Is taxing working memory effective in reducing dental anxiety?

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Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Other condition
Study type	Interventional

Summary

ID

NL-OMON37504

Source
ToetsingOnline

Brief title
Reducing dental anxiety by taxing working memory

Condition

- Other condition

Synonym
dental fear, dental fobia

Health condition

angst voor tandheelkundige ingrepen

Research involving
Human

Sponsors and support

Primary sponsor: Universiteit van Amsterdam
Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: dental anxiety, Tetris, working memory

Outcome measures

Primary outcome

Trait anxiety for dental treatment; state anxiety; liveliness of the

flashforward, emotional charge of the flashforward.

Secondary outcome

Difficulty of accessing the flashforward. The percentage of people that may or

may not (any longer) meet the characteristics of a specific phobia of dental

treatment after the intervention.

Study description

Background summary

The aim of this study is to determine whether level of dental anxiety reduces when people who suffer from dental phobia play the computer game Tetris®. For this study we recrute people who visit a Center for Special Dentistry.
Patients with dental phobia do not primarely suffer from distressing memories and intrusive imagery from the past (i.e., flashbacks), but they mainly suffer from distressing images of what might happen in the future (DSM-IV-TR, 2000; Brewin et al., 2010). The idea of a confrontation with the dreaded object or situation automatically evokes a fear response. A study of De Jongh and his colleagues showed that dentally high-anxious patients are more likely to experience negative, irrational thoughts, both during and prior to treatment, than those with low anxiety (De Jongh et al., 1994). They also report to experience less control about their negative thoughts than their low anxious counterparts (De Jongh et al., 1996; Marteau & Bekker, 1992).
Nowadays, Eye Movement Desensitization and Reprocessing (EMDR) is widely used as a first-line treatment for traumatic memories (Shapiro, 2001; De Jongh & ten

Broeke, 2011). A core feature of EMDR is that the patient is requested to hold in mind a disturbing memory while engaging in sets of bilateral dual attention stimuli (i.e., eye movements, taps or tones; Shapiro, 2001). One of the theories for explaining the effectiveness of this treatment approach is the working memory theory which is based on the notion that recalling an episode depends on the working memory capacity which is limited (Baddeley, 2012). Since a traumatic memory is inherently intense, vivid and emotionally charged, it taxes working memory resources when it is recalled. If at the same time another task (i.e., client*s eyes following the therapist's hand back and forth) is executed during recall, fewer resources would be available for the memory (Maxfield et al., 2008; Weitgarnter, 1984; Baddeley, 2012). This competition within the working memory results in less memory resources for the vividness and the disturbance or emotionality of the memory. Until now, a series of experimental studies has been conducted that is supportive of a working memory explanation of EMDR. Memories have been found to not only become less disturbing and less vivid during execution of an eye movements task (e.g., Gunter & Bodner, 2008).
The working memory account predicts that tasks that tax working memory will affect the intensity of both flashbacks and flashforwards. Indeed, it has been found that a competing task for working memory resources will reduce not only the emotionality of retrospective images but prospective images as well (Engelhard et al., 2011; Butler et al., 1995). This interpretation is supported by a study using Tetris® after viewing a traumatic movie. Individuals that played Tetris® reported significantly less flashbacks of the traumatic images after one week compared to a control group of subjects who did not play Tetris® after having watched the same traumatic movie (Holmes et al, 2009; Homes et al, 2010). The effects of playing Tetris® seems to be comparable with that of using eye movements (Engelhard et al, 2010). Although the effects of taxing working memory with a dual-task on flashbacks and flashforwards has been supported by prior studies (Holmes et al, 2009; Holmes et al, 2010; Engelhard et al, 2010; Engelhard et al, 2011), it is not yet clear whether these effects can be replicated in patients suffering from a specific phobia.
The question is whether playing the computer game Tetris® is capable of exerting a positive effect on flashforwards of patients suffering from a severe form of anxiety about dental treatment. To this end, playing a computer game prior to undergoing dental treatment seems to be more practical than making eye-movements according to the EMDR protocol since these must be applied by an experienced and well-educated clinical psychologist. A computer game like Tetris® can be played behind a PC, on a handheld console or even on a smart phone that is accessible at any given time. Moreover, the game Tetris® can be played solitary.

Study objective

The purpose of this study is to determine whether playing the computer game Tetris® prior to dental treatment is capable of reducing trait anxiety in patients suffering from a severe form of dental anxiety. Patients who visist a

dental fear clinic are asked to think about one aspect of dental treatment that they fear most. They focus on their mental representation of what might go wrong (a so called *flashforward*). At the same time their working memory will be taxed by playing the computer game Tetris®.

The following hypotheses are tested:
1. Taxing working memory of patients with fear of dental treatment by playing the computer game Tetris® reduces the vividness of their flashforward. (as indexed by a Visual Analogue Scale (VAS), from 0 = 'not lively' to 100 = "extremely lively").
2. Taxing working memory of patients with fear of dental treatment by playing the computer game Tetris® reduces the emotionality of a flashforward (as indexed by a Visual Analogue Scale (VAS), from 0 = "not at all emotionally charged" to 100 = 'extremely emotional').
3. Taxing working memory of patients with fear of dental treatment by playing the computer game Tetris® reduces trait anxiety in regard to the dental treatment significantly, compared to the levels of three weeks prior. Level of dental trait anxiety is measure at the start of the study using the K-ATB, and is administered again when commencing dental treatment three weeks thereafter.
4. Taxing working memory of patients with fear of dental treatment by playing the computer game Tetris® reduces dental trait anxiety regarding the dental treatment significantly more than it does for patients without intervention. The difference between the scores of the K-ATB questionnaire at the start of the study and measured three weeks later, will be compared with those of the control group.
5. Taxing working memory of patients with fear of dental treatment by playing the computer game Tetris® reduces state anxiety level of patients during treatment. Level of state anxiety will be determined by the VAS, which runs from 0 = 'no fear' to 100 = "extreme fear". This will be measured at the start of the study and after having playied Tetris®.
6. Taxing working memory of patients with fear of dental treatment by playing the computer game Tetris® reduces state anxiety level of patients during treatment significantly more than of patients that did not get an intervention. Level of state anxiety will be determined by the VAS which runs from 0 = 'no fear' to 100 = "extreme fear". This will be measured at the start of the study and at the start of a treatment appointment three weeks later. The difference between these scores will be compared to those of the control group.
7. Taxing working memory of patients with fear of dental treatment by playing the computer game Tetris® reduces the extent to which a flashforward can be recalled signifcantly more than that of patients who do not receive this intervention. The extent to which the flashforward can be recalled before and after playing the computer game Tetris® will be measured with the Visual Analogue Scale (VAS), which runs from 0 = "can not be recalled at al" to 100 = 'can be recalled extremely easy'.

Study design

Sixty patients with severe fear of dental treatment registered at a Center for Special Dentistry (CBT), will be randomly allocated to two groups of 30 patients each, being the intervention group either the control group. Patients in both groups will receive a necessary dental treatment that will consist of administering a local anesthetic followed by the restoration of a tooth affected by caries, an endodontic treatment or the extraction of a tooth. This treatment will not exceed a duration of 60 minutes.
We expect that 24 to 30 months will be needed to recruit the required number of participants.
To determine whether a specific phobia is present a clinical diagnostic interview, the MINI Plus version 5.0.0. (Sheehan, 1998; van Vliet, the Beurs, 2007) will be administered. A trained dentist will conduct this interview. The second instrument is a short questionnaire, called the 'Phobia checklist', and consists of four questions that will be administered by the dentist (Oosterink et al., 2009). This checklist screens for the presence of the DSM-IV-TR criteria of a specific phobia (DSM-IV-TR, 2000). Subsequently, level of trait anxiety and state anxiety will be determined. Patients will be requested to fill out the K-ATB (Short version of the Dental Anxiety Inventory). The K-ATB appears to be a reliable and valid instrument to assess level of dental anxiety (Aartman, 1998).
Prior to treatment patients are asked to indicate the level anxiety they feel at that particular moment using a Visual Analogue Scale (VAS) ranging from 0 to 100). Next, patients in the control group will receive a standard dental treatment. The need for this dental treatment has previously been assessed and will consist of administering a local anesthetic followed by the restoration of a tooth affected by caries, an endodontic treatment or the extraction of a tooth. Type of treatment and treatment time will be recorded by the investigator and will not exceed 60 minutes. The treatment itself is not adapted to the study and is equal to the treatments other patients receive. Duration of treatment (defined as the time spent in the dental chair), type of treatment (filling, extraction, endodontic treatment), number of treatment (first treatment, second treatment, etc.), and the elapsed time between treatments will be recorded and filled out on a patient-related data sheet.
The participants in the intervention group are told that they will play the computer game Tetris ® on a console LCD Brick Game 999-in1 for a few minutes in four periods of three minutes. Between each period there will be a break of 60 seconds. The consoles are issued out by the investigators.
Prior to playing Tetris the patients in the experimental group are asked to bring up a picture in their heads of the following dental treatment. This so called 'flashforward' will mainly consist of the most feared aspect of dental treatment ("the catastrophe"). The dentist will ask questions to clarify the flashforward for a detailed description: "Create a clear picture of this situation and describe it briefly. What do you see tha tgoes wrong? What are you doing? What is happening? What do you see? (On a scale of 0 to 10, how anxious are you feeling now?)". The patients will be asked to recall their picture for 20 seconds and indicate the vividness and emotional charge of it on two 100 mm Visual Analogue Scale (VAS), which runs from 0 = 'not alive' to 100

= "extremely vivid" . It will be scored for how emotionally charged the picture is and how difficult it is to recall, on a 100 mm VAS (0 = 'not disturbing' and 'not difficult', 100 = 'extremely emotional' and ' extremely difficult "). The patients are asked to keep this picture in mind, while playing Tetris®. After the last period of 180 seconds playing Tetris®, participants are again asked to recall the image for 20 seconds and score it on vividness and emotional impact using the VAS. This procedure is based upon the procedure described and used by Van den Hout et al (2001) and Gunter and Bodner (2008). The VAS scores are used to determine whether the computer game Tetris® provides an accurate taxing of working memory.
Within 15 minutes after completing the VAS, a standard dental treatment will start that is not adapted to the study and is equal to the treatment that other patients receive. The criteria for this are identical to those of the control group. After completing dental treatment the participants of both groups will again be asked on a VAS from 0 to 100 to indicate how much anxiety they feel at that moment.
After three weeks, all participants will again visit the center (the number of days between the first and second appointment will be listed on a patient-related data sheet). During this second appointment participants of both groups, will be asked to again fill out a K-ATB questionnaire and to indicate on a VAS from 0 to 100 the level of anxiety they feel at that moment. The MINI Plus version 5.0.0. and 'Phobia' checklist' will be administered again. The participants in the intervention group will be asked to recall their "flashforward" for 20 seconds and to rate it on vividness and emotional impact using a VAS. Immediately thereafter, within a maximum of 15 minutes, participants of both groups will again receive a 'standard' dental treatment.

Intervention

Prior to dental treatment, the participants in the intervention group are asked about their most feared aspect of the dental treatment (catastrophe) and take this image in mind as a flashforward. They will then play the computer game Tetris ®. Playing the computer game Tetris ® will be done on a console LCD Brick Game 9999-in1. There are four periods of each three minutes played, with 1 minute resting time in between. After the last period again vividness and emotional impact are scored on a VAS. Within 15 minutes after playing the computer game Tetris® a standard dental treatment will take place.

Study burden and risks

Participants who take part in the trial receive dental treatment that is in no way adapted to the study. Their dental treatment will be equal to that which other patients receive. Participation in the study requires completing questionnaires and playing the computer game Tetris ®, which will take about 15 minutes. There are no risks associated with participation in the trail.

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

Participants are 18 years or over and suffer from dental anxiety.

Exclusion criteria

Patients already familiar with EMDR treatment are excluded from this study.

Study design

Design

Study type:	Interventional
Intervention model:	Parallel
Allocation:	Randomized controlled trial
Masking:	Single blinded (masking used)

Primary purpose: Treatment

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	01-02-2013
Enrollment:	60
Type:	Actual

Ethics review

Approved WMO

Date:	10-01-2013
Application type:	First submission
Review commission:	METC Amsterdam UMC

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL40478.029.12