



Treating trauma in addiction with EMDR: A pilot study

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Table 1. Characteristics of the TAU and TAU + EMDR Groups.

		Frequency per group	
		TAU	TAU + EMDR
Trauma causing PTSD	Sexual abuse	4	3
	Physical abuse or Physical threatening or Negligence	2	2
	Emotional abuse	0	1
Gender	Male	0	0
	Female	6	6
Living status	With partner and child(ren)	0	1
	With partner	2	3
	Alone or independently	4	2
	In sheltered housing	0	1
	Homeless	0	0
Substance dependence	Alcohol	4	1
	Cannabis	1	1
	Poly-toxicomania	1	4
Substitution Medication	Methadone	4	4
	<u>Buprenorphine</u> Subutex	1	1
	Other	1	1

Table 2. Baseline Measures Description of the TAU and TAU + EMDR Groups by Questionnaire Data.

	TAU		TAU + EMDR		Test Value	p	Effect size	Confidence Interval
	(N=6)	(N=6)	(N=6)	(N=6)				
	M	SD	M	SD				
Age (years)	29.33	2.94	29.67	3.14	<1	.853	<u>0.004</u>	<u>[-3.58, 4.25]</u>
Duration of addiction symptoms (years)	11.83	3.06	11.17	3.06	<1	.714	<u>0.014</u>	<u>[-4.60, 3.27]</u>
Duration of PTSD symptoms (years)	18	5.40	21.33	5.57	1.11	.318	<u>0.1</u>	<u>[-3.73, 10.39]</u>
Duration of substitution treatment (months)	2.58	1.43	2.47	1.47	<1	.892	<u>0.002</u>	<u>[-1.98, 1.75]</u>
Number of detoxification treatments	1	-	2	-	<1	.549	<u>0.037</u>	<u>[-0.43, 0.76]</u>
Number of rehabilitation treatments	0	-	0	-	-	-	=	=
PCL-S	54.67	7.53	59.83	7.25	1.47	.254	<u>0.128</u>	<u>[-4.34, 14.67]</u>
ASI	5.50	2.16	5.33	1.37	<1	.876	<u>0.003</u>	<u>[-2.50, 2.16]</u>
BDI-2	15.5	5.86	17.83	4.4	<1	.453	<u>0.057</u>	<u>[-4.33, 9.00]</u>
STAI-state	54.17	5.5	61	10.08	2.11	.177	<u>0.174</u>	<u>[-3.64, 17.31]</u>
SEI	27.5	4.76	21.33	6.95	3.21	.103	<u>0.243</u>	<u>[-13.83, 1.50]</u>
TAS-20	43.5	6.95	51	14.42	1.32	.278	<u>0.116</u>	<u>[-7.06, 22.06]</u>

Note. TAU: Treatment As Usual; EMDR: Eye-Movement Desensitization and Reprocessing; Age: age in years; Detoxification: number of previous inpatient detoxification treatments; Rehabilitation: number of previous rehabilitation programs; ASI: Addiction Severity Index; PCL-S: Posttraumatic Checklist Specific; BDI: Beck Depression Inventory; STAI-state: State-Trait Anxiety Inventory Scale State Form; SEI: Self-Esteem Inventory; TAS: Toronto Alexithymia Scale; Treatment: duration of treatment in days; Test-value: Chi2 for categorical variables, *T* for continuous variables.

Table 3. Changes in clinical variables in TAU and TAU+EMDR.

Group	Pre-treatment		Post-treatment		Significance	
	M	SD	M	SD	Test value	Significance
Clinical variables						
PCL-S						
TAU	54.67	7.53	56.5	2.55	-0.945	0.389
TAU + EMDR	59.83	7.25	35.17	13.42	4.211	0.008
ASI						
TAU	5.50	2.16	5.55	2.55	-1	0.363
TAU + EMDR	5.33	1.37	4.17	2.04	1.19	0.287
BDI-2						
TAU	15.5	5.86	17.5	3.78	-2.07	0.093
TAU + EMDR	17.83	4.4	7.83	5.03	4.385	0.007
STAI-state						
TAU	54.17	5.5	56	5.21	-0.43	0.684
TAU + EMDR	61	10.08	42.33	18.57	2.653	0.045
Personality variables						
SEI						
TAU	27.5	4.76	-	-	-	-
TAU+EMDR	21.33	6.95	34	9,32	-3.372	0.012
TAS-20						
TAU	43.5	6.95	-	-	-	-
TAU+EMDR	51	14.42	40,17	6,73	2.312	0.069

Note. TAU: Treatment As Usual; EMDR: Eye-Movement Desensitization and Reprocessing; ASI: Addiction Severity Index; PCL-S: Posttraumatic Checklist Specific; BDI: Beck Depression Inventory; STAI-state: State-Trait Anxiety Inventory Scale State Form; SEI: Self-Esteem Inventory; TAS: Toronto Alexithymia Scale; Test-value: *T* for paired samples.

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Introduction

Post-traumatic stress disorder (PTSD) and substance use disorder (SUD) are both severe disorders causing great psychological distress. According to the current literature, prevalence estimates for PTSD in SUD samples vary from 11% to 41% (Harrington & Newman, 2007; Ouimette, Goodwin, & Brown, 2006; van Dam, Ehring, Vedel, & Emmelkamp, 2010). Despite this variability of prevalence estimates, it is evident that the occurrence of PTSD among SUD-patients is high. A number of authors have suggested a functional relationship between both disorders, which is largely supported by empirical evidence (van Dam, Vedel, Ehring, & Emmelkamp, 2012). The PTSD symptoms negatively affect arousal levels and coping styles that increase the likelihood of substance abuse, substance abuse in turn increases the risk for future traumatic experiences, and withdrawal from substances can trigger PTSD-symptoms (Stewart & Conrod, 2003). This has important clinical implications as patients with concurrent PTSD and SUD show higher symptom severities and worse treatment outcomes compared to patients with either disorder alone (Back, Dansky, Coffey, Saladin, Sonne, & Brady, 2000 ; Najavits, Weiss, & Shaw, 1999; Ouimette, Brown, & Najavits, 1998). Thus, there are compelling reasons to develop and provide effective treatments for these conditions, particularly when they coexist.

Cognitive-behavioral therapy (CBT) is considered to be an evidence-based intervention for SUD. Empirically supported, cognitive-behavioral approaches include training in coping skills, relapse prevention, contingency management, and behavioral therapy (Emmelkamp & Vedel, 2006). Treatment approaches for PTSD are often divided into traditional exposure-based therapies and eye movement desensitization and reprocessing (EMDR). The most recent version of practice guidelines from the International Society for Traumatic Stress Studies cites cognitive-behavioral treatments (including exposure therapy and cognitive-processing therapy) and EMDR as among the PTSD treatments evidencing the

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3 greatest empirical support (Foa, Keane, Friedman, & Cohen, 2009). Recent research
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5 comparing EMDR to traditional exposure-based treatments of trauma has often found EMDR
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7 to be equally or more efficacious (Ironson, Freund, Strauss, & Williams, 2002; Lee, Taylor, &
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9 Drummond, 2006; Seidler & Wagner, 2006).
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12 Eye movement desensitization and reprocessing (EMDR) was initially advanced as a
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14 treatment for Posttraumatic Stress Disorder (PTSD), although its clinical applications have
15
16 been extended considerably over the years. Because empirical evidence suggests that EMDR
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18 is effective in treating PTSD (despite the apparent unimportance of eye movements), more
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20 research is needed to understand the actual mechanism by which it works (Freeman, 2009).
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22 The theory currently used to explain EMDR is called an adaptive information processing
23
24 (AIP) model. The AIP model assumes “an inherent system in all of us that is physiologically
25
26 geared to process information to a state of mental health” (Shapiro, 2002). In EMDR, it is
27
28 presumed that the AIP system leads to reduction in distress and/or negative emotions that can
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30 be stored as a result of upsetting experiences, leading to integrating upsetting information into
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32 a more adaptive, positive state. The AIP system may be hindered or blocked by trauma or
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34 other severe stress but also by the influence of psychoactive drugs. In fact, Shapiro reported
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36 on the use of EMDR in the treatment of addictions early in its development (Shapiro,
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38 Vogelmann-Sine, & Sine, 1994). The possible usefulness of EMDR with these disorders may
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40 also come from the high levels of traumatic exposure and PTSD in this population (Abel &
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42 O’Brien, 2010). However, an apparent gap is the lack of studies investigating the
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44 effectiveness of EMDR in treatment intervention for comorbid SUD and PTSD disorders (van
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46 Dam et al., 2012).
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52 Research on the clinical efficacy of EMDR with addiction is limited. Hase,
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54 Schallmayer, and Sack (2008) published the only randomized control trial found in the
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56 literature. EMDR was implemented with or without “treatment as usual.” Treatment as usual
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3 incorporated detoxification, aspects of motivational interviewing, assessment of social
4 support/adjustment, group treatment, relaxation training, and art therapy. Patients in the
5 experimental group received treatment as usual plus two 1-hr sessions of EMDR that targeted
6 the addiction memory, viewed as the core trigger of relapse. Their findings suggest that
7 EMDR enhanced addiction treatment by decreasing cravings as well as experiences of relapse
8 at 1-and 6-month intervals, respectively, when groups were compared. Marich (2009)
9 discussed a case exploring the use of EMDR with a cross-addicted female with a history of
10 sexual assault, who met criteria for alcohol dependence, cannabis dependence, sedative
11 dependence, and PTSD. The author utilized the EMDR Standard Protocol (Shapiro, 2001) to
12 target shame-based experiences that impeded her recovery. Follow-up interviews indicated
13 that the client had successfully maintained sobriety at 18 months. Abel and O'Brien (2010)
14 also discussed a case study exploring the use of EMDR treatment with a woman who had
15 longstanding comorbid alcohol abuse and PTSD. Two-year follow-up after EMDR showed
16 that the woman was successfully maintaining sobriety and that the PTSD continued in full
17 remission. Another case study investigated the use of EMDR with three patients with severe
18 addiction problems and PTSD, but the study was published in Dutch (van Rens, de Weert-van
19 Oene, van Oosteren, & Rutten, 2012).

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41 The aim of the present study was to use the standard EMDR protocol among substance
42 abuse patients. Unlike certain previous studies (e.g., Hase et al., 2008), we did not adapt the
43 treatment protocol: the target for reprocessing was not the addiction memory but a specific
44 traumatic memory. Therefore, this pilot gives an indication of whether patients with substance
45 abuse disorder and comorbid PTSD can be treated effectively with routine treatments for
46 PTSD as recommended by the guidelines. We also measured addiction severity in order to
47 examine the effect of treatment on the present addiction symptoms. We propose that
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3 reprocessing traumatic memories with EMDR would lead to measurable changes of addiction
4 symptoms. This would be expected to enhance overall treatment outcomes.
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8 9 **Method**

10 *Participants*

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12 Our sample consisted of 12 alcohol and/or drug-addicted women receiving social
13 medical care ~~for addiction problems and addiction treatment~~ within the same clinic (a French
14 departmental Drug Information Centre). ~~About three-quarter of them also received addiction~~
15 ~~treatment.~~ The outpatients were recruited for the present study by the same practitioner
16 qualified in addiction medicine. The inclusion criteria of the selected outpatients were (1)
17 ~~seeking addiction substitution treatment met the substance dependence criteria according to~~
18 ~~the DSM-IV diagnostic features for substance use disorder (APA, 1994),~~ (2) reported having
19 experienced traumatic events, and (3) met the PTSD criteria according to the DSM-IV
20 diagnostic features for PTSD (APA, 1994). Participants with a history of psychosis or organic
21 mental disorder were excluded. Exclusion criteria also included continuous use of heroin or
22 cocaine.
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38 A stratified randomization procedure was applied so that participants were assigned to
39 treatment as usual (TAU) or to TAU plus eight sessions of EMDR (TAU + EMDR). TAU
40 was provided according to the standards of the day care centre. EMDR was provided by the
41 same qualified clinician according to the standard protocol (Shapiro, 2005). After assignment,
42 but prior to treatment, patients gave informed consent and received additional information
43 about the study and EMDR.
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52 *Measures*

53 *Primary outcome measures.*

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3 The PTSD Checklist Specific (PCL-S; Weathers, Litz, Herman, Huska, & Keane,
4 1993) was used to assess the PTSD diagnosis. The PCL is a 17-item self-report checklist of
5 PTSD symptoms based closely on the DSM-IV criteria. The PCL has a variety of purposes,
6 including screening individuals for PTSD, diagnosing PTSD and monitoring symptom
7 changes during and after treatment.
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14 The Addiction Severity Index-Lite (ASI; McLellan, Luborsky, O'Brien, & Woody,
15 1980) is a shortened version of the ASI which is a semi-structured assessment used to
16 evaluate lifetime and recent (past 30 days) problem behaviors. The ASI-Lite is divided into 7
17 separate composite scores: medical, employment, alcohol use, drug use, family, legal, and
18 psychiatric. In the present study, we only focused on alcohol use composite or drug use
19 composite since the aim of our research was only to quantify alcohol and drug consumption
20 before and after intervention. Furthermore, we only used the severity profile scale ranging
21 from 0 to 9 to quantify alcohol and drug consumptions. The ASI-Lite has become a
22 standardized tool used to quantify alcohol and substance consumption.
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34 *Secondary outcome measures.*
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36 Since depression and anxiety are common comorbid conditions in patients suffering
37 from addictive disorders, severity of depression and anxiety were evaluated pre- and post-
38 treatment. Additional focus on other issues that trauma victims report - low self-esteem, guilt,
39 self-blames and difficulty recognizing and expressing emotions - could be useful. Since
40 EMDR might be effective in restoring self-esteem and reducing alexithymia, those variables
41 were evaluated pre - and post-treatment in the TAU+EMDR group.
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49 The Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh,
50 1961) and the State-Trait-Anxiety Inventory (STAI; Spielberger, Gorsuch, & Luschene, 1970)
51 served as measures for depression and anxiety to compare TAU and TAU+EMDR . The BDI
52 is a 21-item self-report questionnaire widely used in research to evaluate cognitive and
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3 vegetative symptoms of depression. The STAI is a widely used 40-item measure with two
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5 scales designed to assess state-anxiety and trait-anxiety.
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8 Self-esteem was measured with Coopersmith's self-esteem inventory (SEI;
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10 Coopersmith, 1981). It comprises 58 unambiguous trait-descriptive sentences to which
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12 subjects respond by indicating whether the sentences describe them or not (either "like me" or
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14 "unlike me"). The SEI has been widely utilized in research and clinical practice, with both
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16 individuals and groups. The validity and reliability of the instrument are well established.
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19 The Toronto Alexithymia Scale (TAS-20; Bagby, Parker, & Taylor, 1994) is a 20-item
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21 self-report measure. Each item is rated on a five-point Likert scale ranging from 1 (strong
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23 disagreement) to 5 (strong agreement). For this scale, a *three-factor* structure was proposed:
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25 *difficulty identifying feelings* (DIF), *difficulty describing feelings* (DDF) and *externally*
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27 *oriented thinking* (EOT).
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29 30 31 32 *Procedure*

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34 After referral to the study, subjects were screened for PTSD with the PCL-S. If PTSD
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36 was diagnosed, and once informed consent was obtained, the remaining baseline
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38 measurements were administered.
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43 *Treatment as Usual.* All outpatients received TAU, which consisted of:

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- clinical interviews with the addiction specialist
 - ~~baclofen administration alcohol-substitute treatment (for the treatment of alcohol craving) (antidepressants, anxiolitics and baclofène) and anxiolitics/antidepressants administration (for reducing anxiety and negative thoughts)~~ prescribed by the addiction specialist

- heroin substitute treatment (methadone and buprenorphine) prescribed by the addiction specialist
- medications for PTSD treatment if required (antidepressants and anxiolytics)
- psycho-educational interviews with social workers for proven positive outcomes
- social and economic support with social workers to cope with the demands of everyday life
- medical care with nurses

EMDR. Subjects were treated with 8 EMDR sessions over 6 months. In the first month patients received 3 EMDR sessions. Thereafter, one monthly EMDR session was provided. After a maximum of eight sessions, post-measurements were taken. During the EMDR therapy treatment as usual was continued. We used the standard eight-phase EMDR procedure as adapted into French (Cornil, 2011). See Shapiro (1995) for a detailed description of the EMDR procedure. The patient is asked to isolate a visual representation (a single picture) of a traumatic memory. The therapist and patient determine what belief statement currently applies to that target image, e.g. "I am powerless". The patient is then asked to form a contradictory belief statement that he would prefer, e.g. "I am now in control". The actual desensitization then starts. Tension is build up by asking the patient to hold the traumatic memory, negative statement, evoked emotion, and area of body where the emotion is experienced while visually focusing on the rapid eye movement of the clinician's fingers. After a set of 25 eye movements, the patient is asked to briefly associate about what comes to his awareness. A new set is then presented. This procedure is repeated until no new associations come to the patient's awareness. The patient is then asked to focus on the target image, after which subjective units of disturbance scores are asked. When this score has gone down to nil, the installation phase is started. The positive contradictory statement is then 'installed'. The

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3 patient is asked how valid the positive cognition feels at that moment (1 ¼ completely untrue
4 to 7 ¼ completely true). Sets are repeated until the positive cognition feels completely true.
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7 Then the patient is asked to perform a body scan (feeling whether there is still any tension in
8 the body) while concentrating on the target image and on the positive cognition. Sets are
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10 repeated until the body feels completely relaxed. The EMDR ends with a positive closure in
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12 which the patient is asked to verbalize the most positive thing that he has learned about
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14 himself in that session with respect to the trauma that was treated.
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21 After each set of 25 eye movements, the therapist asks the patient to rate the strength of both
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23 the distressing memory and their belief in the positive cognition. Other types of bilateral
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25 stimulation can be used, such as tapping or alternating sounds.
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29 30 *Statistical analysis*

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32 Descriptive statistics were produced to describe the characteristics and baseline
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34 variables of the samples. Paired within sample T-tests for means were performed to determine
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36 the statistical significance of the changes in scores on the clinical measures. The baseline
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38 scores on the variables were normally distributed and therefore parametrically analyzed using
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40 T-Tests.
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47 **Results**

48 49 *Characteristics of the samples*

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51 Table 1 displays the characteristics of the TAU and TAU + EMDR groups.
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Baseline

The TAU and TAU+EMDR groups were comparable for age and did not show any statistically significant differences in any of the following variables: duration of addiction symptoms, duration of PTSD symptoms, number of previous detoxification treatments, number of previous rehabilitation treatments and duration of substitution treatment. Both groups were also comparable for all clinical measures: severity of addiction, PTSD, depression and anxiety. Measures of personality (self-esteem and alexithymia) did not show any statistically significant differences (see Table 2).

-Please insert Table 2 here.-

Efficacy

Primary outcome measures.

The hypothesis in this study was that reprocessing traumatic memories with EMDR would lead to measurable changes in addiction symptoms; therefore the most relevant measure for analysis was the PCL-S and ASI. Compared to pretreatment, post-treatment scores of PCL-S revealed a significant improvement in the TAU+EMDR treatment group ($T = 4.211, p = .008$), while no decrease in PTSD symptoms was noticed in the TAU treatment group ($T = -0.945, p = 0.389$) (see Table 3). Between TAU and TAU+EMDR, the difference in PCL-S scores post-treatment was statistically significant ($T = 9.60, p = .011$). Compared to pretreatment, post-treatment scores of ASI revealed that neither the TAU+EMDR treatment group ($T = 1.19, p = 0.287$), nor the TAU treatment group ($T = -1, p = 0.363$) reduced in alcohol and substance addiction. Analysis on the ASI scores also revealed that there was no significant difference between TAU and TAU+EMDR ($T = 1.46, p = 0.25$).

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3 *Secondary outcome measures.*
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5 Compared to pretreatment, post-treatment scores of the BDI revealed a significant
6 reduction in the TAU+EMDR treatment group ($T = 4.385, p = .007$), while a marginal
7 increase was seen in the TAU treatment group ($T = -2.07, p = .093$). Between TAU and
8 TAU+EMDR, the difference in BDI scores post-treatment was statistically significant ($T =$
9 14.134, $p = .004$). Compared to pretreatment, post-treatment scores of the STAI revealed a
10 significant reduction in the TAU+EMDR treatment group ($T = 2.653, p = .045$), while no
11 reduction in state anxiety was noticed in the TAU treatment group ($-0.43, p = .684$). Between
12 TAU and TAU+EMDR, the difference in STAI scores post-treatment was not statistically
13 significant ($T = 3.01, p = .113$).
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16 Compared to pretreatment, post-treatment scores of the SEI revealed a significant
17 increase in the TAU+EMDR treatment group ($T = -3.372, p = .012$). Scores of the TAS-20
18 tend to decrease between pretreatment and post-treatment in the TAU+EMDR treatment
19 group ($T = 2.312, p = .069$)
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43 **Discussion**
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45 The current study aimed to use the standard EMDR protocol for treating addictions.
46 The most important study finding is that reprocessing of earlier (traumatic) memories was
47 followed by a significant decrease in PTSD, depression and anxiety post-treatment. This
48 finding is also reflected in the between-group difference in PTSD and depression symptoms,
49 as patients receiving EMDR scored lower on measures of PTSD and depression than patients
50 not receiving EMDR. However, EMDR treatment was not associated with a significant
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3 decrease in alcohol and drug use. Compared to TAU, patients who received EMDR in
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5 addition to TAU did not report a significant decrease in substance abuse after termination of
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7 treatment. Results also showed that the use of the standard EMDR protocol was followed by a
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9 significant increase in self-esteem and a marginal decrease in alexithymia post-treatment.
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12 Although many substance abuse therapists believe a client should be substance free
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14 before engaging in trauma work (Hase, 2010; Zweben, Clark, & Smith, 1994), this study
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16 demonstrated that a decrease in PTSD symptoms can occur beyond abstinence. This work
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18 also revealed that the reprocessing of traumatic memories increases the likelihood of adaptive
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20 behavior by increasing self-esteem and decreasing depression, anxiety and alexithymia. This
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22 result reinforces the idea that EMDR helps the client to bring up memories in a more adaptive
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24 perspective and consequently to have a more functional attitude about the present and future
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26 (Shapiro et al., 1994).
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30 Contrary to expectations, we did not observe a reduction in alcohol and drug use after
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32 EMDR treatment in our study. However, a previous study found that reprocessing the
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34 addiction memory using a set of modified EMDR procedures was followed by a significant
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36 decrease in craving for alcohol post-treatment (Hase et al., 2008). We suggest that in the
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38 current study reprocessing traumatic memories may not have been sufficient to reduce alcohol
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40 and drug use. This study showed that reprocessing traumatic memories in a SUD sample
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42 reduced PTSD symptoms indicating that EMDR treatment works to treat PTSD in substance
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44 abusers. We propose that reprocessing both traumatic and addiction memories using EMDR
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46 procedure should reduce PTSD symptoms along with alcohol and drug consumption. This
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48 proposal might give us insight about the need for more extensive research focused on both
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50 addiction and traumatic memories to determine the relative impact of both on addiction
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52 symptoms (paper in preparation).
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3 This study met several methodological limitations. The sample size was small, thus
4 reducing statistical validity. Our findings need also to be treated cautiously as our clinical
5 sample was all female. Treatment was applied by the same person evaluating the study, which
6 might have biased the outcome. Moreover, because standardized measures of social support
7 were not used in this study, we were not able to quantify the type and duration of social
8 support. This fact makes improvement by uncontrolled minor influential factors unlikely.
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16 It is hoped that the use of the standard EMDR protocol for treating addicted patients
17 can be replicated in a larger sample of patients suffering from ~~addiction-substance use~~
18 disorders. Providing psychotherapeutic interventions such as EMDR at early stages during
19 inpatient treatment for addicted patients would be expected to enhance overall treatment
20 outcomes.
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30 Acknowledgements

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Introduction

Post-traumatic stress disorder (PTSD) and substance use disorder (SUD) are both severe disorders causing great psychological distress. According to the current literature, prevalence estimates for PTSD in SUD samples vary from 11% to 41% (Harrington & Newman, 2007; Ouimette, Goodwin, & Brown, 2006; van Dam, Ehring, Vedel, & Emmelkamp, 2010). Despite this variability of prevalence estimates, it is evident that the occurrence of PTSD among SUD-patients is high. A number of authors have suggested a functional relationship between both disorders, which is largely supported by empirical evidence (van Dam, Vedel, Ehring, & Emmelkamp, 2012). The PTSD symptoms negatively affect arousal levels and coping styles that increase the likelihood of substance abuse, substance abuse in turn increases the risk for future traumatic experiences, and withdrawal from substances can trigger PTSD-symptoms (Stewart & Conrod, 2003). This has important clinical implications as patients with concurrent PTSD and SUD show higher symptom severities and worse treatment outcomes compared to patients with either disorder alone (Back, Dansky, Coffey, Saladin, Sonne, & Brady, 2000 ; Najavits, Weiss, & Shaw, 1999; Ouimette, Brown, & Najavits, 1998). Thus, there are compelling reasons to develop and provide effective treatments for these conditions, particularly when they coexist.

Cognitive-behavioral therapy (CBT) is considered to be an evidence-based intervention for SUD. Empirically supported, cognitive-behavioral approaches include training in coping skills, relapse prevention, contingency management, and behavioral therapy (Emmelkamp & Vedel, 2006). Treatment approaches for PTSD are often divided into traditional exposure-based therapies and eye movement desensitization and reprocessing (EMDR). The most recent version of practice guidelines from the International Society for Traumatic Stress Studies cites cognitive-behavioral treatments (including exposure therapy and cognitive-processing therapy) and EMDR as among the PTSD treatments evidencing the

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2
3 greatest empirical support (Foa, Keane, Friedman, & Cohen, 2009). Recent research
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5 comparing EMDR to traditional exposure-based treatments of trauma has often found EMDR
6
7 to be equally or more efficacious (Ironson, Freund, Strauss, & Williams, 2002; Lee, Taylor, &
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9 Drummond, 2006; Seidler & Wagner, 2006).

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11 Eye movement desensitization and reprocessing (EMDR) was initially advanced as a
12
13 treatment for Posttraumatic Stress Disorder (PTSD), although its clinical applications have
14
15 been extended considerably over the years. Because empirical evidence suggests that EMDR
16
17 is effective in treating PTSD (despite the apparent unimportance of eye movements), more
18
19 research is needed to understand the actual mechanism by which it works (Freeman, 2009).
20
21 The theory currently used to explain EMDR is called an adaptive information processing
22
23 (AIP) model. The AIP model assumes “an inherent system in all of us that is physiologically
24
25 geared to process information to a state of mental health” (Shapiro, 2002). In EMDR, it is
26
27 presumed that the AIP system leads to reduction in distress and/or negative emotions that can
28
29 be stored as a result of upsetting experiences, leading to integrating upsetting information into
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31 a more adaptive, positive state. The AIP system may be hindered or blocked by trauma or
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33 other severe stress but also by the influence of psychoactive drugs. In fact, Shapiro reported
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35 on the use of EMDR in the treatment of addictions early in its development (Shapiro,
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37 Vogelmann-Sine, & Sine, 1994). The possible usefulness of EMDR with these disorders may
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39 also come from the high levels of traumatic exposure and PTSD in this population (Abel &
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41 O’Brien, 2010). However, an apparent gap is the lack of studies investigating the
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43 effectiveness of EMDR in treatment intervention for comorbid SUD and PTSD disorders (van
44
45 Dam et al., 2012).

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47 Research on the clinical efficacy of EMDR with addiction is limited. Hase,
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49 Schallmayer, and Sack (2008) published the only randomized control trial found in the
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51 literature. EMDR was implemented with or without “treatment as usual.” Treatment as usual
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3 incorporated detoxification, aspects of motivational interviewing, assessment of social
4 support/adjustment, group treatment, relaxation training, and art therapy. Patients in the
5 experimental group received treatment as usual plus two 1-hr sessions of EMDR that targeted
6 the addiction memory, viewed as the core trigger of relapse. Their findings suggest that
7 EMDR enhanced addiction treatment by decreasing cravings as well as experiences of relapse
8 at 1-and 6-month intervals, respectively, when groups were compared. Marich (2009)
9 discussed a case exploring the use of EMDR with a cross-addicted female with a history of
10 sexual assault, who met criteria for alcohol dependence, cannabis dependence, sedative
11 dependence, and PTSD. The author utilized the EMDR Standard Protocol (Shapiro, 2001) to
12 target shame-based experiences that impeded her recovery. Follow-up interviews indicated
13 that the client had successfully maintained sobriety at 18 months. Abel and O'Brien (2010)
14 also discussed a case study exploring the use of EMDR treatment with a woman who had
15 longstanding comorbid alcohol abuse and PTSD. Two-year follow-up after EMDR showed
16 that the woman was successfully maintaining sobriety and that the PTSD continued in full
17 remission. Another case study investigated the use of EMDR with three patients with severe
18 addiction problems and PTSD, but the study was published in Dutch (van Rens, de Weert-van
19 Oene, van Oosteren, & Rutten, 2012).

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41 The aim of the present study was to use the standard EMDR protocol among substance
42 abuse patients. Unlike certain previous studies (e.g., Hase et al., 2008), we did not adapt the
43 treatment protocol: the target for reprocessing was not the addiction memory but a specific
44 traumatic memory. Therefore, this pilot gives an indication of whether patients with substance
45 abuse disorder and comorbid PTSD can be treated effectively with routine treatments for
46 PTSD as recommended by the guidelines. We also measured addiction severity in order to
47 examine the effect of treatment on the present addiction symptoms. We propose that
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3 reprocessing traumatic memories with EMDR would lead to measurable changes of addiction
4 symptoms. This would be expected to enhance overall treatment outcomes.
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8 9 **Method**

10 *Participants*

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12 Our sample consisted of 12 alcohol and/or drug-addicted women receiving social
13 medical care ~~for addiction problems and addiction treatment~~ within the same clinic (a French
14 departmental Drug Information Centre). ~~About three-quarter of them also received addiction~~
15 ~~treatment.~~ The outpatients were recruited for the present study by the same practitioner
16 qualified in addiction medicine. The inclusion criteria of the selected outpatients were (1)
17 ~~seeking addiction substitution treatment met the substance dependence criteria according to~~
18 ~~the DSM-IV diagnostic features for substance use disorder (APA, 1994),~~ (2) reported having
19 experienced traumatic events, and (3) met the PTSD criteria according to the DSM-IV
20 diagnostic features for PTSD (APA, 1994). Participants with a history of psychosis or organic
21 mental disorder were excluded. Exclusion criteria also included continuous use of heroin or
22 cocaine.
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38 A stratified randomization procedure was applied so that participants were assigned to
39 treatment as usual (TAU) or to TAU plus eight sessions of EMDR (TAU + EMDR). TAU
40 was provided according to the standards of the day care centre. EMDR was provided by the
41 same qualified clinician according to the standard protocol (Shapiro, 2005). After assignment,
42 but prior to treatment, patients gave informed consent and received additional information
43 about the study and EMDR.
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52 *Measures*

53 *Primary outcome measures.*

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3 The PTSD Checklist Specific (PCL-S; Weathers, Litz, Herman, Huska, & Keane,
4 1993) was used to assess the PTSD diagnosis. The PCL is a 17-item self-report checklist of
5 PTSD symptoms based closely on the DSM-IV criteria. The PCL has a variety of purposes,
6 including screening individuals for PTSD, diagnosing PTSD and monitoring symptom
7 changes during and after treatment.
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14 The Addiction Severity Index-Lite (ASI; McLellan, Luborsky, O'Brien, & Woody,
15 1980) is a shortened version of the ASI which is a semi-structured assessment used to
16 evaluate lifetime and recent (past 30 days) problem behaviors. The ASI-Lite is divided into 7
17 separate composite scores: medical, employment, alcohol use, drug use, family, legal, and
18 psychiatric. In the present study, we only focused on alcohol use composite or drug use
19 composite since the aim of our research was only to quantify alcohol and drug consumption
20 before and after intervention. Furthermore, we only used the severity profile scale ranging
21 from 0 to 9 to quantify alcohol and drug consumptions. The ASI-Lite has become a
22 standardized tool used to quantify alcohol and substance consumption.
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34 *Secondary outcome measures.*
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36 Since depression and anxiety are common comorbid conditions in patients suffering
37 from addictive disorders, severity of depression and anxiety were evaluated pre- and post-
38 treatment. Additional focus on other issues that trauma victims report - low self-esteem, guilt,
39 self-blames and difficulty recognizing and expressing emotions - could be useful. Since
40 EMDR might be effective in restoring self-esteem and reducing alexithymia, those variables
41 were evaluated pre - and post-treatment in the TAU+EMDR group.
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49 The Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh,
50 1961) and the State-Trait-Anxiety Inventory (STAI; Spielberger, Gorsuch, & Luschene, 1970)
51 served as measures for depression and anxiety to compare TAU and TAU+EMDR . The BDI
52 is a 21-item self-report questionnaire widely used in research to evaluate cognitive and
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3 vegetative symptoms of depression. The STAI is a widely used 40-item measure with two
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5 scales designed to assess state-anxiety and trait-anxiety.
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7 Self-esteem was measured with Coopersmith's self-esteem inventory (SEI;
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9 Coopersmith, 1981). It comprises 58 unambiguous trait-descriptive sentences to which
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11 subjects respond by indicating whether the sentences describe them or not (either "like me" or
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13 "unlike me"). The SEI has been widely utilized in research and clinical practice, with both
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15 individuals and groups. The validity and reliability of the instrument are well established.
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18 The Toronto Alexithymia Scale (TAS-20; Bagby, Parker, & Taylor, 1994) is a 20-item
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20 self-report measure. Each item is rated on a five-point Likert scale ranging from 1 (strong
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22 disagreement) to 5 (strong agreement). For this scale, a *three-factor* structure was proposed:
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24 *difficulty identifying feelings* (DIF), *difficulty describing feelings* (DDF) and *externally*
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26 *oriented thinking* (EOT).
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29 30 31 32 *Procedure*

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34 After referral to the study, subjects were screened for PTSD with the PCL-S. If PTSD
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36 was diagnosed, and once informed consent was obtained, the remaining baseline
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38 measurements were administered.
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43 *Treatment as Usual.* All outpatients received TAU, which consisted of:

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45 - clinical interviews with the addiction specialist
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47 - ~~baclofen administration alcohol-substitute treatment (for the treatment of alcohol~~
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49 ~~craving) (antidepressants, anxiolitics and baclofène) and anxiolitics/antidepressants~~
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51 ~~administration (for reducing anxiety and negative thoughts)~~ prescribed by the
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53 addiction specialist
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- heroin substitute treatment (methadone and buprenorphine) prescribed by the addiction specialist
- medications for PTSD treatment if required (antidepressants and anxiolytics)
- psycho-educational interviews with social workers for proven positive outcomes
- social and economic support with social workers to cope with the demands of everyday life
- medical care with nurses

EMDR. Subjects were treated with 8 EMDR sessions over 6 months. In the first month patients received 3 EMDR sessions. Thereafter, one monthly EMDR session was provided. After a maximum of eight sessions, post-measurements were taken. During the EMDR therapy treatment as usual was continued. We used the standard eight-phase EMDR procedure as adapted into French (Cornil, 2011). See Shapiro (1995) for a detailed description of the EMDR procedure. The patient is asked to isolate a visual representation (a single picture) of a traumatic memory. The therapist and patient determine what belief statement currently applies to that target image, e.g. "I am powerless". The patient is then asked to form a contradictory belief statement that he would prefer, e.g. "I am now in control". The actual desensitization then starts. Tension is build up by asking the patient to hold the traumatic memory, negative statement, evoked emotion, and area of body where the emotion is experienced while visually focusing on the rapid eye movement of the clinician's fingers. After a set of 25 eye movements, the patient is asked to briefly associate about what comes to his awareness. A new set is then presented. This procedure is repeated until no new associations come to the patient's awareness. The patient is then asked to focus on the target image, after which subjective units of disturbance scores are asked. When this score has gone down to nil, the installation phase is started. The positive contradictory statement is then 'installed'. The

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3 patient is asked how valid the positive cognition feels at that moment (1 ¼ completely untrue
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5 to 7 ¼ completely true). Sets are repeated until the positive cognition feels completely true.
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7 Then the patient is asked to perform a body scan (feeling whether there is still any tension in
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9 the body) while concentrating on the target image and on the positive cognition. Sets are
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11 repeated until the body feels completely relaxed. The EMDR ends with a positive closure in
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13 which the patient is asked to verbalize the most positive thing that he has learned about
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15 himself in that session with respect to the trauma that was treated.
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21 After each set of 25 eye movements, the therapist asks the patient to rate the strength of both
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23 the distressing memory and their belief in the positive cognition. Other types of bilateral
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25 stimulation can be used, such as tapping or alternating sounds.
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29 30 *Statistical analysis*

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32 Descriptive statistics were produced to describe the characteristics and baseline
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34 variables of the samples. Paired within sample T-tests for means were performed to determine
35
36 the statistical significance of the changes in scores on the clinical measures. The baseline
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38 scores on the variables were normally distributed and therefore parametrically analyzed using
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40 T-Tests.
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47 **Results**

48 49 *Characteristics of the samples*

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51 Table 1 displays the characteristics of the TAU and TAU + EMDR groups.
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56 -Please insert Table 1 here.-
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Baseline

The TAU and TAU+EMDR groups were comparable for age and did not show any statistically significant differences in any of the following variables: duration of addiction symptoms, duration of PTSD symptoms, number of previous detoxification treatments, number of previous rehabilitation treatments and duration of substitution treatment. Both groups were also comparable for all clinical measures: severity of addiction, PTSD, depression and anxiety. Measures of personality (self-esteem and alexithymia) did not show any statistically significant differences (see Table 2).

-Please insert Table 2 here.-

Efficacy

Primary outcome measures.

The hypothesis in this study was that reprocessing traumatic memories with EMDR would lead to measurable changes in addiction symptoms; therefore the most relevant measure for analysis was the PCL-S and ASI. Compared to pretreatment, post-treatment scores of PCL-S revealed a significant improvement in the TAU+EMDR treatment group ($T = 4.211, p = .008$), while no decrease in PTSD symptoms was noticed in the TAU treatment group ($T = -0.945, p = 0.389$) (see Table 3). Between TAU and TAU+EMDR, the difference in PCL-S scores post-treatment was statistically significant ($T = 9.60, p = .011$). Compared to pretreatment, post-treatment scores of ASI revealed that neither the TAU+EMDR treatment group ($T = 1.19, p = 0.287$), nor the TAU treatment group ($T = -1, p = 0.363$) reduced in alcohol and substance addiction. Analysis on the ASI scores also revealed that there was no significant difference between TAU and TAU+EMDR ($T = 1.46, p = 0.25$).

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3 *Secondary outcome measures.*

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5 Compared to pretreatment, post-treatment scores of the BDI revealed a significant
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7 reduction in the TAU+EMDR treatment group ($T = 4.385, p = .007$), while a marginal
8
9 increase was seen in the TAU treatment group ($T = -2.07, p = .093$). Between TAU and
10
11 TAU+EMDR, the difference in BDI scores post-treatment was statistically significant ($T =$
12
13 $14.134, p = .004$). Compared to pretreatment, post-treatment scores of the STAI revealed a
14
15 significant reduction in the TAU+EMDR treatment group ($T = 2.653, p = .045$), while no
16
17 reduction in state anxiety was noticed in the TAU treatment group ($-0.43, p = .684$). Between
18
19 TAU and TAU+EMDR, the difference in STAI scores post-treatment was not statistically
20
21 significant ($T = 3.01, p = .113$).
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25 Compared to pretreatment, post-treatment scores of the SEI revealed a significant
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27 increase in the TAU+EMDR treatment group ($T = -3.372, p = .012$). Scores of the TAS-20
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29 tend to decrease between pretreatment and post-treatment in the TAU+EMDR treatment
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31 group ($T = 2.312, p = .069$)
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36 -Please insert Table 3 here.-
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43 **Discussion**

44
45 The current study aimed to use the standard EMDR protocol for treating addictions.
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47 The most important study finding is that reprocessing of earlier (traumatic) memories was
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49 followed by a significant decrease in PTSD, depression and anxiety post-treatment. This
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51 finding is also reflected in the between-group difference in PTSD and depression symptoms,
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53 as patients receiving EMDR scored lower on measures of PTSD and depression than patients
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55 not receiving EMDR. However, EMDR treatment was not associated with a significant
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3 decrease in alcohol and drug use. Compared to TAU, patients who received EMDR in
4
5 addition to TAU did not report a significant decrease in substance abuse after termination of
6
7 treatment. Results also showed that the use of the standard EMDR protocol was followed by a
8
9 significant increase in self-esteem and a marginal decrease in alexithymia post-treatment.
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12 Although many substance abuse therapists believe a client should be substance free
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14 before engaging in trauma work (Hase, 2010; Zweben, Clark, & Smith, 1994), this study
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16 demonstrated that a decrease in PTSD symptoms can occur beyond abstinence. This work
17
18 also revealed that the reprocessing of traumatic memories increases the likelihood of adaptive
19
20 behavior by increasing self-esteem and decreasing depression, anxiety and alexithymia. This
21
22 result reinforces the idea that EMDR helps the client to bring up memories in a more adaptive
23
24 perspective and consequently to have a more functional attitude about the present and future
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26 (Shapiro et al., 1994).
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30 Contrary to expectations, we did not observe a reduction in alcohol and drug use after
31
32 EMDR treatment in our study. However, a previous study found that reprocessing the
33
34 addiction memory using a set of modified EMDR procedures was followed by a significant
35
36 decrease in craving for alcohol post-treatment (Hase et al., 2008). We suggest that in the
37
38 current study reprocessing traumatic memories may not have been sufficient to reduce alcohol
39
40 and drug use. This study showed that reprocessing traumatic memories in a SUD sample
41
42 reduced PTSD symptoms indicating that EMDR treatment works to treat PTSD in substance
43
44 abusers. We propose that reprocessing both traumatic and addiction memories using EMDR
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46 procedure should reduce PTSD symptoms along with alcohol and drug consumption. This
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48 proposal might give us insight about the need for more extensive research focused on both
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50 addiction and traumatic memories to determine the relative impact of both on addiction
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52 symptoms (paper in preparation).
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3 This study met several methodological limitations. The sample size was small, thus
4 reducing statistical validity. Our findings need also to be treated cautiously as our clinical
5 sample was all female. Treatment was applied by the same person evaluating the study, which
6 might have biased the outcome. Moreover, because standardized measures of social support
7 were not used in this study, we were not able to quantify the type and duration of social
8 support. This fact makes improvement by uncontrolled minor influential factors unlikely.
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16 It is hoped that the use of the standard EMDR protocol for treating addicted patients
17 can be replicated in a larger sample of patients suffering from ~~addiction~~-substance use
18 disorders. Providing psychotherapeutic interventions such as EMDR at early stages during
19 inpatient treatment for addicted patients would be expected to enhance overall treatment
20 outcomes.
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30 **Acknowledgements**

31 The authors are grateful to Dr Jean-Michel Delille for assistance with the recruitment.
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