.0%)	
Emotion total, M (SD)	440.1 (151.9) ^a	481.8 (108.7) ^a	232.2 (133.6) ^b	$F_{2,32} = 11.84, p < .001$
Distress, M (SD)	84.6 (14.6) ^a	70.9 (22.5)	49.2 (39.3) ^b	$F_{2,32} = 4.43, p = .021$
Appraisal total, M (SD) [†]	626.9 (259.5) ^a	621.3 (162.3) ^a	313.4 (161.5) ^b	$F_{2,18.50} = 11.73, p < .001$
Content				
Self-evaluative	8 (80.0%)	8 (72.7%)	6 (50.0%)	FET $p = .573$
Ext. judgement	0 (.0%)	0 (.0%)	2 (16.7%)	
Threat	1 (10.0%)	1 (9.1%)	2 (16.7%)	
Self-harm	1 (9%)	2 (18.2%)	0 (.0%)	
Images	0 (0%)	0 (0%)	2 (16.7%)	

Note: Different superscript characters indicate significant post-hoc test differences between groups or significant residuals.

Abbreviation: FET, Fisher's exact test.

[†]Welch test was used for appraisal total.

Both the PTSD and MDD groups reported more negative appraisals around their experience of intrusive thoughts compared to the control group, with a large effect size. There was no difference between the clinical groups.

The majority of intrusive thoughts were self-evaluative in content. There were no significant between-group differences.

DISCUSSION

This study measured the experience of intrusive thoughts and memories, associated emotions and how they are appraised in adolescents presenting with MDD, PTSD and a non-clinical group. Intrusive memories and thoughts were common phenomena; in particular, intrusive thoughts which occurred in as many as half of the control group and the majority of the two clinical groups. Over half of the MDD group and nearly all of the PTSD group experienced intrusive memories. The experience of intrusive memories and thoughts was consistently associated with greater emotion and negative appraisals in the two clinical groups compared to the control group; the PTSD group also experienced greater distress compared to the control group for types of intrusive phenomena.

Intrusive memories

As expected, the prevalence of intrusive memories in PTSD was observed to be very high and almost ubiquitous. Intrusive memories were also highlighted as a common experience in adolescent depression, affecting more than half of the current sample and supporting the view of intrusive memories as an important transdiagnostic process (Brewin et al., 2010; Harvey et al., 2004). The prevalence rate of 54.5% in depressed adolescents observed was slightly lower than the rate of 76.0% calculated in adult depression in a recent meta-analysis (Payne et al., 2019). We speculate that this discrepancy might reflect less opportunity to experience major life events in our adolescents compared to adults; however, it is also important to note that the figure of 76.0% given by Payne and colleagues was associated with considerable heterogeneity, and included two adult samples where the prevalence was as low as that observed here. A large effect size between prevalence rates was observed in comparison of clinical groups, indicating a trend towards increased risk of intrusive memories for adolescents with PTSD. Intrusive memories were reported by less than a third of the control group. While requiring replication within a larger sample, this finding tentatively indicates that intrusive memories may be a common (but not ubiquitous) feature of depression in adolescents.

The adolescents with PTSD who reported experiencing intrusive memories rated them as more intrusive compared to the control group participants who also had some experience of some intrusive memories; there was only a trend towards greater intrusiveness in the PTSD participants relative to the MDD participants who also reported some intrusive memories. Intrusive memories were not restricted to representations of traumatic experiences, consistent with the observation that negative but non-traumatic life events may give rise to intrusive memories (Meiser-Stedman et al., 2012).

The adolescents with PTSD who reported intrusive memories described their intrusive memories as higher in sensory quality (as evidenced by elevated TMQQ scores) than both the control and MDD participants who reported experiencing intrusive memories, with no difference between the MDD and control groups. This supports the distinction drawn by cognitive theory between intrusive memories in PTSD and those in depression. The description of intrusive memories in the PTSD group as highly sensory in quality with reduced verbal accessibility is consistent with the postulation of poorly contextualized but enduring S-reps. The experience of having memories that are intrusive but rated lower in sensory quality, as reported in the MDD group, is consistent with the notion of C-reps, that is, contextualized memory representations for a given experience that are subject to top-down control (Brewin et al., 2010). In line with previous research, while negative emotional experience may be sufficient for

the development of enduring S-reps and consequent intrusions (Brewin et al., 2010; Meiser-Stedman et al., 2012), strong sensory quality with reduced corresponding context can be seen to distinguish intrusive memories experienced in PTSD from those experienced in depression and non-clinical populations (Parry & O'Kearney, 2014).

The clinical participants reported stronger emotions than the control group, while the PTSD group reported more intrusive memory-related distress than the control participants. These findings highlight the experience of intrusive memories as more burdensome in clinical populations, despite some parallels in the frequency and duration of intrusive experience. Participants in clinical groups were more likely to endorse negative appraisals of intrusive memories than non-clinical youth; this is consistent with earlier work in adults that demonstrated the importance of negative appraisals surrounding the experience of intrusive memories in PTSD and depression (Ehlers & Steil, 1995; Newby & Moulds, 2010; Starr & Moulds, 2006; Williams & Moulds, 2008). These findings provide initial support for the application of cognitive theory as developed in the context of adult PTSD to both adolescent PTSD and MDD, extending the proposal that maladaptive beliefs attached to intrusive memories may play an important role in impeding processing of negative experience and perpetuating associated distress (Ehlers & Clark, 2000).

The duration of intrusive memories was quite long, with a significant proportion of the PTSD group reporting that their intrusive memories lasted for an hour or more. This raises the question of whether participants were reporting the duration of the intrusive memory alone or included aspects of their reaction to the memory, that is, rumination around the trauma and their reaction to it.

Intrusive thoughts

To date, this is the first study to assess the experience of intrusive thoughts in adolescents with MDD and PTSD. The MDD group was significantly more likely to experience intrusive thoughts than the non-clinical group but did not differ from PTSD group, and the non-clinical group and PTSD group did not differ significantly from each other.

Both clinical groups reported experiencing more negative emotions than the non-clinical group in response to their intrusive thoughts but did not differ from each other. These findings are consistent with research in an adult population who found that participants with MDD and PTSD reported high levels of depression, anxiety, guilt and distress in response to their intrusive thoughts (Reynolds & Brewin, 1998). The clinical groups appraised their intrusive thoughts more negatively than the non-clinical group, with large effect sizes. Such findings are consistent with Rachman's (1997) theory suggesting that it is the *appraisal* of the thought that plays the key role in whether it causes distress, where non-clinical groups are more likely to find intrusive thoughts easy to dismiss (Rachman, 2014). Thus, it is possible that the appraisal of intrusive thoughts plays a role in the maintenance of such psychopathology in adolescents with MDD and PTSD.

No between-group differences were observed in the content of the intrusive thoughts. Self-evaluative thoughts were the most frequently reported form of intrusive thought for all three groups. This second finding is consistent with the work of Reynolds and Brewin (1998) in adults, who found that evaluative cognitions (i.e., cognitions concerning personal blame or responsibility) were the most common form of intrusive thought content in both their clinical group (adults with depression and PTSD) and their non-clinical control group.

Clinical implications

This study has shown that intrusive thoughts and memories are common experiences in adolescents, with intrusive thoughts being present in 50% with no clinical diagnosis. However, a key difference between clinical and non-clinical groups appears to be the appraisal and affect associated with these intrusive cognitions.

These findings have the potential to inform clinical assessment and treatment for adolescents. While negative life events or traumatic experiences may be covered in clinical assessment of adolescents presenting with depressed mood, identification and exploration of intrusive memory and thought experience is likely less routine but is indicated to be of clinical value. Assessing the experience and management of intrusive cognitions could inform psychological formulations and treatment plans. The current study also provides a relatively brief assessment battery providing broad assessment which could feasibly be incorporated into routine clinical assessment. Psychological treatments for depression and PTSD in adolescents may be enhanced by directly addressing the experience of intrusive thoughts and memories, such as psychoeducation, normalizing their experiences and teaching useful coping strategies. An emerging literature suggests that specifically focusing on intrusive memories may be an important treatment approach for both adults (Brewin et al., 2009) and adolescents (Pile et al., 2021).

Given the distress ratings recorded by adolescents with depression, intrusive memories are revealed as a potential target for cognitive intervention. The current findings reaffirm strong sensory quality as a defining feature of intrusive memories in PTSD and provide initial indication that cognitive interventions with primary focus on contextualizing sensory-based memory representations may not be directly applicable in adolescent MDD. The provisional evidence presented here marks associated emotions and negative appraisals as features distinguishing intrusive memories experienced by adolescents with MDD from those reported by their non-clinical peers, offering encouraging avenues for further investigation.

Strengths and limitations

The results of the current study should be considered exploratory given the small sample size, and conclusions must therefore be drawn with some caution. The small sample size means it is underpowered which clearly restricts the inferences that can be made. Due to this small sample size, only very large effects could be found to be statistically significant. Replication with larger sample sizes would be required to yield more conclusive inferences to explore further the relationship between intrusive memory and thought characteristics and both post-traumatic stress and depressive symptomology. In particular, we could not identify enough participants with PTSD alone (i.e., not with depression), and so could not establish the extent to which findings for our PTSD group were actually driven by significant depression symptoms.

The cross-sectional design captures experience at a single time point and does not permit consideration of causality. Longitudinal studies would allow for a more powerful study of the mechanisms explored here and whether they have sustained effect on PTSD and depression.

The use of adolescents with MDD and PTSD based on clinical interviews provides results with direct relevance to adolescents seen in clinical practice. A strength of the study is the structured nature of the interviews used to assess intrusive cognitions. It also allowed for the researchers to ascertain that the thought reported was an intrusive thought, and not a NAT by allowing the space to ask follow-up questions. Nevertheless, there are potential problems with the construction of this interview. The example intrusive thought that was given to participants (see [Supporting Information](#)) involved evaluative content ('I'm rubbish') that may have skewed participants' responses and contributed to the high prevalence of evaluative intrusive thoughts reported here (>70% for the PTSD and MDD groups). Despite this issue, it is important to note that the evaluative thoughts varied in content considerably, suggesting that participants were not just echoing the example given.

CONCLUSION

This study provides preliminary evidence that intrusive thoughts and memories are common experiences in adolescents, particularly in adolescents with MDD or PTSD. This study has found that

adolescents with MDD and PTSD are more likely to experience intrusive memories and thoughts that are associated with greater negative appraisals of such phenomena and greater associated negative emotions. Strong sensory quality was identified as a distinguishing characteristic of intrusive memories in adolescent PTSD. Intrusive thoughts and memories in adolescents warrant further investigation and may prove to be a target of psychological treatment for adolescents with MDD and PTSD.

AUTHOR CONTRIBUTIONS

Aleksandra Kralj: Conceptualization; methodology; investigation; formal analysis; project administration; writing – original draft; writing – review and editing. **Alexandra Payne:** Conceptualization; methodology; formal analysis; project administration; writing – original draft; writing – review and editing. **Olivia Holzhauser-Conti:** Writing – original draft; formal analysis; writing – review and editing. **Judith Young:** Conceptualization; methodology; formal analysis; writing – original draft. **Richard Meiser-Stedman:** Conceptualization; formal analysis; methodology; data curation; supervision; project administration; writing – original draft; writing – review and editing.

CONFLICT OF INTEREST STATEMENT

None.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ORCID

Richard Meiser-Stedman  <https://orcid.org/0000-0002-0262-623X>

REFERENCES

- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders, 4th edition (DSM-IV)*. American Psychiatric Press.
- Beck, A. T. (1976). *Cognitive therapy and emotional disorders*. International Universities Press.
- Birrer, E., Michael, T., & Munsch, S. (2007). Intrusive images in PTSD and in traumatised and non-traumatised depressed patients: A cross-sectional clinical study. *Behaviour Research and Therapy, 45*, 2053–2065.
- Brewin, C. R., Christodoulides, J., & Hutchinson, G. (1996). Intrusive thoughts and intrusive memories in a nonclinical sample. *Cognition and Emotion, 10*, 107–112.
- Brewin, C. R., Dalgleish, T., & Joseph, S. (1996). A dual representation theory of posttraumatic stress disorder. *Psychological Review, 4*, 670–686.
- Brewin, C. R., Gregory, J. D., Lipton, M., & Burgess, N. (2010). Intrusive images in psychological disorders: Characteristics, neural mechanisms, and treatment implications. *Psychological Review, 117*, 210–232.
- Brewin, C. R., Hunter, E., Carroll, F., & Tata, P. (1996). Intrusive memories in depression: An index of schema activation? *Psychological Medicine, 26*, 1271–1276.
- Brewin, C. R., Reynolds, M., & Tata, P. (1999). Autobiographical memory processes and the course of depression. *Journal of Abnormal Psychology, 108*, 511–517.
- Brewin, C. R., Wheatley, J., Patel, T., Fearon, P., Hackmann, A., Wells, A., Fisher, P., & Myers, S. (2009). Imagery rescripting as a brief stand-alone treatment for depressed patients with intrusive memories. *Behaviour Research and Therapy, 47*(7), 569–576.
- Children and War Foundation. (2005). The children's impact of event scale (CRIES-13). <http://www.childrenandwar.org/measures>
- Chorpita, B. F., Moffitt, C. E., & Gray, J. (2005). Psychometric properties of the revised child anxiety and depression scale in a clinical sample. *Behaviour Research and Therapy, 43*, 309–322.
- Ciesla, J. A., & Roberts, J. E. (2007). Rumination, negative cognition, and their interactive effects on depressed mood. *Emotion, 7*(3), 555–565.
- Clark, D. A. (1992). Depressive, anxious and intrusive thoughts in psychiatric inpatients and outpatients. *Behaviour Research and Therapy, 30*, 93–102.
- Clark, D. A. (2005). *Intrusive thoughts in clinical disorders: Theory, research & treatment*. Guilford Press.
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences (2nd ed.)*. Lawrence Erlbaum Associates, Publishers.

- Dunmore, E., Clark, D. M., & Ehlers, A. (1999). Cognitive factors involved in the onset and maintenance of posttraumatic stress disorder (PTSD) after physical or sexual assault. *Behaviour Research and Therapy, 37*, 809–829.
- Dunmore, E., Clark, D. M., & Ehlers, A. (2001). A prospective investigation of the role of cognitive factors in persistent post-traumatic stress disorder (PTSD) after physical or sexual assault. *Behaviour Research and Therapy, 39*, 1063–1084.
- Eckshstein, D., Kuppens, S., Ugueto, A., Ng, M. Y., Vaughn-Coaxum, R., Corteselli, K., & Weisz, J. R. (2020). Meta-analysis: 13-year follow-up of psychotherapy effects on youth depression. *Journal of the American Academy of Child and Adolescent Psychiatry, 59*(1), 45–63.
- Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy, 38*, 319–345.
- Ehlers, A., & Steil, R. (1995). Maintenance of intrusive memories in posttraumatic stress disorder: A cognitive approach. *Behavioural and Cognitive Psychotherapy, 23*, 217–249.
- Foa, E. B., & Rothbaum, B. O. (1998). *Treating the trauma of rape: Cognitive behavioral therapy for PTSD*. Guilford Press.
- Ge, X., Conger, R. D., & Elder, G. H., Jr. (2001). Pubertal transition, stressful life events, and the emergence of gender differences in adolescent depressive symptoms. *Developmental Psychology, 37*, 404–417.
- Hackmann, A., Ehlers, A., Speckens, A., & Clark, D. M. (2004). Characteristics and content of intrusive memories in PTSD and their changes with treatment. *Journal of Traumatic Stress, 17*, 231–240.
- Harvey, A. G., Watkins, E., Mansell, W., & Shafran, R. (2004). *Cognitive behavioural processes across psychological disorders: A transdiagnostic approach to research and treatment*. Oxford University Press.
- Ito, T., Takenaka, K., Tomita, T., & Agari, I. (2006). Comparison of ruminative responses with negative rumination as a vulnerability factor for depression. *Psychological Reports, 99*(3), 763–772.
- Kilpatrick, D. G., Ruggiero, K. J., Acierno, R., Saunders, B. E., Resnick, H. S., & Best, C. L. (2003). Violence and risk of PTSD, major depression, substance abuse/dependence, and comorbidity: Results from the national survey of adolescents. *Journal of Consulting and Clinical Psychology, 71*, 692–700.
- Lynham, H. J., Abbott, M. J., & Rapee, R. M. (2007). Interrater reliability of the anxiety disorders interview schedule for DSM-IV: Child and parent version. *Journal of the American Academy of Child and Adolescent Psychiatry, 46*, 731–736.
- Meiser-Stedman, R., Dalgleish, T., Yule, W., & Smith, P. (2012). Intrusive memories and depression following recent non-traumatic negative life events in adolescents. *Journal of Affective Disorders, 137*, 70–78.
- Meiser-Stedman, R., Smith, P., Yule, W., & Dalgleish, T. (2007). The trauma memory quality questionnaire: Preliminary development and validation of a measure of trauma memory characteristics for children and adolescents. *Memory, 15*, 271–279.
- National Institute for Health and Clinical Excellence. (2019). *Depression in children and Young people: Identification and management in primary, community and secondary care: NG134*. National Institute for Health and Care Excellence.
- Newby, J. M., & Moulds, M. L. (2011). Characteristics of intrusive memories in a community sample of depressed, recovered depressed and never-depressed individuals. *Behaviour Research and Therapy, 49*, 234–243.
- Newby, J. M., & Moulds, M. L. (2012). A comparison of the content, themes, and features of intrusive memories and rumination in major depressive disorder. *British Journal of Clinical Psychology, 51*, 197–205.
- Newby, J. N., & Moulds, M. L. (2010). Negative intrusive memories in depression. The role of maladaptive appraisals and safety behaviours. *Journal of Affective Disorders, 126*, 147–154.
- Parry, L., & O'Kearney, R. (2014). A comparison of the quality of intrusive memories in post-traumatic stress disorder and depression. *Memory, 22*, 408–425.
- Payne, A., Kralj, A., Young, J., & Meiser-Stedman, R. (2019). The prevalence of intrusive memories in adult depression: A meta-analysis. *Journal of Affective Disorders, 253*, 193–202.
- Pile, V., Smith, P., Leamy, M., Oliver, A., Bennett, E., Blackwell, S. E., Meiser-Stedman, R., Stringer, D., Dunn, B. D., Holmes, E. A., & Lau, J. Y. (2021). A feasibility randomised controlled trial of a brief early intervention for adolescent depression that targets emotional mental images and memory specificity (IMAGINE). *Behaviour Research and Therapy, 143*, 103876.
- Purdon, C., & Clark, D. A. (1993). Obsessive intrusive thoughts in nonclinical subjects. Part I. Content and relation with depressive, anxious, and obsessional symptoms. *Behaviour Research and Therapy, 31*, 713–720.
- Rachman, S. (1997). A cognitive theory of obsessions. *Behaviour Research and Therapy, 35*, 793–802.
- Rachman, S. (2014). Global intrusive thoughts: A commentary. *Journal of Obsessive-Compulsive and Related Disorders, 3*, 300–302.
- Reynolds, M., & Brewin, C. R. (1998). Intrusive cognitions, coping strategies and emotional responses in depression, post-traumatic stress disorder and a non-clinical population. *Behaviour Research and Therapy, 36*, 135–147.
- Reynolds, M., & Brewin, C. R. (1999). Intrusive memories in depression and posttraumatic stress disorder. *Behaviour Research and Therapy, 37*, 201–215.
- Rowa, K., & Purdon, C. (2003). Why are certain intrusive thoughts more upsetting than others? *Behavioural and Cognitive Psychotherapy, 31*, 1–11.
- Schwarz, S. M., & Stangier, U. (2023). Contents and characteristics of mental imagery and their association with emotional intensity in adolescents: A pilot study. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 41*(4), 838–855.
- Silverman, W. K., & Albano, A. M. (1996). *Anxiety disorders interview schedule for DSM-IV – Child version: Child interview schedule*. Oxford University Press.
- Silverman, W. K., Saavedra, L. M., & Pina, A. A. (2001). Test-retest reliability of anxiety symptoms and diagnoses with the anxiety disorders interview schedule for DSM-IV: Child and parent versions. *Journal of the American Academy of Child and Adolescent Psychiatry, 40*, 937–944.

- Smith, P., Perrin, S., Dyregrov, A., & Yule, W. (2003). Principal components analysis of the impact of event scale with children in war. *Personality and Individual Differences, 34*, 315–322.
- Starr, S., & Moulds, M. L. (2006). The role of negative interpretations of intrusive memories in depression. *Journal of Affective Disorders, 93*, 125–132.
- Tanaka, N., Uji, M., Hiramura, H., Chen, Z., Shikai, N., & Kitamura, T. (2006). Cognitive patterns and depression: Study of a Japanese student population. *Psychiatry and Clinical Neurosciences, 60*, 358–364.
- Williams, A. D., & Moulds, M. L. (2008). Negative appraisals and cognitive avoidance of intrusive memories in depression: A replication and extension. *Depression and Anxiety, 25*, 26–33.
- Wood, J. J., Piacentini, J. C., Bergman, R. L., McCracken, J., & Barrios, V. (2002). Concurrent validity of the anxiety disorders section of the anxiety disorders interview schedule for DSM-IV: Child and parent versions. *Journal of Clinical Child and Adolescent Psychology, 31*, 335–342.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Kralj, A., Payne, A., Holzhauer-Conti, O., Young, J., & Meiser-Stedman, R. (2024). Intrusive thoughts and memories in adolescents with major depressive disorder or post-traumatic stress disorder. *British Journal of Clinical Psychology, 63*, 543–557. <https://doi.org/10.1111/bjc.12488>