

Addiction-Focused EMDR Therapy in Gambling Disorder: A Multiple Baseline Study

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Eye movement desensitization and reprocessing (EMDR) therapy is an evidence-based treatment for posttraumatic stress disorder (PTSD). Preliminary findings suggest the application of an adapted, addiction-focused EMDR procedure, AF-EMDR therapy, may also be helpful in treating addictions, such as gambling disorder (GD). In this study eight participants with GD received AF-EMDR therapy, using modules from Markus and Hornsveld's Palette of EMDR Interventions in Addiction (PEIA). A multiple baseline design was used to investigate whether AF-EMDR therapy reduced gambling urge and increased experienced self-control. Six weekly AF-EMDR sessions (treatment phase) were preceded by a 3- to 7-week non-treatment baseline phase. During both phases, participants kept a daily diary. Visual inspection as well as an interrupted time series analysis demonstrated mixed findings. Results showed that three participants experienced spontaneous recovery during the baseline period, two did not respond to treatment, and three others showed improvements during the EMDR phase. No adverse effects were noted. In sum, AF-EMDR therapy may have potential in the treatment of gambling addiction. However, more research is needed regarding the efficacy, contra-indications, focus, and application as well as the optimal dose of AF-EMDR therapy using the PEIA modules.

Keywords: eye movement desensitization and reprocessing (EMDR) therapy; addiction; gambling disorder; urge; multiple baseline design; Palette of EMDR Interventions in Addiction (PEIA)

In comparison to substance use disorders, the prevalence of gambling disorder (GD) is relatively low. For instance, in the Netherlands GD constitutes approximately 0.1% of all addiction-related disorders found in the general population (Van Rooij et al., 2014). Only 11% of those afflicted seek treatment. According to the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5;* American Psychiatric Association [APA], 2013), GD is diagnosed when there is a persistent and recurrent problematic behavior leading to clinically important impairment or distress, as indicated by the individual exhibiting four (or more) of the following symptoms

in a 12-month period: (a) a need to gamble with increasing amounts of money in order to achieve the desired excitement; (b) restlessness or irritability when attempting to cut down gambling; (c) repeated unsuccessful efforts to control, cut back, or stop gambling; (d) frequent preoccupation with gambling; (e) frequent gambling when feeling distressed; (f) after losing money on gambling, often returning another day to get even; (g) lying to conceal the excitement of involvement with gambling; and (h) jeopardizing or losing important relationships, a job, or educational or career opportunity because of gambling. The gambling behavior is not explained by a manic period.

Treatment Options for GD

Although a number of effective pharmacological and psychological interventions exist for treating GD, currently no specific treatment is recommended (Raylu & Oei, 2011). Thus, treatment programs need to be tailored to the individual needs, and different combinations of interventions need to be chosen depending on clients' presenting problems. A Cochrane review showed that GD can be treated effectively with cognitive behavioral therapy (CBT) and may also benefit from motivational interviewing (Miller & Rollnick, 1991). Although CBT showed a medium to large treatment effect at 3 months post-treatment, at 9–12 months only small, nonsignificant effects remained, thus calling into doubt the stability of CBT effects (Cowlshaw et al., 2012). The Cochrane review also suggested a possible benefit from other behavioral therapies (e.g., self-help interventions, brief interventions, mindfulness-based CBT, Gamblers Anonymous, couple/family intervention). However, the evidence was insufficient to evaluate these therapies. Therefore, more research is needed to establish which therapies are effective treatment options for GD. One promising but understudied intervention for GD is addiction-focused eye movement desensitization and reprocessing (AF-EMDR) therapy.

Addiction-Focused EMDR

EMDR therapy (Shapiro, 2018) is an evidence-based, trauma-focused therapy for posttraumatic stress disorder (PTSD; e.g., Bisson et al., 2007; Shapiro, 2018). In patients with PTSD, strong emotions can be triggered by stimuli that remind the person of a traumatic event from the past. Similarly, an addiction memory that is developed over the course of a period of problematic substance use or behavior can be triggered and elicit strong urges (e.g., the urge to gamble; Böning, 2009; Müller, 2013). The addiction memory may hold positive- or negative-valenced memory representations of the past (autobiographical memories, e.g., of an event whereby a high amount of money was won in a casino), present (e.g., an image of a current, often repeating trigger situation, such as feeling alone or feeling worthless), or future (e.g., imagining all problems being solved after winning the jackpot). In PTSD as well as in addiction, pathogenic memories are associated with high levels of emotional intensity, intrusiveness, and vividness (Böning, 2009). Similarities between addiction and emotional memory networks implicated in PTSD suggest that the

addiction memory may also be influenced by EMDR. Eye movements lead to a desensitization of the original memory (Lee & Cuijpers, 2013). The reprocessed memory is then reconsolidated into long-term storage, generates less distress on subsequent retrieval, or—in case of addiction—may induce less urge and addiction behavior (Markus & Hornsveld, 2017).

A recent review of AF-EMDR and regular, trauma-focused EMDR (TF-EMDR) therapy in patients with an addiction suggested that both TF- and AF-EMDR therapy may be of benefit in patients with addiction, with or without a trauma history (Markus & Hornsveld, 2017). Four of the studies reviewed focused on patients with GD. Henry (1995) used a quasi-experimental design in which 22 patients with a non-PTSD trauma history and diagnosed with a GD received regular TF-EMDR as an add-on treatment to CBT. This reduced the number of gambling events, especially in those with severe trauma history. Miller (2010) provided a case study in which his Feeling-State Addiction Protocol (FSAP)—a specific AF-EMDR protocol—was used as a stand-alone treatment for a patient with GD. The gambling behavior was reduced. The FSAP (Miller, 2010) posits that strong positive experiences (e.g., a friend cheering after a person wins during gambling), against a background of deprivation of the underlying healthy need (e.g., validation by peers), can become associated with certain behaviors (in this case, gambling). Addictions are subsequently hypothesized to be driven by the desire to reexperience these positive states by means of reengaging in the behaviors. Using the FSAP, Miller (2012) also conducted a multiple baseline study which focused on four patients suffering from behavioral addictions or compulsions. Two of the participants displayed problematic gambling behavior. All reported that their compulsive behavior had ceased after the intervention (Miller, 2012). Finally, Popky's (2010) AF-EMDR therapy approach—the Desensitization of Triggers and Urge Reprocessing (DeTUR) protocol was used as an add-on treatment to a 10-week inpatient program for gamblers (Bae, Han, & Kim, 2013). Popky's (2010) approach focuses on present triggers that induce craving. After the memory representation of the trigger image is fully desensitized, it is coupled to the positive state of the treatment goal, resembling counterconditioning from learning theory. In the study of Bae et al. (2013), Popky's approach was limited to desensitization of images of trigger situations and urge. All participants reported less impulsive behavior and increases in self-control and ego-strength.

In summary, preliminary findings suggest that both TF- and AF-EMDR therapy may be of use in the treatment of GD. However, the quality and quantity of the studies thus far prohibits conclusions on the efficacy. The current study aims at gaining more insight in the efficacy of an AF-EMDR protocol composed of modules, providing shortened versions of several AF-EMDR therapy interventions that are described in the PEIA (Markus & Hornsveld, 2017).

The AF-EMDR therapy approach provided in this study was used as a stand-alone treatment for GD. The focus in this study was on the urge to gamble and the feeling of self-control. Urge is the first criterion of the *DSM-5* classification, and described as a need to gamble with increasing amounts of money in order to achieve the desired achievement (APA, 2013). The urge to gamble can also be described as a strong desire that is difficult to control and can be triggered by memory representations that are not realistic for the current situation (Knipe, 2010; Schiller et al., 2010). As such, an urge reduction provides a good indication for improvement of GD.

Self-control is the extent to which individuals believe that they can influence their behavior in order to deal with a situation properly and is important for behavioral changes (Bandura, 1982). Reducing gambling in the early stages of treatment is better achieved by programs which focus on developing control over gambling than those that push for abstinence (Raylu & Oei, 2011). Specifically, we expected that application of our AF-EMDR protocol would reduce the level of urge to gamble and increase the level of self-control experienced. This, in turn, might also reduce actual gambling behavior.

Method

Design

We used a multiple baseline design. According to Borckardt et al. (2008), useful information about whether, when, and even why a certain intervention works can be collected by evaluating long-term changes in problem behavior, during the course of treatment in one or more patients, from baseline through the treatment phases. In a multiple baseline design, changes during a treatment period can more easily be attributed to the treatment instead of a chance factor when the treatment phase starts at different times in different participants. Using this

strategy, eight single cases, each with a nonconcurrent multiple baseline design, were used in this study. A baseline (waiting list during which some received practical help from social workers with psychosocial problems) phase and an AF-EMDR intervention phase were distinguished. The duration of the baseline phase was minimally 3 weeks (it started as soon as an eligible participant gave informed consent). The duration of the EMDR phase was 6 weeks or longer, depending on the scheduling of six individual, ideally weekly, AF-EMDR sessions. The duration of both phases was dependent on the availability of the therapist and the participant, with variations due to vacations, illness, and so forth. During both phases, participants kept a daily diary, containing rating scales for urge and self-control.

The research proposal was approved by the Medical Ethical Committee of the University Medical Center Groningen in accordance with the Dutch Law on Medical Scientific Research involving Human Beings (registered under number NL 57168.042.16). The study was conducted from December 2016 until December 2017.

Participants

Patients with GD who had sought treatment at one of three outpatient addiction care sites of an addiction care center in the Netherlands (Verslavingszorg Noord Nederland) were screened for eligibility. Eligibility criteria were (a) a *DSM-5* (APA, 2013) diagnosis of GD as the primary diagnosis and (b) Dutch language proficiency. The exclusion criteria were (a) having comorbid psychiatric problems that required treatment first, such as PTSD, and (b) receiving additional treatment during the study. Although one participant (number 2) received three sessions of group therapy while receiving AF-EMDR, he was not eliminated from the study sample since he ended group therapy after three sessions. He also did not seem to have benefitted from the group therapy. Some patients (no exact number available) who met the criteria did not choose to participate because they preferred treatment as usual (individual or group CBT) or were not interested in participating in the study. One participant did not complete AF-EMDR therapy and dropped out after three sessions. Because he did not show up for later sessions and because he had a history of treatment dropout, he was signed out. Participants' characteristics are shown in Table 1.

TABLE 1. Participant Characteristics

Variable	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Participant 8
Sex	Male	Male	Male	Female	Female	Male	Female	Male
Age (years)	40	49	51	42	46	25	61	58
Primary diagnosis	Gambling disorder	Gambling disorder	Gambling disorder	Gambling disorder	Gambling disorder	Gambling disorder	Gambling disorder	Gambling disorder
Known comorbidity	Tobacco use disorder Differential diagnosis Personality disorder	Suspicion of personality disorder	Tobacco use disorder Differential diagnosis Autistic disorder	Tobacco use disorder Avoidant personality disorder	Tobacco use disorder	Alcohol use disorder Personality disorder Not otherwise specified One-time depressive disorder	Borderline personality disorder	Tobacco use disorder Impulse control disorder
Number of indoor treatments	0	0	0	1	0	1	0	1
Number of outdoor treatments	3	0	0	2	0	1	0	1
Medication	No	No	No	No	No	No	No	No
Ethnic background	Dutch	Dutch	Algerian	Dutch	Dutch	Dutch	Dutch	Indonesian
Baseline phase (weeks)	4	3	3	6	4	4	3	7
Intervention phase (weeks)	12	12	8	15	9	16	9	25

Interventions

The Waiting List Psychosocial Help

As soon as they were accepted into the research study, participants were placed on a waitlist. During the waitlist patients received practical help from social workers, such as with financial, housing, or other psychosocial problems. This help was not directly focused on their addiction.

The AF-EMDR Therapy Protocol

The intervention consisted of six 90-minute sessions of AF-EMDR therapy. The protocol used in this study

consisted of a selection of modules (see Table 2) of the Palette of EMDR Interventions in Addiction (PEIA) framework (Markus & Hornsveld, 2017). The PEIA describes a set of 15 resourcing, TF- and AF-EMDR interventions (“modules”) that are thought to be particularly useful and effective in addiction. The modules are based on existing protocols (Hase, 2010; Knipe, 2010; Miller, 2010; Popky, 2010), theoretical considerations, and clinical experience. The rationale behind using a selection of PEIA modules instead of the more focused approach of Hase (2010), Popky (2010), or Miller (2010) is the broadness the PEIA offers. Whereas the approaches of others either have some overlap (e.g., Hase and Popky both target trigger memories) or address some but not all conceivable targets, the PEIA offers a “palette” of all AF-EMDR

TABLE 2. Modules of the PEIA Used in This Study

Session	Aims	PEIA module	Intervention	Main Indication(s)
Session 1	Resourcing; Increasing safety, strength, and accessibility of resources	2	Installation of positive treatment goal (based on Popky, 2010)	Insufficient availability of a motivating, achievable personal goal
	AF-EMDR; Reducing the impact of change-blocking fears	6	EMDR on negative flash-forwards of prolonged abstinence (Markus & Hornsveld, 2017)	Fear of sobriety
Session 2	AF-EMDR; Reducing the impact of change-blocking fears	8	EMDR on memories of relapse (based on Hase, 2010)	Feeling of powerlessness in the face of the addiction
Session 3		10	EMDR on positive memories (based on Knipe, 2010; Miller, 2010)	Patient wants to reach an unrealistic or dysfunctional goal
Session 4	AF-EMDR; Reducing the attractiveness of the addictive behavior	11	EMDR on memories linking substance or behavior with underlying healthy needs (based on Knipe, 2010; Miller, 2010)	The addictive behavior is linked to the healthy need
Session 6		12	EMDR on positive flash-forward about “dry use” (Markus & Hornsveld, 2017)	Desire thinking, craving
Session 5	AF-EMDR; Increasing stability of treatment effects	14	Desensitization of trigger situations (Hase, 2010; Popky, 2010)	Present situations that trigger craving

Note. AF-EMDR = addiction-focused EMDR; PEIA = Palette of EMDR Interventions in Addiction.

Source: Markus, W., & Hornsveld, H. (2017). EMDR interventions in addiction. *Journal of EMDR Practice and Research*, 11(1), 3–29. doi:10.1891/1933-3196.11.1.3.

targets, which are conceptualized as impacting the continuation of addiction.

The PEIA also includes modules developed on the basis of recent laboratory research, such as the reprocessing of positive memories, and positive and negative flash-forwards (Markus & Hornsveld, 2017). In addition, although promising, to date none of the individual AF-EMDR protocols has established its effectiveness in replicated randomized controlled trials. Therefore, acknowledging the fact that GD is seen as a multifactorial determined disorder (Bachmann, Bachmann, & Frensemeier, 2019), we opted for a broad set of targets as provided by the PEIA. As indicated in Table 2, our selection of PEIA modules incorporated elements of Popky’s (2010) DeTUR protocol, Hase’s (2010) “Craving Extinguished (CravEx)”

approach, Miller’s (2010) FSAP approach, and Knipe’s (2010) dysfunctional positive affect technique as well as elements of other interventions. Adaptations from the approaches based on the work of others are mentioned below but see Markus and Hornsveld (2017) for a more thorough discussion.

Protocol

In session one, the treatment goal was determined by using Popky’s (2010) imagery of a positive treatment goal (PEIA module 2). In this session the participant visualized what really motivated him or her to reduce or stop the gambling. In contrast to Popky (2010), no bilateral stimulation was used because research has

shown the desensitizing effects of eye movements on positive material, and the researchers (Hornsveld, De Jongh, & Ten Broeke, 2012) recommended being very cautious about using eye movements to strengthen memory content. Next, participants were asked what negative associations they had with prolonged abstinence, and images of negative associations regarding gambling cessation were processed (PEIA module 6; Hornsveld & Markus, 2016).

In session two, memories of loss of control over gambling behavior were reprocessed (PEIA module 8; Hase, 2010). The questions asked were what memories (first, worst, last) participants had regarding relapsing in gambling. This fully overlaps with Hase's (2010) approach. In addition, to make sure that all relevant debilitating memories were considered, participants were asked whether there were other memories about losing control over gambling or what other experiences provided the strongest "proof" that they could not control the gambling urge.

In session three, positively valenced memories of gambling were processed (PEIA module 10). This bears some resemblance to the ideas of Miller (2010) and Knipe (2010) in that it is hypothesized that positively valenced material may fuel dysfunctional behavior. Because participants often try to reach unrealistic and dysfunctional goals, they were asked about their positive memories (first, most intense, and last) regarding previous experiences in gambling.

In session four, memory representations that are rewarding for gambling were desensitized because they either fulfill a psychological need or because they help to avoid negative feelings (PEIA module 11). The participants were asked about their underlying healthy need that was linked to gambling and what that need fulfilled. This is a simplified adaptation of Miller's (2010) FSAP approach in that memories linking the gambling behavior to underlying positive needs were targeted, but our protocol did not target preexisting negative beliefs or negative beliefs arising from the gambling behavior. There are other PEIA modules dealing with those aspects in a different manner (e.g., Markus & Hornsveld, 2017).

In session five, images of trigger situations were desensitized (PEIA module 14) This module follows Hase (2010) and Popky (2010). The participants were asked during which regularly occurring circumstances or mood states they could resist the gambling the least.

Finally, in the last session, the focus was on desensitizing unrealistic positive feelings about what they hope to achieve in the future by gambling, using a "positive flash forward" (PEIA module 12). They were

asked what was the most appealing aspect of future gambling.

Horizontal eye movements were induced with the use of the EMDR-kit (light-bar), which uses a horizontal moving light, in accordance with the standard protocol (Shapiro, 2001). During EMDR processing, the participants rated target memories using the subjective unit of distress (SUD), the level of urge (LoU; Popky, 2010), or the level of positive affect (LoPA; Knipe, 2010), all using a Likert-type scale (range 0–10), depending on the target. The desensitization procedure was repeated until the SUD, LoU, or LoPA ratings were either 0, did not change any more for at least 10 minutes or until there was no time left in the session. Each session started with a new module, with a new target, so the therapist did not go back to the previous target in the following session. However, the final session was used to process targets that had not been fully desensitized in the previous sessions. These targets were prioritized by the participant and the therapist. Each session finished by asking the participant what positive things they had learned about themselves in the course of the session, and then the EMDR procedure followed until no new positive thoughts came up.

EMDR was provided by EMDR therapists who had received advanced EMDR training and were certified by the Dutch EMDR Association. EMDR sessions were registered on video to check if the therapists followed the protocol.

Instruments

All instruments and ratings described here were provided in a digital format using a web-based application (SurveyMonkey, www.surveymonkey.com).

Daily Diary

Daily urge was rated using a 100-mm Visual Analogue Scale (VAS). The question "How much urge to gamble did you experience today?" was answered on a scale with anchor points 0 (*No urge at all*) and 100 (*Extreme urge*).

Daily experienced self-control was also measured using a 100-mm VAS. The question "How much control over gambling did you experience today?" was answered on a scale with anchor points 0 (*No control at all*) to 100 (*Extreme control*).

The diary also contained some daily, explorative questions about clients' gambling behavior: "Did you gamble today?"; "If yes, did you spend more money than planned?"; and "How much money did you

gamble?” In addition, they were asked for details of that day that might explain why they did or did not gamble.

Participants were reminded to keep a daily diary at 10 PM by means of a text message with a link to the diary.

Start and End of Phase Assessments

The following instruments were used during the start and end of the baseline phase and the end of the intervention phase assessment.

Obsessive Compulsive Drinking Scale (Short Version)

A shortened version of the Dutch translation (OCDS-5 as suggested by a study of De Wildt et al., 2005) of the Obsessive Compulsive Drinking Scale (OCDS; Anton, Moak, & Latham, 1995) was used. It intends to measure urge retrospectively. It consists of 5 Likert-type scales (range 0–4, timeframe previous week). The OCDS contains many items that do not represent the core concept of craving but instead are indicators for the consequences of craving. The study of De Wildt et al. (2005) suggested that craving, in a narrow sense, can be reliably assessed with just five items of the original OCDS; for example, “When you are not gambling, how much of your time is taken by thoughts, ideas, impulses or images that are related to gambling?” The predictive validity and longitudinal stability of the different concepts of the short version of the OCDS remain to be studied.

Gambling Abstinence Self-Efficacy Scale

The Gambling Abstinence Self-Efficacy Scale (GASS; Hodgins, Peden, & Makarchuk, 2004) intends to measure experienced self-control in the context of GD. This scale was translated into Dutch by the first author for this study but this translated version has not yet been validated. The original version has shown good psychometric qualities in English–Canadian patients with GD who recently quit gambling ($n = 35$, Cronbach = .93 and re-test reliability (ICC) = .86). The total score and three of the subscales (winning/external: = .91; negative emotions: = .87; positive mood/testing/urges: = .70; social factors: = .81) showed evidence of predictive validity for gamblers not currently involved with treatment. It consists of 21 statements regarding events that may generate the urge to gamble. On a 5-point Likert-type scale ranging from 0 (*Not confident at all*) to 5 (*Extremely confident*), the participant

expresses the feeling of confidence not to gamble in each of the situations.

Evaluation Question

To find out how participants evaluated the treatment, the participants were given three explorative questions after the treatment: “How did you appreciate the treatment?”; “What session did you appreciate the most in overcoming your gambling problem?”; and “What session did you appreciate the least in overcoming your gambling problem?”

Procedure

During the intake, a psychologist, medical doctor, or psychiatrist determined the *DSM-5* (APA, 2013) classification of GD for each participant.

In three outpatient facilities in the Netherlands, professionals responsible for the intake procedure were asked to recruit patients who met the inclusion criteria. After informed consent the baseline assessment was planned. After completion the participants kept the daily diary for the complete study period. The length of the baseline phase was determined by the availability of the EMDR therapist after a baseline phase of at least 3 weeks (Table 1; range 3–7 weeks). At the end of this phase participants were assessed again. Subsequently the participants received six weekly 90-minute sessions of EMDR. In some cases the sessions were spread over more weeks due to planning issues, sickness, vacations, or no-show (Table 1; range: 6–25 weeks). After the last AF-EMDR session participants received a final assessment. The participants were then given the option to receive additional treatment as usual: group CBT or individual CBT focused on GD.

Analysis

The Statistical Package for the Social Science (SPSS) version 24 was used for the analyses of the daily diary data using interrupted time-series analysis (ITSA; Hartman et al., 1980). ITSA is especially suited to evaluate behavioral change interventions using single-subject experimental designs. ITSA shows whether the variables under investigation changed from the baseline phase to the intervention phase and whether changes were gradual or abrupt. (Ramsay, Matowe, Grilli, Grimshaw, & Thomas, 2003). Level effects (abrupt change in the mean level of the data) and

slope effects (gradual changes) were estimated following the recommendations of Huitema and McKean (2000). ITSA was controlled for autocorrelation (serial dependency) by fitting ARIMA models to the residuals (Hartman et al., 1980). ITSA shows three outcomes, as in Table 3: a level change, a slope change, and a baseline change. If there is a statistically significant level change, then there is an abrupt change in the level of VAS directly after the intervention. If there is a statistically significant slope change, then VAS gradually increases (positive sign) or decreases (negative sign). If the baseline change is statistically significant, then the gradual change already started at the beginning of the baseline. If the intervention was effective, then ITSA would show for urge a significant positive level change or slope change and a significant negative level change or slope change for self-control.

The shortened OCDS and GASS were not administered frequently enough to be submitted to ITSA. Visual inspection was used to identify changes in these parameters over the different phases.

Results Per Participant

The results of ITSA are shown in Table 3. One of the time-series of the VAS is shown in Figure 1 while the changes in the shortened OCDS and GASS are shown in Figure 2. The results are described for each participant separately.

Participant 1

A 40-Year-Old Dutch Man Who Had Received Three Previous Outpatient Addiction Treatments

ITSA results (Table 3) for participant 1 showed a negative change in the urge level, indicating that the urge decreased abruptly after the start of the intervention. The statistically significant slope change had a positive sign, indicating that the decreasing trend observed in the baseline phase leveled off after the start of the intervention. The VAS results show that all urge scores were close to the bottom of the VAS scale in the intervention phase. There was no statistically significant change in self-control in this participant, but the self-control scores were rather high already during the baseline phase. As can be seen in Figure 2, the urge scores had decreased at the end of the baseline phase compared to the start of the baseline phase but did not change between the end of the baseline phase and the end of the EMDR sessions. Self-control had not increased at the end of the baseline phase, but was higher at the end of the EMDR sessions. Thus, according to Figure 2, it seems that participant 1 had experienced a lowering in urge during the baseline phase and an increase in self-control after the EMDR sessions.

Participant 1 did not gamble during the baseline and EMDR phases. He valued the AF-EMDR as positive and believed it worked for him. He had found it difficult to make mental pictures of memories during the treatment.

TABLE 3. Results of ITSA Performed on Daily Diary Data for Each Participant (Treatment Phase Compared to Baseline Phase)

Variable	Participant Number	Level Change (Estimate)	Slope Baseline (Estimate)	Slope Change (Estimate)
Urge	1	-15.40*	-.82	1.11*
	2	-1.53	-1.50****	1.40****
	3	-2.40	.03	-.05**
	4	-.78	-.06	.17
	5	NA		
	6	.48	-.00	.02
	7	-2.66	-.02	-1.35**
	8	7.09	-2.09****	2.28***
Self-control	1	8.22	.23	-.45
	2	-1.19	3.06****	-2.96****

(Continued)

TABLE 3. Results of ITSA Performed on Daily Diary Data for Each Participant (Treatment Phase Compared to Baseline Phase) (Continued)

Variable	Participant Number	Level Change (Estimate)	Slope Baseline (Estimate)	Slope Change (Estimate)
	3	-.77	-.12**	-.12**
	4	-9.68	-.19	.27
	5	NA		
	6	-.59	-.00	.02
	7	13.84	-2.87**	4.90****
	8	-6.83	0.75****	-0.77**

Note. ITSA = interrupted time-series analysis. NA = not assessed. The data of participant 5 could not be analyzed. * $p < 0.1$. ** $p < 0.5$. *** $p < 0.01$. **** $p < 0.001$.

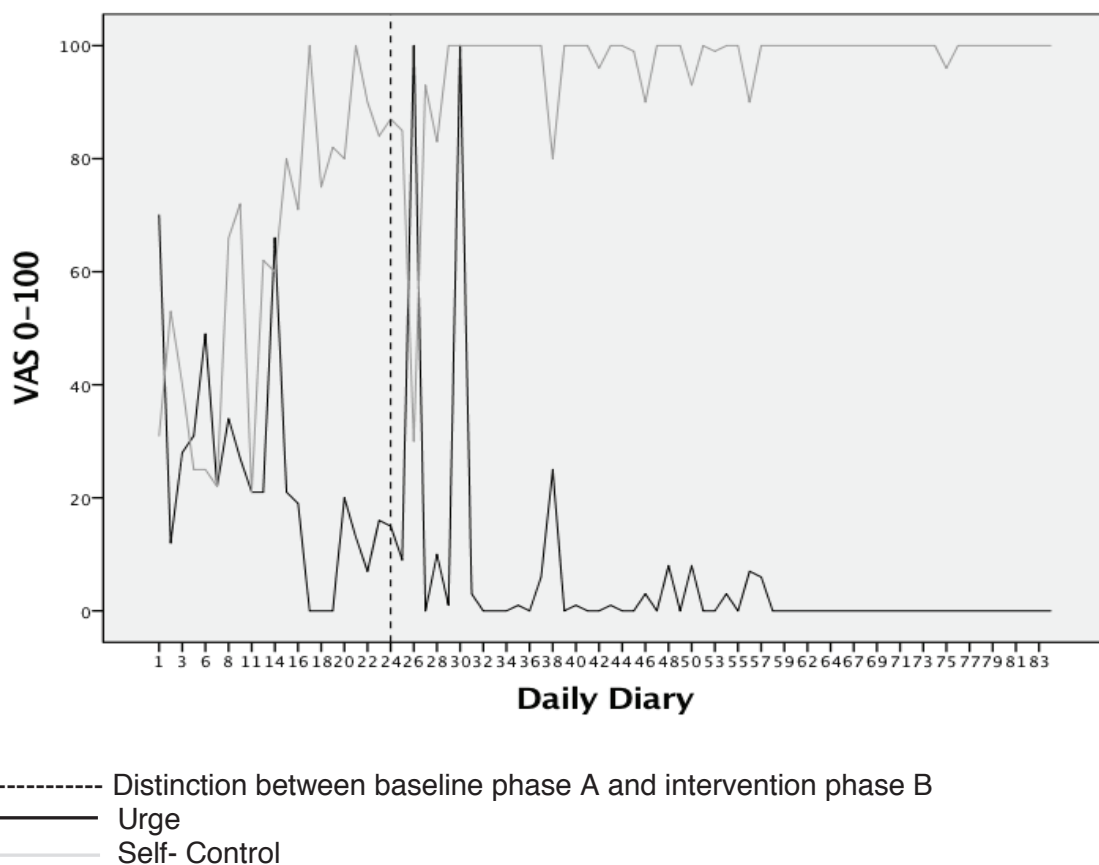


FIGURE 1. Example of VAS ratings of experienced urge and self-control (daily diary) for participant 2. *Note.* VAS = Visual Analogue Scale.

Participant 2

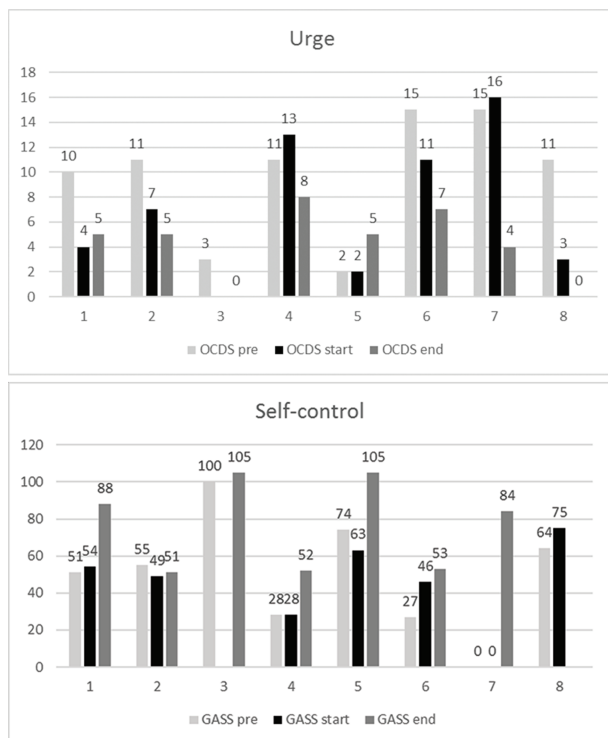
A 49-Year-Old, Treatment-Naïve, Algerian Man

ITSA results (Table 3) showed a statistically significant negative slope baseline in urge, indicating that the urge to gamble decreased gradually at the start

of the baseline. The statistically significant positive slope change for urge indicates that during the EMDR phase the urge increased or did not decrease as much as in the baseline phase. The same happened with the slope baseline for self-control, only here it had a positive sign, indicating that the self-control increased

gradually during the baseline phase. The statistically significant positive slope change for self-control indicates that the self-control decreased or did not increase as much as in the baseline phase. The VAS results show that the urge did not increase during the EMDR phase, but it did not decrease as much as in the baseline phase, since scores were, in the beginning of the EMDR phase, already close to the floor of the VAS. The same was seen for self-control: the scores did not decrease during the EMDR phase but did not increase as much as during the baseline phase. The scores were already close to the ceiling of the VAS at the beginning of the EMDR phase. The VAS on both variables (Figure 2) remained rather stable after the start of the EMDR sessions. Figure 2 shows that the urge to gamble had decreased during the baseline phase and decreased even further during the EMDR phase and that self-control remained almost the same.

Participant 2 gambled at the start of the baseline phase and in the beginning of the EMDR sessions. He



No bar and figure: the participant did not fill in the list

No bar: the score was zero and the zero is shown

FIGURE 2. Results of urge and self-control measured with the OCDS and the GASS.

Note. OCDS = Obsessive Compulsive Drinking Scale; GASS = Gambling Abstinence Self-Efficacy Scale.

considered the AF-EMDR to be comfortable. He mentioned that he was more accepting of his past and that more positive thoughts came up.

Participant 3

A 51-Year-Old, Treatment-Naïve, Dutch Man

ITSA results (Table 3) showed a statistically significant small negative slope change for urge, which indicates that the urge decreased gradually during the EMDR phase. With regard to self-control, there was a statistically significant small negative change in the slope baseline and in the slope change, indicating that the self-control decreased gradually during the baseline and even more during the EMDR phase. The VAS results show that the scores for both variables were already very high (urge) or low (self-control) at the start of the baseline until the end of the EMDR phase and could not get any higher (urge) or lower (self-control). This is also seen in Figure 2.

Participant 3 did not gamble during either the baseline phase or the EMDR sessions. He valued the AF-EMDR as good, but time-consuming.

Participant 4

A 42-Year-Old Dutch Woman Who Previously Received Inpatient Addiction Treatment Once and Outpatient Addiction Treatment Twice

ITSA results (Table 2) showed no statistically significant changes in either urge or self-control for participant 4. The VAS results show that the VAS on both variables did not show a visually discernible difference in the fluctuation of the scores before and after the EMDR sessions. Figure 2 shows that the urge was getting lower during the EMDR phase and the self-control was getting higher. But these scores were assessed only 3 times. Participant 4 gambled 9 times during the baseline phase and 11 times during the EMDR phase. She qualified the AF-EMDR as “special” and “intense,” but the effect as “elusive.”

Participant 5

A 46-Year-Old, Treatment Naïve, Dutch Woman

It was not possible to make a model with ITSA for participant 5, because there was almost no variation in the scores on the VAS on both variables. The diary results show that the VAS for self-control was close to the ceiling at the beginning of the baseline phase

and close to the floor for urge, and both remained stable during the EMDR phase. The results in Figure 2 with regard to urge do not differ from the start to the end of the baseline phase and increased slightly during the EMDR phase. Self-control increased in the EMDR phase. Participant 5 did not gamble during the baseline phase and EMDR sessions. She valued the AF-EMDR as positive.

Participant 6

A 25-Year-Old Dutch Man Who Received Inpatient and Outpatient Addiction Treatment Once Before

ITSA results (Table 3) showed no statistically significant changes in either urge or self-control. The VAS results show that the fluctuation pattern looked the same before and after the EMDR phase. Figure 2 shows that the urge to gamble was somewhat lower at the end of the baseline phase and still lower at the end of the EMDR phase. Self-control increased most during the baseline phase and a little more after the EMDR phase. Participant 6 gambled three times during the baseline phase and once during the EMDR sessions. The last time he gambled, he spent as much money as he had planned. He valued the AF-EMDR as “good.” He stated that it was strenuous for him to do and he did not look forward to going to the sessions, but afterwards he considered that the sessions were not too difficult to handle.

Participant 7

A 61-Year-Old, Treatment-Naïve, Dutch Woman

ITSA results (Table 3) showed a statistically significant change in the slope for urge that had a negative sign, which indicates that after the baseline phase the urge decreased gradually. For self-control there was a statistically significant baseline change that had a negative sign and a statistically significant slope change that had a positive sign. This indicates that the self-control decreased gradually during the baseline phase and increased gradually during the EMDR phase. The VAS results show that the VAS for urge fluctuated more during the EMDR phase than during the baseline phase. Self-control showed the same pattern of fluctuation before and after the EMDR phase. Figure 2 shows that the urge to gamble had not changed much at the baseline phase, but was substantially lower after the EMDR phase. The same pattern was seen for self-control, as self-control had not changed at the end of the baseline phase but had increased after the EMDR

sessions. Participant 7 gambled eight times during the baseline phase and did not gamble during the EMDR sessions. She valued the AF-EMDR as positive and believed that the therapist had a positive influence on her recovery.

Participant 8

A 58-Year-Old Man From Indonesia With a History of a Single Inpatient and Outpatient Addiction Treatment Episode

ITSA results (Table 3) showed statistically significant changes in the slope baseline for urge (negative sign) and self-control (positive sign). The slope change showed statistically significant changes in the opposite directions. There was a positive sign for urge and a negative sign for self-control. This indicates that the urge to gamble decreased gradually during the baseline phase and increased during the EMDR phase or did not decrease as much as in the baseline phase. The self-control increased gradually during the baseline phase and decreased during the EMDR phase or did not increase as much as in the baseline phase. The VAS results show that the VAS could not decrease (for urge) and increase (for self-control) any further during the baseline phase, due to the ceiling and floor effect. Figure 2 shows only two measurements because of missing data at the end of the EMDR sessions. The data show that the urge decreased and the self-control increased at the end of the baseline phase. Participant 8 did not gamble during the baseline phase and the EMDR sessions. He valued the sessions as “very good,” and believed AF-EMDR would help him to stop gambling.

Results Summarized

Interrupted Time-Series Analysis

Urge. Table 2 shows a statistically significant decrease in the slope change of the urge to gamble during the baseline phase in two participants (P2 and P8). These participants reported a decrease of their urge to gamble in the baseline phase, to an extent that made it hard to experience further improvement during the AF-EMDR phase (a floor effect). There were statistically significant slope changes in urge during the AF-EMDR treatment phase for two participants (P3 and P7), indicating that their urge to gamble decreased gradually during the EMDR phase. In addition, there was a marginally significant slope change for one participant (P1) whereby the level of the urge changed abruptly after the start of the AF-EMDR intervention.

Self-control. In the baseline phase, two participants (P2 and P8) reported a significant increase in experienced self-control to an extent that further improvements were hardly feasible (again a floor effect). One participant (P3) reported a small but significant decrease of experienced self-control during the baseline phase and showed a larger decrease of self-control during the AF-EMDR phase, but experienced an overall high level of self-control in the whole study period. Another participant (P7) experienced a decrease of self-control during the baseline phase but an improvement of self-control during the AF-EMDR phase. Three participants had no changes in their self-control (P1, P4, and P6).

Visual Inspection

Shortened OCDS. Figure 2 indicates that the urge to gamble decreased for two participants (P4 and P7) from baseline to the AF-EMDR phase. In one participant (P5) the urge to gamble increased somewhat, and this participant indicated more urge to gamble after the AF-EMDR phase compared to the baseline phase. In the other five participants (P1, P2, P3, P6, and P8) the urge to gamble had already decreased in the baseline.

GASS. Figure 2 indicates that experienced self-control increased in four participants (P1, P4, P5, and P7) from baseline to the AF-EMDR phase. For experienced self-control an early effect during the baseline was seen in two participants (P6 and P8), and in two other participants (P2 and P3) self-control stayed more or less the same during the AF-EMDR phase.

Gambling Behavior. Of all eight participants, four did not gamble in both phases (P1, P3, P5, P8). Three participants gambled in both phases (P2, P4, P6), but two of them (P2 and P6) gambled less during the AF-EMDR phase. One participant (P7) gambled during the baseline phase but not during the AF-EMDR phase.

Discussion

ITSA analysis identified three groups of participants: those with spontaneous recovery during baseline ($n = 2$), which resulted in a floor effect during the AF-EMDR phase; those who did not show changes at all or could not be assessed due to a lack of variation in scores ($n = 3$); and those who showed improvement during AF-EMDR therapy ($n = 3$). Two of the eight participants (P2 and P8) experienced spontaneous

recovery before the EMDR phase, either on self-control (P8) or on self-control and the urge to gamble (P2). Spontaneous recovery during waiting time is a common occurrence (Schacter, Gilbert, & Wegner, 2011). Consequently, these two could not experience further improvement during the AF-EMDR phase. However, they did not relapse during the AF-EMDR phase and seemed to stabilize. No change was seen for another two participants (P4 and P6).

Based on the ITSA analysis, the other three participants (P1, P3, P7) experienced positive effects regarding the urge to gamble during the AF-EMDR phase. The analysis showed that in the EMDR phase compared to the waiting period (baseline phase), the urge to gamble was marginally (P1) or more substantially significantly reduced (P3, P7). Regarding self-control in these three participants, one participant reported a significant increase in experienced self-control during the AF-EMDR phase (P7). The visual inspection also shows similar results in these three participants as the urge was reduced and the experience of self-control increased during the AF-EMDR phase. No harmful side effects were reported.

Four participants did not gamble at all during both phases, two other participants did not gamble or gambled less in the EMDR phase, and one other participant gambled more in the EMDR phase. This constitutes an acceptable success rate in comparison to that of CBT, where changes in the classification of gambling behaviors and/or changes in gambling symptom severity vary between 39% and 89% (Mercuris, Thomas, Browning, & Dowling, 2016). During the AF-EMDR phase, three out of five participants experienced positive changes in one or both variables. This also appears to be an acceptable success range.

Treatment-naïve participants seem to have experienced more positive changes due to AF-EMDR therapy than those who had previously received addiction treatment. This could be due to the fact that they made the first step in getting rid of their problem or that participants with a treatment history did not gain as much as the treatment-naïve participants, because symptom levels had already improved. However, these are preliminary findings. The small sample prohibits definitive conclusions.

The treatment consisted of a number of different AF-EMDR modules and it is not known which modules are best used. Because of the length of the treatment (six sessions of 90 minutes), there was not always time to desensitize all targets. Although all participants valued AF-EMDR therapy as an intensive but positive experience, it was not always clear what

aspects of this treatment were considered positive. Most participants expressed the idea that the intervention would help them to control their gambling behavior. These attributions may keep participants motivated and prevent dropout.

In summary, in accordance with preliminary findings about AF-EMDR therapy in general (Markus & Hornsveld, 2017) and findings about AF-EMDR for GD in particular (Bae et al., 2013; Miller, 2012), the present study shows that AF-EMDR seems to be of value for several patients with GD. However, the referenced studies differed in the way they used EMDR, and it is not yet clear which AF-EMDR interventions work best. In addition, the studies also differed in the dose of AF-EMDR used. The optimal dose may differ between patients and may be higher for some than used in this study.

This study sample, although it included both female and male patients with differing ethnic backgrounds and treatment histories, was limited to eight participants. This limits the generalizability of these preliminary findings. In addition, the fact that several EMDR therapists participated (working at three different sites) may have influenced the way the intervention is given, but analysis of the session videotapes showed good adherence to the AF-EMDR protocol, thereby prior instruction and the use of a treatment manual also assured treatment fidelity. Finally, since follow-up assessments were not planned, the question of whether clinical effects lasted over time is still open. Further research is also warranted since, as was argued in the introduction, there are no established evidence-based treatments for GD. Research should therefore focus on determining whether AF-EMDR is equally or more effective than currently used interventions.

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