

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

Sophie R. Homer, Catherine Deepprose*, Jackie Andrade

*School of Psychology, Cognition Institute, Plymouth University, Drake Circus,
Plymouth, Devon, PL4 8AA, UNITED KINGDOM*

*E-mail address: catherine.deepprose@plymouth.ac.uk

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.

Key words: EMDR, imagery, public speaking, social anxiety, eye movements, working memory

1. Introduction

Despite controversy, several meta-analyses have substantiated the effectiveness of Shapiro's (1989; 2001) Eye Movement Desensitisation and Reprocessing (EMDR) therapy (Bisson, 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 and Baddeley, 1997; Kavanagh, Freese, Andrade & May, 2001; Lilley, Andrade, Turpin, Sabin-Farrell & Holmes, 2009; Engelhard, van den Hout, Janssen and van der Beek, 2010; Engelhard, van den Hout, Dek et al., 2011).

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; and Rudy, 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 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 (2011) 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 the 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 and 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 Martinez-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: 100mm 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 speaking including any negative experiences, how they feel during public speaking and what particular aspects of public speaking they believed to be anxiety inducing. Participants were asked whether they had experienced any imagery during the interview and if so, asked to describe this. In the absence of being able to spontaneously report a clear image, participants were probed on particular memories or experiences they had mentioned. For example, if the participant described dislike of seeing their audience, they would be asked to describe how the audience might appear to them. When the interviewer was satisfied that a clear visual image had been established, participants rated how well they felt that the image represented their PSA on a 100mm VAS. This was used to ensure the validity of the image as a visual representation of the participant's anxiety prior to undertaking the main experimental manipulation. A subset of the interviews were transcribed and analysed with the aim of replicating the procedure and findings of Hackmann et al. (2000) in the current sub-clinical participant sample using a comparable number of participants as originally reported. Themes were identified by the experimenter through thematic analysis of the transcripts (Braun and Clarke, 2006) based on the findings by Hackmann et al. (2000).

Concurrent Working Memory Tasks: Visuospatial and auditory interference was established using computerized working memory tasks based on Andrade, Kavanagh and Baddeley (1997) and Boomsa (2013). In the visuospatial (eye movement) condition, individual letters (5mm height, bold font) were repeatedly presented at alternate sides of the computer monitor, on a background of alternating black and white stripes (1.5cm in width) in order to increase visuospatial interference. At the beginning of each trial, participants were presented the target letter and told to respond when it appeared on either side of the screen by pressing the space bar. Letters were presented in sequences of 20 items. Two sequences made up one trial, and the task consisted of 3 trials lasting a total of 60sec. Trial 1 consisted of 38 presentations of the letter p with the target letter, q, presented once at random points in each sequence (a total of twice per trial). This procedure was repeated for trial 2 with the target letter d, and trial 3 utilized the letter m with n as the target letter. The letters were presented for 300msec with a 200msec interstimulus interval. Participants were asked to refrain from moving their head during the task, thus moving only their eyes to focus on each letter. Before the main task, participants completed a practice task comprising one sequence of six letters with one target.

The comparable auditory condition required participants to listen to spoken letters presented in stereo through headphones in front of a blank computer screen. Participants responded to target letters placed randomly within a sequence by pressing the space bar. Each spoken letter was presented for 400msec with a 200msec interstimulus interval. The auditory task consisted of sequences of 17 letters with 1 target per sequence, thus matching the visuospatial task in duration.

Again, 2 sequences constituted 1 trial and the task comprised of 3 trials, lasting 61.2sec. The letter used in trial 1 was P with the target B, P in trial 2 with the target D, and M in trial 3 with the target N. As with the visuospatial task, participants completed a practice task comprising one sequence of six letters with one target.

The tasks were designed such that they differed only in the working memory modality they targeted (i.e., visuospatial working memory or the phonological loop). Feedback on performance was not provided to participants. A pilot study confirmed that the tasks were of equal cognitive load. Each task was completed by 12 participants using a counterbalanced within subjects design. No statistically significant differences were found between the tasks for self-reported difficulty ($M_{\text{eye movements}} = 5.58$, $SD = 1.93$; $M_{\text{auditory}} = 5.08$, $SD = 2.71$; $t(11)=1.39$, $p=.191$), self-reported pleasantness ($M_{\text{eye movements}} = 4.92$, $SD=1.78$; $M_{\text{auditory}} = 4.50$, $SD=1.73$; $t(11)=.57$, $p=.581$), or task accuracy assessed by the number of correct responses ($M_{\text{eye movements}} = 5.67$, $SD = 0.65$; $M_{\text{auditory}} = 5.83$, $SD = 0.39$; $t(11)=-.692$, $p=.504$.)

Public Speaking Scenario: Participants were given a hypothetical public speaking scenario as follows: 'During a session this week, your personal tutor announced that you must deliver a 10 minute PowerPoint presentation to around 15 of your peers. You have one week to prepare the presentation, which can be on any topic within your core psychology modules. Please spend 20 seconds vividly imagining this scenario, as if it were real'. The scenario was piloted in seven Plymouth University students. All participants reported that the scenario was believable and realistic; that the audience size, presentation length and preparation time specified in the scenario were appropriate and anxiety-inducing. The participants were invited to make

additional suggestions, and the scenario was amended slightly based on their feedback.

2.3 Procedure

The study began with the semi-structured interview to explore participant's experience of negative imagery in relation to public speaking. Participants were then asked to visualise their representative image of public speaking for 20sec and rate the vividness and emotionality on 100mm VASs. They also rated general (trait) confidence in and anxiety of public speaking, also on 100mm VASs.

Participants were randomly assigned to one of two conditions: visuospatial interference (eye movements) and auditory interference, and so completed one of the two computer-based tasks as previously described. Participants were asked to visualise their image as vividly as possible throughout the task. Immediately afterwards, they rated the difficulty of the task and the degree of vividness to which they maintained their image on 100mm VASs. Accuracy on the visual and auditory tasks was recorded by the software. Participants then completed a final image visualisation (20sec), followed by vividness and emotionality ratings.

Participants were then asked to read the public speaking scenario and to spend 20sec visualising it as vividly as possible. They then rated the vividness of their scenario visualisation on a 100mm VAS. Finally, they completed the post-test PRCS scale and rated their (state) confidence and anxiety in response to the scenario, again on 100mm VASs.

3. Results

3.1 Imagery

The first twenty interviews (mean age 21 years, age range = 18-35; 17 females) were transcribed and analysed.

3.1.1 Image Themes

1) Being the Centre of Attention (8 images, 40%)

Example 1: Image of the audience “staring” and “looking like they’re waiting.”

Example 2: “All eyes on me”.

2) Looking Anxious (4 images, 20%)

Example: Being “red faced and shaking”.

3) Making a Mistake (3 images, 15%)

Example: Watching oneself “muddling papers” and being unable to speak.

4) Being Judged by the Audience (3 images, 15%)

Example: Image of the audience “giggling” and “pulling faces” at each other.

5) The Moments Before Public Speaking (2 images, 10%)

Example 1: Looking down at a podium, about to begin a presentation.

Example 2: Facing a backstage door, waiting to enter the stage to begin a speech.

3.2 Image Representativeness

37 participants (92.5%) agreed that their image was representative of their PSA (mean rating = 84.72, SD = 6.50, range = 71-95). Phrases used included “typical of public speaking for me”, and “I can fully imagine”.

3.3 Working Memory Taxation

As per Engelhard, van den Hout, Dek, et al. (2011), four participants who were unable to generate a vivid image (baseline vividness score < 45 /100) were excluded, leaving $n = 36$ ($n = 17$ eye-movements, $n = 19$ auditory). Data were checked for outliers and distribution with no causes for concern identified.

3.3.1 Baseline Measures

Independent samples t tests confirmed that there were no differences in baseline (trait) PRCS scores, $t(34) = 1.42$, $p = .166$; confidence scores, $t(34) = 0.15$, $p = .882$, or anxiety scores, $t(34) = -.22$, $p = .828$, between groups. Means and SDs are shown in Table 1.

3.3.2 Control Measures

Independent samples t -tests confirmed that there were no differences in image representativeness scores, $t(20.21) = -1.50$, $p = .149$; task difficulty scores, $t(34) = -.94$, $p = .352$; or task accuracy scores, $t(34) = -.83$, $p = .414$, between groups. Means and SDs are shown in Table 1.

Table 1

Mean scores between conditions on baseline and control measures, SDs shown in brackets.

Condition	Baseline PRCS	Baseline Confidence	Baseline Anxiety	Image Rep.	Task Difficulty	Task Accuracy
Eye Movements ($n = 17$)	40.18 (8.54)	37.62 (19.83)	77.47 (13.18)	79.88 (14.76)	36.79 (23.22)	5.47 (.80)
Auditory ($n=19$)	36.21 (8.27)	36.47 (25.40)	78.53 (15.41)	85.61 (5.69)	44.12 (23.16)	5.68 (.75)

Rep = Representativeness

3.3.3 Vividness

A 3 x 2 mixed ANOVA assessed changes in vividness over time within subjects (baseline, during the task and after a final visualisation) and between the two task conditions (eye movements and auditory). Using the Greenhouse-Geisser correction, the ANOVA revealed significant main effects for time, $F(1.70, 57.75) = 81.75$, $p < .001$, $\eta p^2 = .706$, and condition, $F(1,34) = 5.68$, $p = .023$, $\eta p^2 = .143$, though the condition x time interaction showed only a trend in the expected direction, $F(1.70,57.75) = 3.00$, $p = .066$, $\eta p^2 = .081$. Paired samples t tests to investigate this trend revealed significant drops in vividness during the task (from baseline) for both conditions, $t(16) = 10.34$, $p < .001$, $d = 2.51$, (eye movements), $t(18) = 8.10$, $p < .001$, $d = 1.86$, (auditory), and significant increases from the task to the post-test visualisation $t(16) = -5.50$, $p < .001$, $d = -1.33$ (eye movements), $t(18) = -6.58$, $p < .001$, $d = -1.51$ (auditory). Independent samples t tests confirmed that there were no significant differences in baseline vividness scores between conditions, $t(34) = -.326$, $p = .746$, but that the eye movements vividness scores were significantly lower than auditory vividness scores during the task, $t(34) = -2.67$, $p = .012$, $d = 0.90$ and marginally lower after the post-test visualisation, $t(34) = -1.96$, $p = .058$, $d = 0.64$. Crucially, paired samples t tests also showed that images in the auditory condition reverted back to their original (baseline) vividness during the final post-test visualisation, $t(18) = .326$, $p = .748$, whereas post-test visualisation vividness scores in the eye movements condition were significantly lower than baseline vividness scores, $t(16) = 2.17$, $p = .045$, $d = 0.53$. Means and SDs can be seen in Table 2.

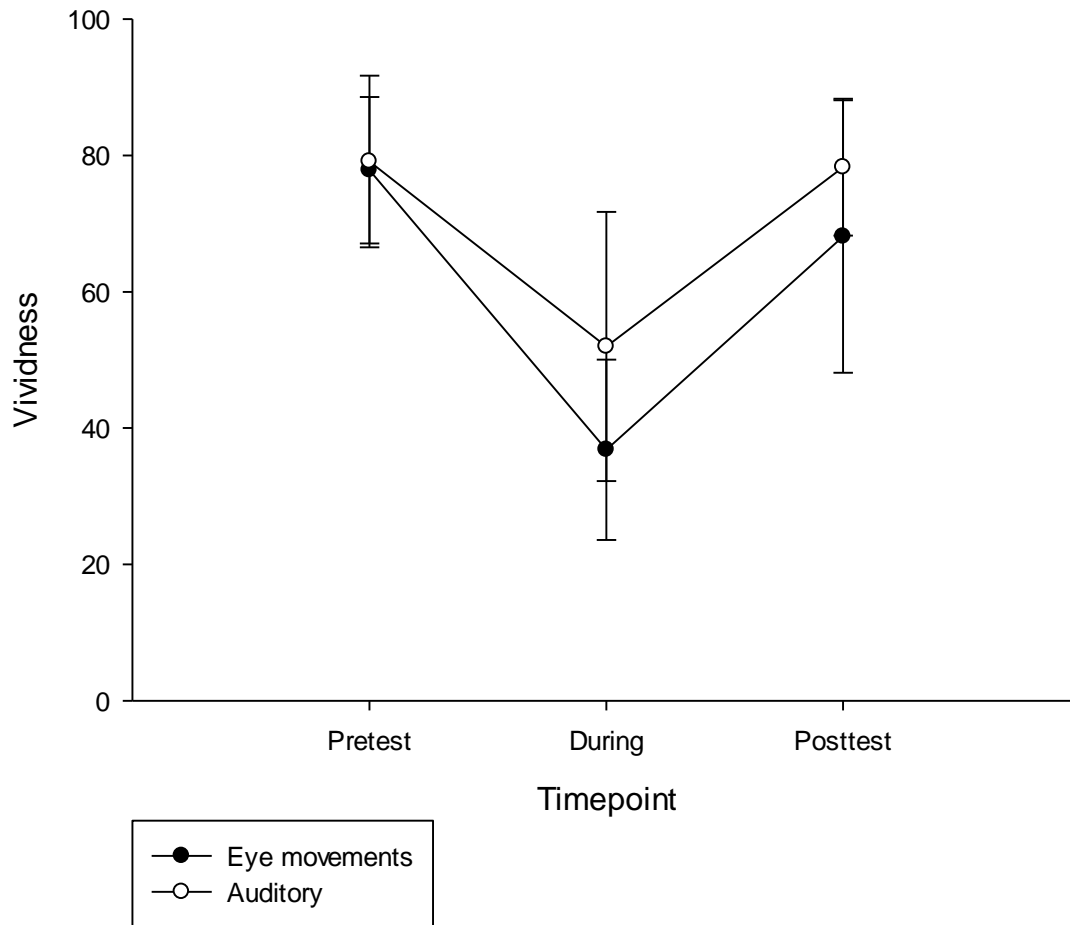


Figure 1: Baseline image vividness, image vividness during the concurrent working memory task and post-test image vividness between conditions (Mean +/- SD)

3.3.4 Emotionality

Emotionality scores were compared at baseline to the post-test image visualisation between groups. A 2x2 mixed ANOVA did not reveal significant main effects for time, $F(1, 34) = 2.34, p = .135$, nor condition, $F(1, 34) = .099, p = .756$. The condition x time interaction was in the expected direction, $F(1, 34) = 2.83, p = .102$, but did not reach significance. Means and SDs can be seen in Table 2.

Table 2

Mean vividness and emotionality scores between conditions across time, SDs shown in brackets.

Condition	Baseline Vividness	Task Vividness	Post-test Vividness	Baseline Emotionality	Post-test Emotionality
Eye movements (n=17)	77.85 (10.74)	36.82 (13.24)	68.12 (19.98)	65.56 (21.80)	53.88 (20.74)
Auditory (n=19)	79.13 (12.58)	51.97 (19.75)	78.29 (10.03)	61.55 (25.13)	62.11 (23.27)

3.3.5 Scenario Vividness

An independent samples *t* test confirmed that scenario vividness scores were significantly lower in the eye movements condition ($M = 67.71$, $SD = 13.28$), than the auditory condition ($M = 81.05$, $SD = 14.27$), $t(34) = -2.89$, $p = .007$, $d = 0.97$, even though participants stopped doing the eye movements or auditory task prior to visualising the scenario.

3.3.6 Post-test Measures

Independent measures *t* tests showed no significant differences between conditions, for post-test (state) PRCS scores ($M_{\text{eye movements}} = 40.12$, $SD = 8.85$; $M_{\text{auditory}} = 40.00$, $SD = 7.53$), $t(34) = .04$, $p = .966$, or post-test (state) confidence scores ($M_{\text{eye movements}} = 38.94$, $SD = 21.90$; $M_{\text{auditory}} = 37.47$, $SD = 24.42$), $t(34) = .19$, $p = .851$. However, post-test (state) anxiety scores for the eye movements group ($M = 73.74$, $SD = 14.53$) were significantly lower than for the auditory group ($M = 82.53$, $SD = 11.25$), $t(34) = -2.04$, $p = .049$, $d = 0.68$.

4. Discussion

As hypothesised, it was possible to establish a vivid visual image representative of public speaking anxiety (PSA) for the large majority of participants. The vividness of these images dropped significantly during both concurrent tasks, suggesting that concurrent cognitive load, regardless of the specific locus of working memory interference (see Gunter and Bodner, 2008), may have at least temporary benefits. However, our data suggest that larger and longer lasting benefits were found in the eye movement condition. While vividness levels returned to baseline in the auditory condition after the task, they remained lower than baseline in the eye movement condition, consistent with previous demonstrations that effects are durable (van den Hout, Muris, Salemink & Kindt, 2001). We suggest that these findings are in accordance with Baddeley & Andrade (2000), who found that visuospatial interference reduced visual image vividness more effectively than auditory interference. In the current study, the auditory and visuospatial tasks were closely matched and previous small-scale pilot work indicated the tasks were of comparable load. Although this initial pilot work may not have been well-powered, both tasks required detection of infrequent targets from similar distractors and used the same timings and response modes, with the critical difference being that the visual task required eye movements to spot targets and the auditory task required careful listening. In the current study, participants in both conditions performed equally well on the tasks and gave them equivalent difficulty ratings suggesting matching had been successful.

The trend towards greater vividness reductions in the eye movement condition, along with the clear differences between conditions in scenario visualisation and

concomitant anxiety, suggests that eye movements may have a greater impact on visual imagery compared to auditory interference, due in part to modality congruency (Andrade et al, 1997; Engelhard et al, 2011; Kemps & Tiggemann, 2007; Lilley et al, 2009) and not solely to differences in general task load (Gunter & Bodner, 2008; van den Hout et al, 2011). However the difference in vividness reductions between conditions was significant only at trend level and the larger drop in emotionality for the eye movements group compared to the auditory group did not reach statistical significance.

Significant reductions in both the vividness of the hypothetical scenario as well as reduced state anxiety were observed in the eye movements group compared to the auditory group. Notably, there were no differences in the scenario-based PRCS scores or confidence scores between groups, and the magnitude of effect for eye movements appeared greater for the scenario vividness ratings than for the representative image post-task. The extent of potential transfer of the reduction of vividness of past negative imagery to a reduction in image vividness and anxiety for *future* public speaking requires replication and extension, as well exploration of the potential underlying mechanisms.

We postulate that negative self-imagery would ordinarily be incorporated into (or would 'contaminate'; Hirsch et al., 2004) the scenario visualisation, adding to its vividness, negativity and resultant anxiety. Reducing the vividness of this self-imagery with competing visuospatial working memory load reduced its power to contaminate. This cognitive resistance to contamination meant that the scenario was not visualised as vividly and negatively as it may otherwise have been, manifesting

in a reduced anxiety response. Our interpretation is, however, preliminary as the study did not include a control scenario condition to confirm that the effects were specific to public speaking imagery. It is therefore possible that the eye movements group would have visualised any further imagery less vividly than the control group which would mean that the reduced scenario vividness was due to another effect, such as visuospatial working memory fatigue, rather than reduced contamination. The tasks were short, relatively undemanding and matched for difficulty which renders working memory fatigue or ego depletion less likely (see Baumeister, Bratslavsky, Muraven & Tice, 1998), but future research should seek to confirm this. Crucially, a reduced anxiety response was observed in the eye movement group regardless of the underlying mechanism.

The study used a hypothetical scenario and would benefit from replication using a real-life public speaking challenge. An additional limitation of the study is its reliance on self-report measures; future research could use psychophysiological measures as an objective measure of anxiety. Replications of the methodology should include a control scenario as previously described, and larger as well as clinical samples.

As well as anxiety, effects of reducing the vividness of negative imagery in social anxiety could be examined in terms of other relevant constructs such as implicit and explicit self-esteem. Any generalisation of the effect to public speaking or clinical samples is as yet speculative, pending replication, but the findings hold promise that cognitive manipulations that reduce the vividness of negative images before a social performance will help reduce anxiety during the performance. This would aid those experiencing anxiety prior to public speaking and, potentially, individuals for whom

negative self-imagery 'contaminates' their social interactions. Replication of the study in socially anxious individuals meeting diagnostic criteria and investigation of their performance in an actual social situation following the manipulation would be an interesting next step with more compelling clinical implications. Though preliminary, the study exemplifies a novel application of the eye movement technique beyond application to PTSD. Indeed, the methodology reported here may be used to investigate the effects of eye movements on other forms of negative imagery such as those found in phobias and health anxiety (see Hirsch & Holmes, 2007), suicidal imagery in depression (see Holmes, Crane, Fennell & Williams, 2007), and recurrent visual imagery accompanying cravings (e.g. Tiggemann & Kemps, 2005). Image themes relating to public speaking anxiety were a supplement to the quantitative methodology described here, but could be more deeply explored in qualitative work.

4.1 Conclusion

Public speaking anxiety can typically be represented in a visual mental image. These anxiety-images contaminate anticipations of public speaking performance but may be made less vivid through visuospatial interference. Reducing the vividness of representative images may reduce the imagined vividness of future feared events as well as subsequent anxiety. This cognitive resistance to contamination demonstrates a preliminary but promising novel finding within a well-established paradigm, and eagerly awaits replication and further exploration.

Author's note

All authors declare that there is no conflict of interest.

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