

# Hypothetical future orientated positive imagery reduces feelings of social anxiety in a healthy population

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**Abstract** Negative mental imagery has been shown to be involved in the onset and maintenance of numerous clinical disorders and as a result there has been growing scientific study of the therapeutic role of positive mental imagery, with studies reporting favourable results. However, with regard to social anxiety (SA) disorder the conventional approach to induce positive mental imagery has been suggested to be too demanding due to impairment in the retrieval of such episodes. Therefore, researchers have called for controlled studies to explore alternative inducement techniques with specific focus upon future orientated methods (a method more suitable for patients with SA). In the current study, we compare the conventional inducement technique (past) to a future orientated inducement technique (future) and a control condition (no imagery) and measure the impact upon self-reported levels of anxiety in a non-clinical population. Seventy-Eight younger students were randomly allocated to one of the two imagery inducement techniques or the control condition (and completed anxiety scales before and after imagery inducement or control task). To capture situational anxiety, phobia and broader short and long term (state versus trait) dysfunction the *Liebowitz Social Anxiety Scale* and *State-Trait Anxiety Inventory* were the chosen measures. Results confirmed that positive mental imagery reduces feelings of anxiety and demonstrated, for the first time, the effectiveness of a hypothetical future orientated technique to induce positive mental imagery. These data will provide the groundwork for intervention development in clinical populations with known difficulties capitalising on past based mental imagery.

**Keywords:** *Mental Imagery; Anxiety, Social Anxiety, Social Phobia, SAD, Social Anxiety Disorder, Affect, Memory*

## 1. Introduction

Over the previous two decades there has been growing scientific interest in the role that negative mental imagery may play in the onset and/or maintenance of some clinical disorders; for example, Depression, PTSD, Schizophrenia, Social Anxiety Disorder, Stroke, MS, Craving and Eating Disorders (see [1] for review) and its relevance for, and impact upon clinical treatment programmes; for example, imagery re-scripting in CBT (e.g. [2], schema focused therapy (e.g. [3]) and positive interpretation training (e.g. [4]). The scientific evidence for the role of negative mental imagery in Social Anxiety Disorder (SAD) is promising; for example, a negative mental image of the perceived self has been argued to be a key cognitive process for SAD maintenance (see [5] for review) and recent empirical evidence has demonstrated that SAD symptoms can be alleviated by self-imagery based interventions (e.g. [6, 7, 8]). In addition to the research on negative mental imagery, there is a small and limited body of work that has explored the impact of positive mental imagery in the context of social anxiety, in non-clinical student populations; for example, [9] and [10] have demonstrated the potential benefits of positive mental imagery for decreasing feelings of anxiety, while [11] and [6] have

demonstrated its benefits for increasing self-esteem. Indeed, a recent review, [12] highlights the potential for positive mental imagery in social anxiety contexts, despite making recommendations for replication in clinical populations and emphasising a need for appropriate control conditions.

Particular relevance to the present study, [12] draws attention to the fact that little is known of the optimal way to promote positive mental imagery in SAD. Indeed, the conventional approach, based upon the methods outlined by [13], may be too demanding cognitively and emotionally for individuals with clinical levels of social anxiety, due to their reduced ability to recall and elaborate upon previous positive social situation (e.g. [14]). This is a key point since those with SAD not only have a detrimental bias to effortlessly retrieve negative images but also poor encoding ability for positive episodes. The consequence of less rich memory for past positive episodes has the consequence of problematic later recall in SAD and is precisely why interventions which are less demanding are sought. Indeed, [12] suggests further exploration of hypothetical, future-orientated scenarios as an alternative.

The present study therefore aims to investigate the impact of positive mental imagery in the context of social anxiety

in a non-clinical student population utilising past (i.e. conventional method) and hypothetical future orientated imagery inducement procedures. To the authors knowledge this is the first study to investigate the potential efficacy of future orientated positive mental imagery in this context.

## 2. Methods

### 2.1. Design

A between subjects experimental design was utilised, consisting of one factor (imagery inducement technique) with three levels (past, future, and no imagery). Four dependant variables were measured (social anxiety, general anxiety, image vividness and image duration).

### 2.2. Participants

Seventy eight young healthy undergraduate students (28 male) were recruited from UK universities and randomly allocated (using simple randomisation) to one of three study conditions (past, future and no imagery conditions) resulting in 11 Males and 15 females in the past induced imagery condition, 9 males and 17 females in the future induced imagery condition and 8 males and 18 females in the no imagery condition.

### 2.3. Measures

#### Social Anxiety:

Social Anxiety was measured by the Liebowitz Social Anxiety Scale (LSAS-SR) [15]. The scale has been used in social phobia research for a number of years (e.g. [16, 17]). The LSAS-SR is a standardised 4 point self-report Likert scale consisting of 24 social situations, (e.g. "speaking up at a meeting") allowing participants to rate, for each situation, their fear of anxiety and how often they would avoid that situation. It has demonstrated high levels of internal consistency as well as good convergent and construct validity ([17, 18, 19])

#### General anxiety:

General anxiety was measured by the State-Trait Anxiety Inventory (STAI) [20]. The STAI consists of 40 statements, 20 measuring state anxiety (STAI-S; e.g. "I feel upset") and 20 measuring trait anxiety (STAI-T; "I lack self confidence"). Each statement is rated on a 4 point scale.

#### Image vividness and image quality scales:

Two eleven-point likert scales were implemented to measure Image vividness and image quality. Participants rated how vivid the induced image was from 0 (not at all) to 10 (extremely) and the length of time the image was held from 0 (none of the time) to 10 (all of the time).

#### Imagery instructions (adapted from [13])

Past induced imagery condition: participants were asked to recall a memory of a social situation where they felt significantly relaxed (positive). Once each participant

confirmed they had brought an image to mind they were instructed to close their eyes and imagine the image in detail. A series of questions were presented to help aid the detail of the image (e.g. How did you look? How do you feel? How did you come across to other people? What could you hear? What were your surroundings?).

Future induced imagery condition: participants were asked to imagine a future social situation where they would feel relaxed (positive). Once each participant confirmed they had brought an image to mind they were instructed to close their eyes and imagine the image in detail. A series of questions were presented to help aid the detail of the image e.g. How did you look? How do you feel? How did you come across to other people? What could you hear? What were your surroundings?).

No imagery condition: participants were asked to name 18 well known celebrity pictures. Participants received 1 point for each correct answer. Data was not analysed.

### 2.4. Procedure

The study received ethical approval from Teesside University's School of Social Sciences, Business and Law ethical committee. Each participant gave informed consent and after a 5 minute relaxation (sitting quietly) period, to allow the participant to compose themselves. completed the general (STAI) and social (LSAS) anxiety scales. Participants were randomly allocated to one of the three (past, future or no imagery) experimental conditions and provided with the appropriate written instructions to induce a positive mental image or complete the picture control task. In the past and future imagery conditions, participants were instructed to complete the LSAS and STAI-S whilst holding the induced image in mind. After this, participants completed the vividness and duration scales. The participants in the no imagery condition completed the celebrity picture task rather than induce a positive mental image. Participants were debriefed and thanked for their participation.

### 2.5. Analysis plan

To confirm that random allocation was successful and no systematic differences were present before intervention, pre-task self-reported levels of general (STAI) and social anxiety (LSAS) was explored by three separate one-way (past X future X no imagery) ANOVAs. To test the effect of positive mental imagery on general and social anxiety, two separate one-way ANOVAs utilising post-imagery change STAI(S) and LSAS score as the dependent variable was implemented. All significant effects were further explored by post-hoc (Bonferroni) test. Finally, image vividness and image duration was explored by two separate one-way (past X future) ANOVAs.

### 3. Results

Means and SD of self-reported ratings of general (STAI) and social (LSAS) anxiety, pre and post positive mental image inducement, for past, future and no imagery conditions can be found in table 1. Means and SD of self-reported ratings of image vividness and image duration can be found in table 2.

Table 1: Means and SD of self-reported ratings of general state (STAI-S), trait (STAI-T) and social (LSAS) anxiety, pre and post positive mental image inducement, for past, future and no imagery conditions

		Pre Image		Post Image	
		M	SD	M	SD
STAI (T)	Past	44.19	11.10	...	...
	Future	42.08	10.30	...	...
	No	44.73	11.41	...	...
STAI (S)	Past	40.69	11.42	-9.23	7.73
	Future	39.85	10.16	-7.15	7.31
	No	40.19	11.77	-1.12	3.39
LSAS	Past	56.69	27.95	-8.85	7.86
	Future	51.81	25.97	-11.5	13.26
	No	54.35	23.37	-1.96	5.24

#### Pre-imagery inducement:

One way ANOVAs revealed no significant effect of imagery condition on general anxiety [STAI(T) -  $F(2,75)=.427, p = 0.654$ ; STAI(S)-  $F(2,75)=.038, p=0.963$ ] or social anxiety [LSAS- $F(2,75)=0.233, p=0.793$ ] before imagery inducement. This confirms no systematic differences between groups prior to imagery inducement. See Table 1.

#### Effects of positive mental imagery:

One way ANOVAs revealed a significant effect of imagery condition on general anxiety [STAI(S) -  $F(2,75)=11.12, p<0.01$ ] and social anxiety [ $F(2,75)=7.13, p<0.01$ ] see Table 1 and Figure 1. Post hoc (Bonferroni) analysis revealed significant differences between past imagery and no imagery conditions for general ( $p<0.01$ ; Cohen's  $d=1.36$ ) and social anxiety ( $p=0.03$ ;  $d=1.03$ ); between future imagery and no imagery condition for general ( $p < 0.01$ ;  $d=1.06$ ) and social anxiety ( $p<0.01$ ;  $d= 0.95$ ); however, no significant difference between past imagery and future imagery conditions for general ( $p = .747$ ) and social anxiety ( $p=0.936$ ). See Figure 1, Panel A (general anxiety) and Panel B (social anxiety).

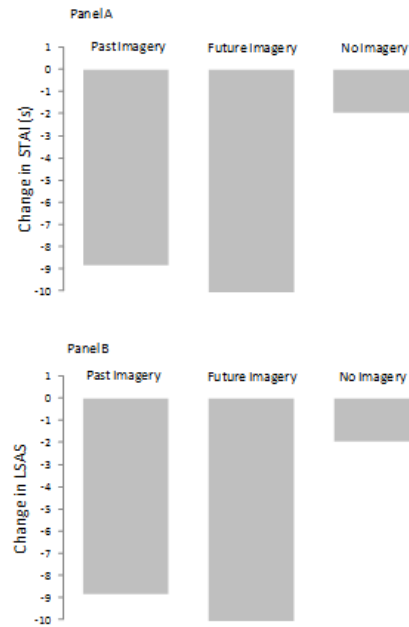


Figure 1. Mean change in self reported ratings of state (STAI-S) and social anxiety (LSAS) for past, future and no-imagery conditions

#### Image vividness and image duration:

One-way ANOVA revealed no significant difference between past imagery and future imagery conditions on self reported ratings of image vividness [ $F(1,50)=0.022, p=0.884$ ] and image duration [ $F(1,50)=0.631, p=0.431$ ]. See Table 2.

Table 2: Means and SD of self-reported ratings of image vividness and image duration of past and future imagery conditions

	Past		Future	
	Mean	SD	Mean	SD
Vividness	7.31	1.76	7.23	2.01
Duration	6.96	2.18	7.42	2.00

### 5. Discussion

The primary aim of the current study was to explore the potential of future orientated positive imagery in reducing social anxiety in a health population. Pictet's [12] review suggests such research activities are warranted given the difficulties with conventional inducement techniques with regards to the demands placed on the individual. The results of the present study demonstrated that positive mental imagery can reduce feelings of general and social anxiety in healthy volunteers. In addition, and for the first time, the results demonstrated that positive mental imagery induced by imagining a hypothetical future scenario can reduce feelings of general and social anxiety (large effect sizes  $d= 1.06, 0.96$ ) in healthy volunteers; with confirmation it is as effective as positive mental imagery induced using past events (large effect sizes  $d = 1.36, 1.03$ ) from memory; leads to similar image vividness ratings and can be

held for a similar period of time. These results are the first to demonstrate the effectiveness of hypothetical future orientated positive mental imagery in this context and provide evidence that such an inducement technique may be a useful method, for clinicians, when faced with individuals who cannot induce positive mental imagery from their own memory (i.e. those who suffer from social anxiety disorder); however, replication in a patient population is needed.

These results are in line with previous work demonstrating the beneficial impact of positive mental imagery on a number of psychological markers of well-being in non-clinical populations (e.g. [6, 9, 10, 11]) and provide support to [12] request to further explore the optimal inducement technique for positive mental imagery. The processes underpinning the efficacy of positive mental imagery are not fully understood; however, the self-memory system (SMS) outlined by Conway and Pleydell-Pearce [21] has proved to be a useful framework. The SMS suggests that self-images, and their related autobiographical memories are responsible for the development of a working-self. Hulme et al. [11], using this framework, provided preliminary evidence that imagery (in particular positive imagery) may help people access a more positive working-self and thus go some way to breaking one of the vicious cycles proposed to maintain social anxiety – a negative self image and working-self. We postulate that the same underlying process may account for the effects of hypothetical future orientated positive mental imagery, as previous research has shown that both past and future imagery requires similar psychological processes (e.g. those subserved by the hippocampus) during the imagery inducement [22, 23] and it has been demonstrated that individuals can base predictions of the future on atypical past experiences that are not necessarily going to happen [24] leading to the belief that imagining the future increases the likelihood that the event will occur [25] (Carroll, 1978). In addition to this, both past and future induced images have been shown to be equitable in terms of vividness, detail and are contextually specific [26].

Future research should consider the limitations of this study; first, as this was a proof of concept study we decided to recruit healthy volunteers – future work should replicate these findings in a high/low social anxiety group, in a clinical population and track improvement over time. It should also be noted that our male population was under-represented. Second, the questions used to induce and improve the detail of the image may have increased the likelihood of the participant implementing an observer perspective and it has been suggested that a field perspective (open's own eyes; e.g. [27]) may be more effective (see [12] for discussion). Third, we implemented a non-imagery based control condition, as we believe this acts as a true control; however, previous work has often used a negative and/or neutral imagery condition for comparison (e.g. [13]). In conclusion, this study demonstrates, for the first time, that hypothetical future orientated positive self imagery can reduce subjective feelings of general and social anxiety in healthy volunteers. This method of imagery inducement may have clinical application for those who suffer from social anxiety; however, further work is needed in clinical populations.

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