Accepted: 13 January 2017

DOI: 10.1111/jar.12335

ORIGINAL ARTICLE

WILEY JARID Journal of Applied Research in Intellectual Disabilities bild

Eye movement desensitisation and reprocessing therapy for posttraumatic stress disorder in a child and an adolescent with mild to borderline intellectual disability: A multiple baseline across subjects study

Liesbeth Mevissen[1] | Robert Didden[2] | Hubert Korzilius[3] | Ad de Jongh[4,5]

[1]Department Kinnik, Mental Health Organisation (MHO) GGZ Friesland, Leeuwarden, the Netherlands

[2]Behavioural Science Institute, Radboud University, Nijmegen, the Netherlands

[3]Institute for Management Research, Radboud University, Nijmegen, the Netherlands

[4]Academic Centre for Dentistry Amsterdam (ACTA), University of Amsterdam and VU University Amsterdam, Amsterdam, the Netherlands

[5]School of Health Sciences, Salford University, Manchester, UK

Correspondence
Liesbeth Mevissen, Mental Health Organisation (MHO) GGZ Friesland, Leeuwarden, the Netherlands.
Emails: lmevissen@gmail.com; liesbeth.mevissen@ggzfriesland.nl

Background: This study explored the effectiveness of eye movement desensitisation and reprocessing (EMDR) therapy for post-traumatic stress disorder (PTSD) in persons with mild to borderline intellectual disability (MBID) using a multiple baseline across subjects design.

Methods: One child and one adolescent with MBID, who met diagnostic criteria for PTSD according to a PTSD clinical interview (i.e., ADIS-C PTSD section), adapted and validated for this target group, were offered four sessions of EMDR. PTSD symptoms were measured before, during and after EMDR, and at six weeks follow-up.

Results: For both participants, number of PTSD symptoms decreased in response to treatment and both no longer met PTSD criteria at post-treatment. This result was maintained at 6-week follow-up.

Conclusions: The results of this study add further support to the notion that EMDR can be an effective treatment for PTSD in children and adolescents with MBID. Replication of this study in larger samples and using a randomized controlled design is warranted.

KEYWORDS

children and adolescents, eye movement desensitization and reprocessing, intellectual disabilities, post-traumatic stress disorder, trauma, treatment

1 | INTRODUCTION

On average, 16% of children exposed to trauma develop post-traumatic stress disorder (PTSD) (Alisic et al., 2014) which may negatively affect their emotional, social, academic and physical development (Alisic, Jongmans, Van Wesel, & Kleber, 2011). Not only the child, also the parents may be affected through concerns for their child's well-being, for example when their child has been exposed to injury, life-threatening illness or sexual abuse (Scheeringa, Meyers, Putnam, & Zeanah, 2015). Probably siblings will also suffer from the consequences of traumatization in their family. Cumulative exposure to traumatic events in children is related to many forms of psychopathology, with the strongest links being with anxiety and depressive disorders (Copeland, Keeler, Angold, & Costello, 2007). Moreover, cumulative childhood trauma predicts symptom complexity in adults (Cloitre et al., 2009). Timely PTSD treatment is of importance considering the personal suffering and the significant costs to society (Priebe et al., 2009).

Children with intellectual disabilities (ID) experience a greater number and range of adverse life events than children without intellectual disabilities (Hatton & Emerson, 2004). Processing adverse events is supposed to be more difficult due to impairments in their cognitive and adaptive skills (Mevissen & De Jongh, 2010). Also early separation from parents through institutionalization or hospital admissions, fewer experiences in managing negative life events successfully and limited availability of a supportive network as well as capacity for gathering social support may make individuals with intellectual disabilities particularly vulnerable for the development of PTSD (Mevissen, Didden, & de Jongh, 2016).

For the treatment of PTSD, trauma-focused cognitive behaviour therapy (CBT) and eye movement desensitisation and reprocessing (EMDR) therapy are the psychotherapies recommended by the World Health Organization (2013). A meta-analysis by Rodenburg, Benjamin, De Roos, Meijer, and Stams (2009), showed that in children (i), application of EMDR therapy resulted in a substantial reduction in PTSD symptoms compared to therapy-as-usual or no-treatment control groups, and (ii) although both CBT and EMDR were effective, EMDR added "a small but significant incremental value" (p. 604).

Eye movement desensitisation and reprocessing therapy is a protocolized, eight-phase psychotherapeutic approach, developed by Shapiro (2001) aimed to resolve symptoms resulting from disturbing and unprocessed life experiences. EMDR Phase I consists of history taking and case formulation, resulting in a treatment plan. In this study, history taking was performed by administering the Adapted ADIS-C PTSD section. In Phase II, the participant is prepared for the trauma work. Skill building and resource development were not applied as this was deemed not necessary (Lindauer, 2015). In the first treatment session, EMDR was introduced followed by Phase III to VII which pertain to the reprocessing of the traumatic memory. Phase III begins with a focus on the traumatic memory itself by asking the participant to bring up the memory and to concentrate on various aspects of it, specifically the most distressing image and the dysfunctional negative cognition (NC) of oneself in relation to the image, as well as the accompanying emotions and the body disturbance that go along with it. A core feature of the procedure is the performance of a working-memory-demanding task, typically, the therapist moving his fingers back and forth in front of the client, asking him or her to track the movements, while concentrating on the trauma memory. Following the image and negative cognition, access to the emotional and somatic aspects of the memory takes place. The therapist then asks the client to follow his or her fingers, while encouraging to "go with" whatever freely arises in the client's awareness. Repeatedly, the client is asked to report about emotional, cognitive, somatic and/or imagistic experiences that arise, until internal disturbances reach a SUDs (Subjective Unit of Disturbances scale) of zero and an adaptive and positive statement about oneself (PC, Positive Cognition) is rated as fully believable on a VoC (Validity of Cognition) scale. Phase VII is dedicated to closing down the session and preparing the client for the interim between sessions. Phase VIII consists of re-evaluation and integration.

The underlying adaptive information processing theory of EMDR therapy asserts that the application of the EMDR procedure induces a physiological condition in which unprocessed memories of traumatic events become linked up with networks that already include adaptive information and skills (Shapiro, 2007). Various experimental studies support this theory by showing that eye movements during recall of aversive memories reduce their vividness and emotionality (De Jongh, Ernst, Marques, & Hornsveld, 2013; Engelhard, van den Hout, & Smeets, 2011). As in children with typical development, in persons with intellectual disabilities, task variations might be necessary, for instance, the therapist putting stickers on his fingers to facilitate tracking, using buzzers to vibrate alternately between the person's right and left hand, administering alternating tones via a headphone or audio speakers placed on either side of the person or tapping on the person's hands or knees (Adler-Tapia & Settle, 2008).

Controlled studies that have assessed the effectiveness of PTSD treatment in people with intellectual disabilities are lacking. Until now, as few as five case reports have been published pertaining to the treatment of post-traumatic stress symptoms in children and adolescents with mild to borderline intellectual disability (MBID) (for an overview, see Mevissen et al. (2016); see also Table 1). In one of these case studies (Stenfert Kroese & Thomas, 2006), imagery rehearsal therapy, a CBT approach, was used to reduce trauma-related nightmares, whereas in the remaining four cases, a broad range of trauma-related symptoms were addressed using EMDR with promising results.

Research investigating the efficacy of EMDR in children with MBID has been particularly hindered by the lack of valid and reliable instruments to assess PTSD in this target group. In three of the four aforementioned EMDR case studies (Giltaij, 2004; Mevissen, Lievegoed, & De Jongh, 2011), results were based on only caregiver reports regarding problem behaviours that resembled post-traumatic stress symptoms. The Impact of Event Scale (IES), a screening self-report questionnaire to index subjective stress caused by traumatic events, used by Rodenburg, Benjamin, Meijer et al. (2009) to measure PTSD symptoms, was not validated for persons with intellectual disabilities at that time. Therefore, to fill this gap in diagnostic accuracy, the "Adapted ADIS-C PTSD section" was developed, a PTSD clinical interview that was adapted for use in children and adolescents with MBID aged 6 to 18 years, and which has shown good to excellent psychometric properties (Mevissen, Barnhoorn, Didden, Korzilius, & De Jongh, 2014; Mevissen, Didden, Korzilius, & De Jongh, 2016). As a result, research on PTSD and its treatment in children with MBID can be improved because PTSD symptoms, and therefore treatment results, can be measured in a standardized and reliable way. Another problem with the case studies on PTSD treatment in patients with MBID (see Table 1) is that internal validity has been impaired by the lack of control for natural recovery in the course of time given that before the start of treatment, the measurements were taken only once. Moreover, in none of the case reports measures to achieve reliability of recording were specified. Finally, in two of the case studies (Giltaij, 2004; Mevissen et al., 2011), there were no follow-up assessments.

This study, therefore, aimed to examine the effectiveness of EMDR regarding symptoms of PTSD in one child, and one adolescent, with MBID. The aforementioned limitations were taken into account (i) using the Adapted ADIS-C-PTSD section as a valid and reliable PTSD instrument, (ii) collecting data using a multiple baseline across subjects design, (iii) conducting video analyses to assess reliability of recording and (iv) assessing maintenance of outcomes at 6-week follow-up.

2 | METHOD

The study is part of a broader research project which received ethical approval of the Ethical Committee of the Department of Social Sciences of the Radboud University, Nijmegen, the Netherlands (ESCW2014-1003-211).

TABLE 1 Treatment of post-traumatic stress disorder in children and adolescents with mild to borderline intellectual disability: 5 case reports

Authors/Year	Treatment method	Number of sessions	Age in years	Male/ Female	Level of intellectual disabilities/comorbidity	Trauma's/life events	Results
Stenfert Kroese and Thomas (2006)	CBT (Imagery Rehearsal Therapy)	3	18 years	F	Mild	Sexual, physical and emotional abuse	Nightmares ceased, improved self-confidence
Giltaij (2004)	Eye movement desensitisation and reprocessing (EMDR)	12	16 years	F	Mild/nearly blind; epilepsy; brain damage	Witnessed mother being threatened with knives	Significant decrease of self -reported problem score (9→1) (complaints: fears/avoidance, sleep problems, demanding behaviour)
Rodenburg, Benjamin, Meijer et al. (2009)	EMDR	5	18 years	M	Mild/epilepsy	Repeated physical abuse, being threatened with knife by his father, and parents divorced	Significant decrease of Impact of Event Scale score (complaints: flash backs, sleep problems, frequent nightmares, suicidal thoughts)
Mevissen et al. (2011)	EMDR	5	11 years	M	Mild	Witnessing car fire, being threatened, witnessing domestic violence, parents divorced and outplacements	Absence of pre-treatment symptoms (fears, compulsive behaviour, obsessions, hearing voices, difficulties distinguishing reality from fantasy, avoiding to sleep at parental home). At follow-up, medication was faded out.
Mevissen et al. (2011)	EMDR	3	7 years	F	Mild/autism	Two dear family members died, suicide attempt of father's best friend and serious illness of school friend	Disturbing thoughts disappeared, more often cheerful, significant decrease of anger outbursts, more relaxed.

2.1 | Participants

Participants were William, a 10-year-old boy (mild intellectual disabilities, IQ 66), and Rose, an 18-year-old girl (mild intellectual disabilities, IQ 67), both living in a single-parent family (William and Rose are not the real names of the participants). Emotional and behavioural problems were the reason for referral to an outpatient centre for child and adolescent psychiatry in the eastern part of the Netherlands. William showed aggressive behaviour, he was restless and unable to build relationships with peers. His behavioural problems were supposed to be related to a long period of emotional and physical abuse by a stepparent. Rose had completed CBT treatment for emotional and behavioural problems at the same outpatient centre 2 years earlier after which she functioned well during about 1 year. Then, she gave birth to a child after which serious conflicts with youth welfare developed. This impeded a training, delivered by a service centre specialized in the care for youth with MBID, aimed to help her being a good-enough mother. The service centre advised her to undergo treatment of her emotion regulation problems which were considered to be a risk factor for her baby's development.

Participants met PTSD DSM-IV and DSM-5 criteria according to the child version of the Adapted ADIS-C PTSD section, a clinical interview for assessing PTSD according to DSM-IV and DSM-5 criteria in children with MBID, aged 6-18 years (Mevissen et al., 2014, 2016).

2.2 | Design

Data were collected within a (non-concurrent) multiple baseline across subjects' design (Kazdin, 2011). According to a planned procedure, the two participants were randomly assigned to different numbers of baseline and post-treatment measurements. Six weeks after the last post-treatment measurement, a follow-up was conducted. During treatment, PTSD symptoms were measured immediately prior to each session. Baseline measurements started at different time points. The time between the first and second baseline measurement was one week for William and five weeks for Rose. EMDR was introduced after three and four baseline measurements, respectively. From the second baseline until the last post-treatment session, measurements were carried out weekly. William was assessed on PTSD symptoms nine times instead of ten times because EMDR was completed after three instead of four sessions as all unprocessed memories had been treated at that time (also see Table 2).

By randomizing participants across different baseline lengths, the effect of time and the start of therapy were separated (Kazdin, 2011). The effect of the therapy was expected to become visible shortly after the start of treatment, and to hold on at post-treatment and at follow-up.

2.3 | Procedure

Both participants were recruited during the final stages of a study aimed to validate the Adapted ADIS-C PTSD section, a clinical interview for assessing PTSD according to DSM-IV and DSM-5 criteria in

TABLE 2 Multiple baseline design

Patient	Measurements
William	t1/B B B B/T T T T P P FU
Rose	t1/B B B/T T T T P P P FU

t1/B = first baseline measurement (post-traumatic stress disorder is diagnosed); B = baseline; B/T = last baseline measurement prior to the first treatment session; P = post-treatment; FU = 6-week follow-up.

children with MBID, aged 6-18 years (Mevissen et al., 2014, 2016). Eligible for the current study were children with MBID, aged 6-18 years who met PTSD DSM-IV and/or DSM-5 criteria according to the interview. Comorbid autism spectrum disorder was an exclusion criterion resulting in William and Rose as the only children/adolescents to whom the EMDR protocol was administered. Both participants and their parent(s) were informed about PTSD and EMDR therapy and about the aims of the study. They gave their written consent to participate.

Trauma history was taken at the first baseline measurement by administration of the Adapted ADIS-C PTSD section. The traumatic events to which the participant had been exposed were visualized on the timeline that is an integral part of the interview. It is conceivable that during the course of the study, the participant would be exposed to new potentially traumatic events, influencing PTSD symptom outcomes. Therefore, at each measurement point, the participant was asked as to whether new potentially traumatic events had occurred.

All measurements were videotaped for the purpose of assessing inter-rater reliability of recording.

2.4 | Treatment

EMDR therapy comprised a maximum of four 60-min sessions. No subsequent treatment session was offered in case none of the participants' timeline events elicited any disturbance when bringing up the corresponding memories, meaning that all traumatic memories had successfully been processed. For William, EMDR was administered by the first author, a licensed clinical psychologist and EMDR Europe-accredited consultant. Rose was treated by a psychologist who had been trained in EMDR therapy at an advanced level, and who was supervised by the first author. Supervision consisted of agreement beforehand on the case conceptualization, and provision of feedback on applying the EMDR protocol on the first targeted memory (also see Introduction).

In this study, the Dutch protocol for children and adolescents (De Roos, Beer, de Jongh, & ten Broeke, 2012) was applied. This protocol consists of several age categories instructing the therapist as to how to activate the trauma memory, and to support the participant during the desensitization and reprocessing phase in a way that is adjusted to the participant's chronological age. In this study, instructions were given at a difficulty level which corresponded with the estimated mental age of both participants with mild intellectual disabilities. Ten-year-old William was instructed comparable to a seven-year-old child and eighteen-year-old Rose at the level of a ten-year-old child. The validity of the preferred positive cognition (VOC) was found by asking to point to a number on a visual representation of a 1 (completely false) to 7 (completely true) scale to "show how true it feels deep down." A similar visual representation of a number scale, 0 to 10, was used to obtain the subjective unit of distress (SUD) rating (0—no distress and 10—highest distress). At both ends and in the middle of the VOC and SUD rating scales, additional visual support was offered by means of a drawing representing the feeling and its intensity. Visual analog scales, although not validated, are frequently administered in people with intellectual disabilities whereby a creative use is recommended (Emerson et al., 2012). Different from most seven-year-olds, for William, rating the VOC had to be omitted because he did not understand the instruction. No further adaptations were needed. Both participants were able to follow the therapist's finger with their eyes. Therefore for both of them, the standard eye movements were used as a working-memory-demanding task.

2.5 | Adapted ADIS-C PTSD section

The Adapted ADIS-C PTSD section (Mevissen et al., 2014, 2016) was used for diagnosing PTSD according to DSM-IV and DSM-5 criteria. The interview was adapted for the use in children with MBID and used simplified language and visual cues. It consisted of an event and a symptom section with answer categories "yes," "no" or "other." The event section (26 items) included type A trauma events as well as life events and had one open-ended question. Events the child had been exposed to were visualized on a timeline to help the child keep in mind the events when symptoms were asked for. Once the timeline was completed, the child would be prompted to point out which event actually was the worst to think of. The symptom section (30 items) included symptoms originating from PTSD measures that were used in children without intellectual disabilities. Finally, a thermometer card was used to support the child to indicate the interference score (0 = totally not, 8 = very much) representing the subjective level of daily life impairment. The Adapted ADIS-C PTSD section appeared feasible and child-friendly (Mevissen et al., 2014), had good convergent validity and excellent inter-rater reliability (child version: κ = .81, range: .38-1, M = .81, SD = 0.16) (Mevissen et al., 2016). The Adapted ADIS-C PTSD section was administered by a trained psychologist.

2.6 | Inter-rater reliability

Five of nineteen (26%) randomly chosen PTSD symptom interviews consisting of 30 questions per interview were independently scored by a second observer on a question-by-question basis. Mean percentage of agreement was 95.3 (SD = 21.2; range 0-100), indicating excellent inter-rater reliability of recording (Cicchetti, 1994).

2.7 | Evaluation

Total number of PTSD symptoms were plotted on a graphical display. Data were interpreted by visual inspection, following the guidelines of Lane and Gast (2014) for assessing trend, level and stability of data

within and between conditions. Results with regard to the information as to whether or not PTSD criteria were met at post-treatment and at follow-up were included in a table.

3 | RESULTS

3.1 | William

3.1.1 | (First) Baseline outcomes (adapted ADIS-C PTSD section)

Trauma exposure

William's timeline displayed the following potentially traumatic events: parents divorced (age 2), got lost (age 5), stepparent did not allow him to play outside the home/no food (from age 6), pushed by a peer resulting in a wounded leg (age 7), grabbed by the throat, kicked and beaten in the face by stepparent (age 8), witnessed (parental) domestic violence (age 9), placement at a special school (age 9), death of his cat (age 9), fire nearby (age 10), bullied at school (age 10) and watching war on television (from age 4 until present). The actually worst event was the physical abuse by his stepparent at age 8.

PTSD symptoms

William reported symptoms of re-experiencing (often thinking of the events unintentionally, having nightmares, awful physical feelings when thinking of the events), avoidance (trying not to think of the events, avoiding certain people and situations), hyperarousal (sleeping problems, outbursts of anger, difficulties concentrating, hypervigilant, easily startled) and negative thoughts and feelings (feeling lonely, more difficult to trust other people, often bad feelings). The interference score was 8.

PTSD diagnosis

The outcomes of the Adapted ADIS-C section PTSD resulted in a PTSD diagnosis according to both DSM-IV-TR and DSM-5.

3.1.2 | EMDR therapy

For each timeline event, William rated his actual subjective level of disturbance that was elicited by thinking of the event, on a scale reaching from zero (no disturbance) to ten (highest). The memories of the events in which his stepparent was involved (not allowed to play outside, physical abuse and parental domestic violence) bothered him most (10) and were treated first. The consecutive target images were as follows: "Stepparent hits me, it hurts," "Me, alone in my bedroom, my friends playing football outside" and "Stepparent grasps me by my throat." Within two sessions, these memories were processed (e.g., target images SUD = 0, VOC = 7), and a future template was installed successfully (meeting his stepparent, who lived in the same village: "Me and my mother at the pay desk, stepparent behind us, I feel calm"). At the start of the third EMDR session, William was asked to carefully check all timeline events one by one. He reported that he was unable to recall a memory that elicited any distress. Considering that no unprocessed memories were present, EMDR therapy was terminated.

3.1.3 | Course of PTSD symptoms

Figure 1 shows the course of the total number of PTSD symptoms from the first baseline measurement to the 6-week follow-up. At first glance, the baseline measurements seem to show a slightly decreasing trend in the data. However, when applying the guidelines of Lane and Gast (2014) for assessing within-condition stability of data (criterion

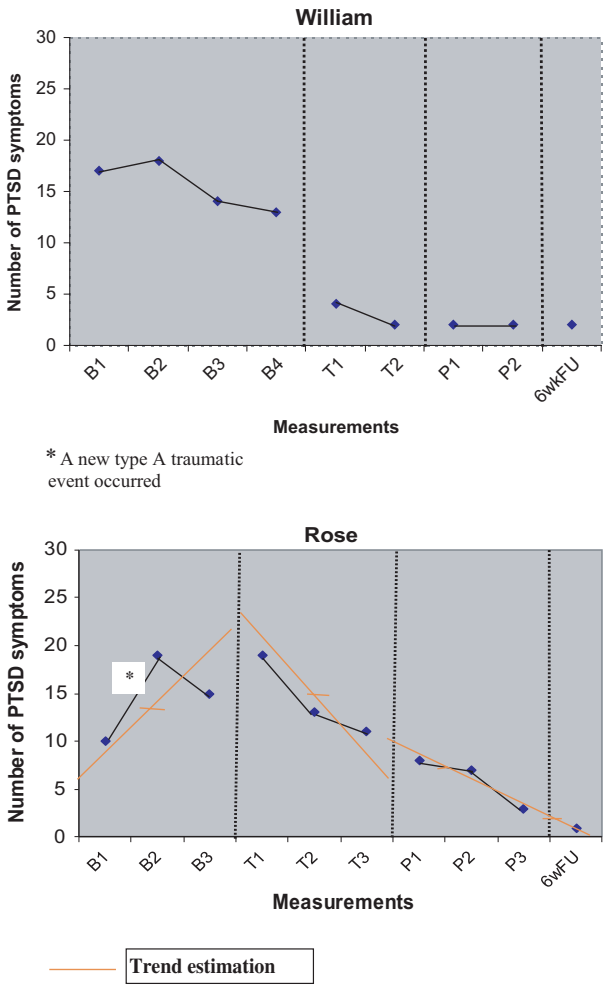

FIGURE 1 Total number of post-traumatic stress disorder (PTSD) symptoms (max = 30) for participants. Scores across baseline, treatment, post-treatment and follow-up [phases divided by vertical lines]

TABLE 3 Post-traumatic stress disorder (PTSD) diagnoses before treatment, after treatment and at follow-up

Participant	PTSD algorithm	Baseline 1	P1	Follow-up
William	DSM-IV-TR	Yes	No	No
	DSM-5	Yes	No	No
Rose	DSM-IV-TR	Yes	No	No
	DSM-5	Yes	No	No

stability envelope ≥80% within + or − 25% of median), the baseline (B1 = 17, B2 = 18, B3 = 14, B4 = 13) can be considered as "stable" (100% within 15.5 + 3.9 = 19.4 and 15.5-3.9 = 11.6).

Mean number of PTSD symptoms in the different phases were as follows: 15.5 [range 13-18] (baseline), 3 [range 2-4] (treatment) and 2 [range 2-2] (post-treatment and follow-up). After the first treatment session, a substantial decrease in total number of PTSD symptoms had occurred. Results remained stable at post-treatment and were maintained at 6-week follow-up.

3.1.4 | PTSD diagnosis

At post-treatment, for William, PTSD criteria according to DSM-IV and DSM-5 were no longer met. This result was maintained at 6-week follow-up (also see Table 3).

3.2 | Rose

3.2.1 | (First) Baseline outcomes (adapted ADIS-C PTSD section)

Trauma exposure

Rose's timeline displayed the following potentially traumatic events: her father was repeatedly imprisoned for addiction-related crimes (from birth until present), for the first time her father left the house (age 2.5), was bullied by peers (age 8-12), left the country to live abroad temporally (age 12), witnessed domestic violence (age 12), her father took all the money and disappeared (age 12), serious illness of sibling (age 12), taken by police and questioned (age 14), witnessed a big fire nearby (age 14), a dear family member died (age 16), she met father in court (age 17), youth welfare took her child from her and forced her to accept help (age 17) and a dear friend was threatened with dead (age 18). The actually worst event was youth welfare taking her child from her at age 17.

PTSD symptoms

Rose reported symptoms of re-experiencing (feeling as if it could happen again right now, awful physical feelings when thinking of the events), avoidance (trying not to think of the events, does not remember some parts of the events, keeps feelings to herself), hyperarousal (outbursts of anger, destroys things, hypervigilant), and negative thoughts and feelings (more difficult to trust other people). The interference score was 6.

PTSD diagnosis

The outcomes of the Adapted ADIS-C section PTSD resulted in a PTSD diagnosis according to criteria of both DSM-IV-TR and DSM-5.

3.2.2 | EMDR therapy

Between the first and second baseline measurement, Rose had been exposed to a new (DSM-IV-TR) type A trauma event. She was told that her beloved grandma was terminally ill. This event was added to her timeline. At the start of EMDR therapy, Rose was still upset and pre-occupied by her grandma's nearing death. This timeline event actually elicited the highest subjective level of disturbance (i.e., 10). The distress linked with memories related to her child, her father and the death of a beloved family member was very high as well (i.e., 9). A central theme of these events is the experience of loss or threatened loss by death, serious illness or being abandoned. The consecutive target images which were brought up in the first session were "Grandma putting a farewell letter in a drawer," "X (= close family member) in a coffin, I close the lid," and "Y (= close family member) in a hospital bed, screaming in pain." The target images, belonging to the memories that were treated in the second EMDR session, were "Me in the courtroom, sitting alone, it's black around me" (the judge assigned the custody of her child to youth welfare), "I'm sitting in the living room, he drives away" (father leaves the family) and "The policeman is questioning me." In session 3, a memory of witnessing a parental row was treated as well as a memory of being bullied by peers for giving birth to a child at such a young age. The fourth session was terminated soon. The only unprocessed memory that could be detected and subsequently treated was about a violent row between her and her mother in relationship with the care about her child.

3.2.3 | Course of PTSD symptoms

Figure 1 shows the course of the PTSD symptoms from the first baseline measurement to the 6-week follow-up. During the baseline phase, the total number of PTSD symptoms substantially increased. In that period, Rose had been exposed to a new type A traumatic event. Mean number of PTSD symptoms in the different phases were as follows: 14.7 [range 10-19] (baseline), 14.5 [range 11-19] (treatment) and 4.8 [range 1-8] (post-treatment and follow-up).

According to the guidelines of Lane and Gast (2014), the split-middle method of trend estimation was used. First half, second half and mid-rate for each condition were 10, 15 and 12.5 (baseline); 19, 11 and 14.5 (treatment); and 7.5, 2 and 4.75 (post-treatment and follow-up), respectively. The results indicate a deteriorating trend in participant's functioning during baseline (explained by the occurrence of a new type A traumatic event), a strong improving trend during treatment, and a less stronger improving trend during post-treatment and follow-up. Figure 1 shows the trend lines within the different phases.

3.2.4 | PTSD diagnosis

At post-treatment, for Rose, PTSD criteria according to DSM-IV and DSM-5 were no longer met. This result was maintained at 6-week follow-up (also see Table 3).

4 | DISCUSSION

As far as we know, this study is the first to examine the effectiveness of EMDR therapy in patients with MBID and PTSD using a multiple baseline design. The results suggest that EMDR therapy is effective for PTSD treatment in this target group. This study extends the literature

on the effectiveness of EMDR therapy in patients with MBID and PTSD in that a design was used that controlled for natural recovery in the course of time, and in which the PTSD diagnoses and the course of PTSD symptoms were measured with a valid and reliable PTSD clinical interview adapted for this target group (i.e., Adapted ADIS-C PTSD section (Mevissen et al., 2014, 2016)). Other improvements were that inter-rater reliability and follow-up measurements were taken.

In both participants, the number of PTSD symptoms decreased as a result of EMDR therapy. Both no longer met PTSD criteria at post-treatment, a result which was maintained at 6-week follow-up. EMDR therapy was adapted to the participant's mental age by following the mental age-related instructions of the Dutch standard EMDR protocol for children and adolescents without intellectual disability (De Roos et al., 2012) with no more than a single minor adaptation (i.e., omitting the VOC in William's treatment). The findings of the present study underpin the outcomes of the previously published case studies on EMDR and on the feasibility and effectiveness of this therapy in children and adolescents with PTSD and MBID (Giltaij, 2004; Mevissen et al., 2011; Rodenburg, Benjamin, Meijer et al. (2009)). EMDR therapy may be especially applicable in individuals with intellectual disabilities as it does not involve (i) detailed descriptions of the events, (ii) direct challenging of beliefs, (iii) prolonged exposure and (iv) daily homework as opposed to trauma-focussed CBT. The results of the current study also are in line with the WHO guidelines (WHO 2013) recommending EMDR, besides trauma-focussed CBT, as evidence-based practice in the treatment of PTSD in children and adolescents.

With regard to the course of PTSD symptoms (see Figure 1), it is remarkable that during the baseline period, Rose showed a substantial increase in number of PTSD symptoms. Unlike William, she had been exposed to a new DSM-IV type A trauma event during baseline. This deterioration in functioning is in line with the literature on the cumulative effect of trauma, indicating that a higher number of traumatic event types as well as repeated exposure to similar traumatic experiences is related to an increase of PTSD symptom severity (Wilker et al., 2015). It is assumed that repeated exposure to disturbing memories of an event might strengthen peoples' fear memories of that event (Wilker et al., 2015). As Rose had a history of other serious illness and death-related events, we may assume that the experience of a similar new potentially traumatic event might have caused the increase of the total number of PTSD symptoms that was observed during baseline.

Part of the PTSD diagnosis was the interference score representing the subjective level of daily life impairment. After treatment both participants indicated a "0" on the thermometer card, meaning that in daily life, they no longer felt impaired by the traumatic events they had experienced. Based on anecdotical information only, caregivers for example noticed that after treatment, their child was in a better mood, was able to talk about feelings and took up all kinds of activities. Parenting no longer felt as a heavy burden.

During treatment, avoidance behaviours may occur. It is part of the therapist's training to recognize and break through these behaviours. For both participants in our study, however, EMDR therapy went smoothly; they were both able to handle the confrontation with their negative memories. This is supposed to be facilitated not only by a directive and supportive attitude of the therapist but certainly by the therapeutic method too. Indeed, exposure to the most distressing aspects of the traumatic memories lasts only for short moments and is immediately followed by desensitisation, eliciting feelings of relief within a short period of time which is an important reason why EMDR is known to be child-friendly.

4.1 | Strengths and limitations

The current study has several strengths. First, data were collected using a multiple baseline across subject design, which has the advantage of controlling for natural recovery in the course of time. Secondly, we used a valid and reliable PTSD interview adapted for children and adolescents with MBID for the use of history taking, establishing a PTSD diagnosis and the evaluation of the intervention (Mevissen et al., 2014, 2016). Child measurements were used to diagnose PTSD which can be viewed as a strength given that caregivers are only partially able to assess the inner world and perceptions of their trauma-exposed child. A final extension of the literature is that in the current study, an excellent inter-rater reliability was assessed. Considering the PTSD interview, an advantage compared to the PTSD clinical interviews for people without intellectual disability is that persons' whole trauma history is visualized on a timeline. Moreover, the timeline not only plays a role in assessing PTSD but also serves as an instrument to decide about the sequence of targeting memories in EMDR therapy, and thereby enhancing standardisation of EMDR's history taking. Finally, in the present study at each measurement (i.e., immediately prior to a session), the participant was asked for the occurrence of new potentially traumatic events leading to an update of the treatment plan if required. The present study also has several limitations. One limitation is the sample size (n = 2). Although two baselines are considered minimum for a multiple baseline design (Kazdin, 2011), a design consisting of three or more baselines would have offered opportunities to calculate effect sizes developed for N = 1 studies (see Parker, Vannest, & Davis, 2011). Another limitation is the lack of measurements concerning treatment fidelity of EMDR therapy. Finally, it must be recognized that the follow-up assessment was taken at only six weeks post-treatment. As a consequence, conclusions regarding the sustainability of treatment gains over a longer period are limited.

5 | CONCLUDING COMMENTS AND FUTURE DIRECTIONS

Besides other types of trauma, both participants in the present study had been exposed to domestic violence, one of the most common forms of child maltreatment putting children at risk for the development of other mental health problems besides PTSD, such as anxiety disorders, mood disorders, reactive attachment disorder and conduct disorder (Lindauer, 2015). Child maltreatment also predicts adult delinquent behaviour (Van der Put & De Ruiter, 2016). This emphasizes the importance of timely PTSD treatment and the need of further research to establish a firm evidence base for EMDR therapy as an

effective treatment method for PTSD in children and adolescents with MBID. Replication of the present study in larger samples and implementation of randomized controlled trials are certainly warranted.

CONFLICT OF INTERESTS

No conflicts declared.

REFERENCES

Adler-Tapia, R., & Settle, C. (2008). *EMDR and the art of psychotherapy with children*. New York, NY: Springer Publishing Company.

Alisic, E., Jongmans, M., Van Wesel, F., & Kleber, R. (2011). Building child trauma theory from longitudinal studies: A meta-analysis. *Clinical Psychology Review*, *31*, 736–747.

Alisic, E., Zalta, A., Van Wesel, F., Larsen, S., Hafstad, G., Hassanpour, K., & Smid, G. (2014). Rates of post-traumatic stress disorder in trauma-exposed children and adolescents: Meta-analysis. *The British Journal of Psychiatry*, *204*, 335–340.

Cicchetti, D. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment*, *6*, 284–290.

Cloitre, M., Stolbach, B., Herman, J., van der Kolk, B., Pynoos, R., Wang, J., & Petkova, E. (2009). A developmental approach to Complex PTSD. Childhood and adult cumulative trauma as predictors of symptom complexity. *Journal of Traumatic Stress*, *22*, 399–408.

Copeland, W., Keeler, G., Angold, A., & Costello, E. (2007). Traumatic events and posttraumatic stress in childhood. *Archives of General Psychiatry*, *64*, 577–584.

De Jongh, A., Ernst, R., Marques, L., & Hornsveld, H. (2013). The impact of eye movements and tones on disturbing memories of patients with PTSD and other mental disorders. *Journal of Behavior Therapy and Experimental Psychiatry*, *44*, 447–483.

De Roos, R., Beer, R., de Jongh, A., & ten Broeke, E. (2012). *EMDR protocol voor kinderen en jongeren tot 18 jaar. [EMDR protocol for children and youth until age 18 years]*. Amsterdam: Pearson.

Emerson, E., Dickson, K., Gone, R., Hatton, C., Bromley, J., & Caine, A. (2012). *Clinical psychology and people with intellectual disabilities*. Chichester: John Wiley & Sons.

Engelhard, I., van den Hout, M., & Smeets, M. (2011). Taxing working memory reduces vividness and emotionality of images about the Queen's Day tragedy. *Journal of Behavior Therapy and Experimental Psychiatry*, *42*, 32–37.

Giltaij, H. (2004). Alsof er een stofzuiger door mijn hoofd is gegaan. EMDR bij mensen met een visuele en verstandelijke beperking. [As if a vacuum cleaner went through my head. EMDR in people with visual and intellectual disabilities]. *Tijdschrift voor Kinder- & Jeugdpsychotherapie [Journal of Child & Adolescentl Psychotherapy]*, *3*, 81–97.

Hatton, C., & Emerson, E. (2004). The relationship between life events and psychopathology amongst children with intellectual disabilities. *Journal of Applied Research in Intellectual Disabilities*, *17*, 109–117.

Kazdin, A. (2011) *Single-case research designs. Methods for clinical and applied settings*, 2nd ed.. New York/Oxford: Oxford University Press.

Lane, J., & Gast, D. (2014). Visual analysis in single case experimental design studies: Brief review and guidelines. *Neuropsychological Rehabilitation*, *24*, 445–463.

Lindauer, R. (2015). Trauma treatment for children and adolescents: Stabilizing or trauma-focused therapy? *European Journal of Psychotraumatology*, *6*, 27630.

Mevissen, L., Barnhoorn, E., Didden, R., Korzilius, H., & De Jongh, A. (2014). Clinical assessment of PTSD in children with mild to borderline intellectual disabilities: A pilot study. *Developmental Neurorehabilitation*, *17*, 16–23.

Mevissen, L., & De Jongh, A. (2010). PTSD and its treatment in people with intellectual disabilities. *Clinical Psychology Review*, *30*, 308–316.

Mevissen, L., Didden, R., & de Jongh, A. (2016). Assessment and treatment of PTSD in people with intellectual disabilities. In C. Martin, V. Preedy & V. Patel (Eds.), *Comprehensive guide to post-traumatic stress disorder* (pp. 281–299). Switzerland: Springer.

Mevissen, L., Didden, R., Korzilius, H., & De Jongh, A. (2016). Assessment of PTSD in children with mild to borderline intellectual disabilities. *European Journal of Psychotraumatology*, *7*, 29786.

Mevissen, L., Lievegoed, R., & De Jongh, A. (2011). EMDR treatment in people with mild ID and PTSD: 4 cases. *Psychiatric Quarterly*, *82*, 43–57.

Parker, R., Vannest, K., & Davis, J. (2011). Effect size in single-case research: A review of nine nonoverlap techniques. *Behavior Modification*, *35*, 303–322.

Priebe, S., Mtanov, A., Gavrilović, J., Crone, P., Ljubotina, D., Knežević, G., … Schützwohl, M. (2009). Consequences of untreated posttraumatic stress disorder following war in former Yugoslavia: Morbidity, subjective quality of life and care costs. *Croatian Medical Journal*, *50*, 465–475.

Rodenburg, R., Benjamin, A., De Roos, C., Meijer, A., & Stams, G. (2009). Efficacy of EMDR in children: A meta-analyses. *Clinical Psychology Review*, *29*, 599–606.

Rodenburg, R., Benjamin, A., Meijer, A., & Jongeneel, R. (2009). Eye movement desensitization and reprocessing in an adolescent with epilepsy and mild intellectual disability. *Epilepsy & Behavior*, *16*, 175–180.

Scheeringa, M., Meyers, L., Putnam, F., & Zeanah, C. (2015). Maternal factors as moderators or mediators of PTSD symptoms in very young children: A two-year prospective study. *Journal of Family Violence*, *30*, 633–642.

Shapiro, F. (2001). *Eye movement desensitization and reprocessing: Basic principles, protocols and procedures*, 2nd ed.. New York, NY: Guilford Press.

Shapiro, F. (2007). EMDR and case conceptualization from an adaptive information processing perspective. In: F. Shapiro, F. W. Kaslow & L. Maxfield (Eds.), *Handbook of EMDR and family therapy processes* (pp. 3–34). Hoboken, New York: John Wiley & Sons Inc.

Stenfert Kroese, B., & Thomas, G. (2006). Treating chronic nightmares of sexual assault survivors with an intellectual disability-two descriptive case studies. *Journal of Applied Research in Intellectual Disabilities*, *19*, 75–80.

Van der Put, C., & De Ruiter, C. (2016). Child maltreatment victimization by type in relation to criminal recidivism in juvenile offenders. *BMC Psychiatry*, *16*, 1.

Wilker, S., Pfeiffer, A., Kolassa, S., Koslowski, D., Elberts, T., & Kolassa, I. (2015). How to qualify exposure to traumatic stress? Reliability and predictive validity of measures for cumulative trauma exposure in a post-conflict situation *European Journal of Psychotraumatology*, *6*, 28306.

World Health Organization (2013). *Guidelines for the management of conditions specifically related to stress*. Geneva, Switzerland: World Health Organization.

How to cite this article: Mevissen L, Didden R, Korzilius H, de Jongh A. Eye movement desensitisation and reprocessing therapy for posttraumatic stress disorder in a child and an adolescent with mild to borderline intellectual disability: A multiple baseline across subjects study. *J Appl Res Intellect Disabil*. 2017;00:1–8.