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Negative mental imagery in public speaking anxiety: Forming cognitive resistance by taxing visuospatial working memory



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ABSTRACT

Background and objectives: This study sought to reconcile two lines of research. Previous studies have identified a prevalent and causal role of negative imagery in social phobia and public speaking anxiety; others have demonstrated that lateral eye movements during visualisation of imagery reduce its vividness, most likely by loading the visuospatial sketchpad of working memory. It was hypothesised that using eye movements to reduce the intensity of negative imagery associated with public speaking may reduce anxiety resulting from imagining a public speaking scenario compared to an auditory control task.

Methods: Forty undergraduate students scoring high in anxiety on the Personal Report of Confidence as a Speaker scale took part. A semi-structured interview established an image that represented the participant's public speaking anxiety, which was then visualised during an eye movement task or a matched auditory task. Reactions to imagining a hypothetical but realistic public speaking scenario were measured.

Results: As hypothesised, representative imagery was established and reduced in vividness more effectively by the eye movement task than the auditory task. The public speaking scenario was then visualised less vividly and generated less anxiety when imagined after performing the eye movement task than after the auditory task.

Limitations: Self-report measures and a hypothetical scenario rather than actual public speaking were used. Replication is required in larger as well as clinical samples.

Conclusions: Visuospatial working memory tasks may preferentially reduce anxiety associated with personal images of feared events, and thus provide cognitive resistance which reduces emotional reactions to imagined, and potentially real-life future stressful experiences.

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1. Introduction

Despite controversy, several meta-analyses have substantiated the effectiveness of Shapiro's (1989; 2001) Eye Movement Desensitisation and Reprocessing (EMDR) therapy (Bisson et al., 2007; Cloitre, 2009) and experimental, laboratory-based paradigms have enabled the isolation and testing of the core eye movement component. Typical methodologies involve lateral eye movements during image visualisation, with pre-test and post-test vividness and emotionality ratings. Using this procedure, studies have shown that eye movements reduce the intensity of negative autobiographical memory and negative future imagery in normal, sub-

clinical and clinical samples (e.g. Andrade, Kavanagh, & Baddeley, 1997; Engelhard, van den Hout, Janssen, & van der Beek, 2010; Engelhard et al., 2011; Kavanagh, Freese, Andrade, & May, 2001; Lilley, Andrade, Turpin, Sabin-Farrell, & Holmes, 2009).

Regarding the underlying mechanism of this effect, the consensus is that eye movements depend upon limited working memory resources, leaving fewer resources to be allocated to the image visualisation (see Postle, Idzikowski, Della Sala, Logie, & Baddeley, 2006). This interference combined with the volatile nature of memory renders the image subject to reconsolidation as less vivid and consequently less emotionally salient (see Nader, 2003; Lee, 2008). Baddeley and Andrade (2000) showed that taxing the visuospatial sketchpad specifically provided optimum interference with visual imagery. Thus, theoretical accounts based on a working memory perspective and convergent experimental work suggest that visuospatial tasks, such as eye movements, reduce the

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vividness of imagery as a result of limited capacity working memory resources, which then reduces emotionality (Andrade et al., 1997; Kemps & Tiggemann, 2007; Lilley et al., 2009).

A separate line of research has highlighted the prominence of negative imagery in the onset and maintenance of anxiety. Hackmann, Clark, and McManus (2000) found that all 22 of their socially anxious participants experienced recurrent negative imagery based around an event that they felt had caused or worsened their condition. In an experimental manipulation, Hirsch, Meynen, and Clark (2004) found that socially anxious participants and their conversational partners rated their interaction more negatively when the participants visualised a negative self-image. The authors concluded that negative imagery ‘contaminates’ social interaction.

This finding was replicated in confident public speakers: rehearsing a negative self-image led to lower self-report performance ratings and increased anxiety during a speech (Hirsch, Mathews, Clark, Williams, & Morrison, 2006). Negative imagery therefore appears to play a causal role in social performance and anxiety, even in confident public speakers, and so may be an important factor in public speaking anxiety (PSA). Public speaking is a common requirement in many occupations and courses of education, and PSA is a prevalent phenomenon affecting educational success, career progression and general self-confidence (Bodie, 2010). Novel theory-driven approaches to reduce negative imagery in PSA could therefore inform interventions for individuals across the social anxiety continuum.

The present study seeks to reconcile the two lines of research. Negative imagery is an established factor in the onset and maintenance of social anxiety (Hackmann et al., 2000), and has been shown to ‘contaminate’ future social interaction and public speaking performance (Hirsch et al., 2004, 2006). This implies that reducing the intensity of such imagery may in turn reduce levels of social anxiety and reduce the ‘contamination’ observed by Hirsch and colleagues. Reducing the intensity of negative imagery using the eye movement paradigm is, in itself, an established body of literature (for review see Jeffries & Davis, 2013) but thus far primarily applied to post-traumatic flashbacks in clinical samples or general negative autobiographical memories in analogue studies. The rationale for the present study was, therefore, to apply the eye movement technique to the negative imagery common in social anxiety (specifically public speaking anxiety), in order to test whether such imagery may be reduced and if so, whether such reductions would transfer to future public speaking image vividness and associated anxiety.

Although the effect of eye movements on imagery is well established, the interpretation that this effect stems from modality-specific interference is more contentious. In the studies by Andrade et al. (1997), Kemps and Tiggemann (2007) and Lilley et al. (2009), eye movements were compared with concurrent articulation (e.g., counting aloud), which arguably is a less novel, less demanding task. Gunter and Bodner (2008) suggested that the critical variable is task load not modality congruency, reporting that an auditory shadowing task that imposed a similar cognitive load to eye movements had similar effects on vividness and emotionality. Van den Hout et al (2011) reported that equally demanding tasks, namely, eye movements and an attentional breathing task, had similar effects on vividness and emotionality despite different visuospatial demands. However, Engelhard, van Uijen and van den Hout (2010) found similar effects of two visuospatial tasks, Tetris and eye movements, despite differing general loads. In all of these studies, the interference tasks differed considerably in features such as task structure and response mode as well as in general and modality-specific cognitive load, making it hard to evaluate the differing findings. Therefore, a further innovation in the present study was to compare eye movement

and auditory tasks that were far more closely matched than those used previously. If eye movements are found to reduce public speaking anxiety relative to the control task, the effect would be attributable to modality-congruent interference rather than general distraction.

In summary, this study was the first to the authors' knowledge to apply the established eye movement paradigm to negative imagery in social/public speaking anxiety and to observe effects on a hypothetical real-life scenario. The study aimed to contribute to the broader and topical body of research in experimental psychopathology investigating the nature of working memory interference during image visualisation by comparing two closely matched interference tasks differing only in relative impact upon visuospatial and auditory working memory. Our predictions were as follows:

- 1) Participants would be able to report visual mental images representing their PSA
- 2) The vividness of these representative images would be reduced to a greater extent following the eye movement task than the auditory task due to modality-specific interference
- 3) Participants in the eye movement condition would report lower levels of emotionality of their images related to social anxiety, and experience less vivid imagery of a future public speaking scenario, as well as less associated anxiety, than those in the auditory condition.

2. Method

2.1. Participants

Forty Plymouth University undergraduate students participated in the study (mean age 22 years, age range = 18–39, 31 females). All participants were screened for public speaking anxiety (PSA) using the 12-item Personal Report of Confidence as a Speaker (PRCS) scale (Hook, Smith, & Valentiner, 2008). Seven participants (17%) indicated that they had received treatment for anxiety or related disorders, and two participants (5%) declined to respond to this question.

2.2. Measures and materials

Personal Report of Confidence as Speaker (PRCS; Hook et al., 2008): This 12-item scale was used as a screening measure, with a six-point rating scale (completely disagree to completely agree) as per Martínez-Pecino and Durán (2013) to allow increased depth of responding. The PRCS includes items such as ‘While preparing a speech I am in a constant state of anxiety’ and ‘I am fearful and tense all the while I am speaking before a group of people’. As reported by Hook et al. (2008), the scale has high internal consistency (Cronbach's $\alpha = .85$), and high convergent validity with the Social Phobia Scale, ($r = .54, p < .001$), and the State-Trait Anxiety Inventory Trait scale ($r = .44, p < .001$). For post-test re-administration, the short-form PRCS scale was amended to the future tense and words such as “speech” substituted with “presentation” to reflect the public speaking scenario used here.

Image Representativeness, Vividness, Emotionality, Confidence, Anxiety, Task Difficulty and Scenario Vividness: 100 mm visual analogue scales (VAS) were used to record responses whereby 0 = ‘Not at all’ and 100 = ‘Extremely’.

Semi-structured Public Speaking Anxiety Interview (adapted from Hackman et al., 2000): Experiences of public speaking and associated feelings and imagery were elicited by the interviewer. Participants were asked to describe their past experiences of public

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