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SOCIAL ANXIETY IN CHILDREN AND YOUNG PEOPLE: IMAGERY AND ATTENTION

Jennifer Chapman

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Social Anxiety in Children and Young People: Imagery and attention

Jennifer Chapman, Harris Manchester College

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Abstract

Social Anxiety Disorder (SAD) is one of the most prevalent mental health disorders in children and young people, and can have a negative effect on multiple areas of the child's life, for example, education, and peer relationships. Adult cognitive models of SAD outline the mechanisms involved in the maintenance of the disorder. Two core components of this model are negative self-images, and attentional focus. Although these mechanisms have been widely explored in the adult literature, far less is known about them among children and young people.

The first paper presents a systematic review investigating the association between imagery and social anxiety in children and young people. The review found that to date, there is some evidence to support the association between imagery and social anxiety in children and young people. However, many of the effects of negative imagery were found not to be specific to those with high social anxiety.

The second paper presents an empirical study exploring the association between the balance of internal and external focus of attention and anxiety under social stress conditions in pre-adolescent children. A community sample of children completed self-report questionnaires assessing focus of attention and social anxiety. Children scoring high and low in social anxiety also completed an attention task assessing focus of attention. The findings of the questionnaires revealed a significant cross sectional association between increased

internal, relative to external, focus of attention and high social anxiety. However, the results of the attentional task provided no evidence that heightened anxiety led to increased internal, relative to external, focus of attention for high vs. low socially anxious children. These findings are discussed in terms of implications for clinical practice and future research, together with the limitations of the study.

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PAPER A

MENTAL IMAGERY IN SOCIAL ANXIETY IN CHILDREN AND YOUNG PEOPLE: A SYSTEMATIC REVIEW

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Mental Imagery in Social Anxiety in Children and Young People:

A Systematic Review

Jennifer Chapman, Harris Manchester College

University of Oxford, Doctorate in Clinical Psychology

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Abstract

Social anxiety disorder (SAD) is one of the most common mental health disorders in childhood and adolescence, and is considered to be a risk factor for developing further mental health disorders as an adult. Negative self-images are one of the core components of the cognitive models of SAD in adults. However little is known about the role of negative self-imagery in the maintenance of social anxiety disorder for children and young people. This review aimed to systematically evaluate studies that have investigated the association between imagery and social anxiety in children and young people. Thirteen studies meeting the inclusion criteria were identified. Findings suggest that negative imagery is associated with social anxiety in children and young people, and provides some evidence to support the cognitive models of social anxiety disorder. However, many of the effects of negative imagery were found not to be specific to those with high social anxiety. Methodological issues are discussed, for example the inconsistencies in, and lack of good psychometric measures for imagery. More conclusive evidence is needed to develop significant and robust conclusions.

Highlights

- Negative imagery appears to play a role in social anxiety in children and young people
- A consistent relationship was found between negative, observer perspective images and social anxiety
- Negative imagery was associated with an increase in self-reported anxiety for individuals with high social anxiety

Keywords: Social anxiety, Imagery, children and young people

Proposed Journal: Clinical Psychology Review (see Appendix A for author guidelines)

Introduction

Social anxiety disorder (SAD) is one of the most common psychological disorders with an estimated prevalence in children and young people of between 3-10% (Merikangas et al., 2010; Wittchen & Fehm, 2003). Although the median age of onset of SAD is typically 12 years (Kessler et al., 2005), it is also commonly found in pre-adolescent children (Waite & Creswell, 2014). The presence of SAD during childhood and adolescence is considered to be a risk factor for developing further psychological disorders (e.g. depression and substance abuse) as an adult (Stein & Stein, 2008), highlighting the importance of early intervention.

SAD involves a persistent fear of social situations in which the individual believes they will act in a way, or show anxiety symptoms, that will be negatively judged by others. This fear leads to avoidance, significant distress, and a marked impairment in daily functioning (American Psychiatric Association [APA], 2013). In order to meet the diagnostic criteria as a child or adolescent, the fear, or anxiety, must occur in peer settings (APA, 2013). SAD in children and young people can manifest differently compared to SAD in adults, for example, it may be expressed by crying, freezing, tantrums, or failing to speak in social situations (APA, 2013).

Imagery and Social Anxiety in Adults

Cognitive models of SAD (Clark & Wells, 1995; Rapee & Heimberg, 1997) have provided a theoretical framework to understand the maintenance of this disorder in adults. The most cited adult cognitive model is Clark and Wells (1995), who propose that a set of negative assumptions are activated when someone with SAD enters a social situation, which are then maintained by several psychological processes. These include: (i) increased self-focused attention; (ii) the use of misleading internal information, including negative images,

to make erroneous inferences about how they appear to others; (iii) safety seeking behaviours such as avoidance, which prevent the individual from challenging their beliefs; and (iv) negative processing before and after the event.

Negative self-images are one of the core components of Clark and Wells' (1995) model. The model suggests that when an individual enters a social situation, they experience spontaneously occurring images as if seen from an observer (rather than field) perspective. These images are excessively negative, and can be based on a 'felt sense', as well as introspective information (e.g. sweating, shaking), to infer how they appear to others. For example, an individual with a fear of blushing may experience physiological changes, as well as 'feeling' red and hot, which are used to create a particular mental image. The individual believes that these distorted images represent an accurate reflection of how others perceive them, further increasing their social anxiety (Clark, 2001).

Rapee and Heimberg (1997) also proposed a cognitive model of social anxiety. Similarly to Clark and Wells' (1995) model, Rapee and Heimberg (1997) posit that mental representation of the self, seen from an observer perspective, is central to the maintenance of SAD. However, in addition to the use of internal information, Rapee and Heimberg (1997) argue that an individual also uses external feedback to confirm their distorted negative self-image.

Empirical studies using self-report measures have suggested that adults with SAD experience distressing self-images before, during, and after social encounters (Hirsch, Mathews, Clark, Williams, & Morrison, 2006). The nature of the self-images have been found to be excessively negative and distorted (Hackmann, Surawy, & Clark, 1998), and involve seeing themselves from an observer perspective (Hackmann, Clark, & McManus,

2000; Wells, Clark, & Ahmad, 1998). The negative images are often recurrent and typically linked to early unpleasant memories (Hackmann et al., 2000). Negative imagery has also been shown to increase the use of safety seeking behaviours (Salkovskis, 1991) in an attempt to avoid imagined fears (Wild, Hackmann, & Clark, 2008).

In order to address potential bias in retrospective accounts of in-situation imagery, Hirsch, Clark, Mathews, and Williams (2003) used experimental manipulation, and found that when individuals with SAD hold a positive, compared to a negative observer perspective image, they feel less anxious and believe they perform better than SAD individuals holding a negative image in mind. Hirsch et al. (2006) expanded on these findings with non-socially anxious participants. Participants were instructed to hold a negative, positive, or control image in mind. The results revealed that individuals in the negative imagery group felt more anxious, believed they performed less well, and reported more negative thoughts than the positive imagery group. The findings suggest that negative self-imagery may have a causal role in the development and maintenance of SAD.

Ng, Abbott, and Hunt, (2014) completed a recent systematic review investigating imagery in adults with social anxiety. They investigated studies comparing high social anxiety and control groups against different imagery conditions, as well as reporting the effects of negative imagery for socially anxious and control groups. Their results provide general support for the role of imagery as described by the adult cognitive models of SAD (e.g. Clark & Wells, 1995) but disorder specificity remained unclear. When examining the *effects* of negative imagery, they found that it resulted in heightened anxiety and negative thoughts, as well as poorer self and observer rated performance for individuals with high

social anxiety. However, many effects were not found to be significantly greater for those with elevated social anxiety compared to controls.

Imagery and Social Anxiety in Children and Young people

Research in adults with SAD has suggested that many of the negative images experienced correspond with early unpleasant experiences, for example, bullying at school (Hackmann et al., 2000). Despite this, little is known about the role of imagery in SAD for children and young people. Although existing research provides nominal support for the role of negative self-imagery in SAD for adults (Ng et al., 2014), these findings do not incorporate developmental factors associated with children and young people, such as biological, psychological, and social differences. It is possible that the role of imagery, as described by adult models of SAD, may not apply to children. For example, during middle childhood, there is a greater increase in cognitive capacity, and individuals begin to develop more sophisticated cognitive structures (Yurgelun-Todd, 2007). During this time children develop the ability to see oneself through the eyes of another, as well as developing a greater capacity for social comparisons (Cole, Jacquez, & Maschmen, 2001).

The emerging knowledge in the field, and the evidence linking early life experiences to the development of the disorder, highlights the importance of exploring the role of imagery in social anxiety disorders in children and young people. To date, there have been no systematic reviews of the association between imagery and social anxiety in children and young people, suggesting a gap in the evidence base.

Aims of the Review

This systematic review aims to identify research that has investigated the association between imagery and social anxiety in children and young people. As there have been no prior reviews, this paper will synthesise and critically evaluate the literature in this area, with the aim of ascertaining the current state of the evidence base. Although the paper will take a broad perspective, it also aims to replicate aspects of the recent review on adults (Ng et al., 2014) in order to get a sense of the existing literature in child and adolescent populations. Since Ng et al. (2014) found that many of the effects of negative imagery were significant both for those with and without social anxiety, the current review will separate findings that examine high anxiety groups against controls, with those that examine different imagery conditions. The review will aim to examine, firstly, the effect of negative imagery on children and young people with high social anxiety across a range of outcome variables (including the comparison of those with high social anxiety to other groups), and secondly, the association between imagery characteristics and social anxiety experienced by children and young people (in their own right and in comparison to other groups).

Method

Inclusion Criteria

Studies were included if:

(i) Participants were clinical or non-clinical samples of children or young people aged 25 or under. Where the upper age limit of the sample group exceeded 25 years, the study was only included if a subgroup of participants were under 25 years, and these results could be analysed separately. If the mean age of participants was recorded without the range, the age was determined using an assumption of normality that the sample mean age plus 3

standard deviations equalled under 25 years. Studies involving undergraduate students were included if the age criterion was not explicitly violated;

(ii) There was a measure of social anxiety symptoms or diagnosis;

(iii) Imagery was assessed by measures relating to the experience of imagery;

(iv) It was possible to extract data about the association between social anxiety and imagery;

(v) Paper was written in English;

(vi) Paper was published in a peer reviewed journal.

Exclusion Criteria

Studies were excluded if:

(i) Social anxiety was measured in the context of other non-anxiety (e.g. autism) and/or non-mood disorders (e.g. psychosis);

(ii) Social anxiety was measured in the context of physical health (e.g. pain or surgery);

(iii) It was a non-empirical paper (e.g. a review or discussion paper).

Search Strategy

A search was carried out on 27th December 2017. Studies were identified by systematically examining the following databases: PsycInfo, CINAHL, MEDLINE, and EMBASE. Search terms included 'social anxiety' and related terms (such as, 'social phobia' and 'performance anxiety') combined with imagery, representation*, or 'observer perspective' (see Appendix B for full search terms). The search criteria were refined following a

discussion between the authors, ensuring that the social anxiety terms corresponded with those presented in a recent Lancet review of SAD, thereby reducing the chance of relevant papers being missed (Mayo-Wilson, et al., 2014). The results were then narrowed down to populations consisting of children and young people up to the age of 25. All titles and abstracts were screened for eligibility using the inclusion and exclusion criteria above. A manual search was also carried out on the reference lists of all articles meeting the inclusion criteria.

Study Selection

The Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines (Moher et al., 2015) informed the reporting of search strategies, search findings, and presentation. The combined electronic database search retrieved 1789 records, which was combined with one additional paper sourced through hand searching relevant reference lists. Eight hundred and ninety one papers were identified once duplicates were removed. An initial screening of the titles and abstracts led to the exclusion of 733 papers. Articles were removed if: they did not investigate social anxiety and imagery; they were comorbid with physical health or with disorders other than anxiety and mood; or the article type was inappropriate, as outlined in the exclusion criteria.

The remaining 158 full texts were screened and assessed against the inclusion criteria. This process led to the exclusion of 145 articles. A total number of 13 articles met the inclusion criteria for review. The PRISMA flow diagram of this search process is displayed in Figure 1.1.

Data Extraction and Quality Assessment

A data extraction tool was developed to promote reliability of data collection and reduce the risk of error (Appendix C). A second reviewer (BH) independently assessed the included papers against the inclusion and exclusion criteria. Any discrepancies in the inclusion of a paper were discussed between the two reviewers. A third reviewer was consulted (CC) in the case of any outstanding differences.

The methodological quality of the included studies were assessed using a modified version of the quality rating checklist developed by Kmet, Lee, and Cook (2004; Appendix D). This checklist reflects specific methodological issues associated with psychological research studies. The items cover basic elements of the design, such as whether the sample was adequately powered, or the measures employed were described in detail and had good psychometric properties. The wording of some items was adapted to match the current review, and other items were excluded if they were not relevant. Items on the checklist were rated on a 3 point scale (0= no, 1= partial, 2= yes). The maximum score was 24. Based on the final score, studies were classified into three groups to reflect the spread of quality scores, low (0-14), medium (15-19), and high (20-24). Two reviewers (JC & BH) independently assessed the quality of each included study, and scores were compared to test for reliability between ratings. There was a high degree of reliability between the two raters. The average intraclass correlation coefficient (ICC) was .944 with a 95% confidence interval from .925 to .958 ($F_{(178)} = 17.723$, $p < .001$).

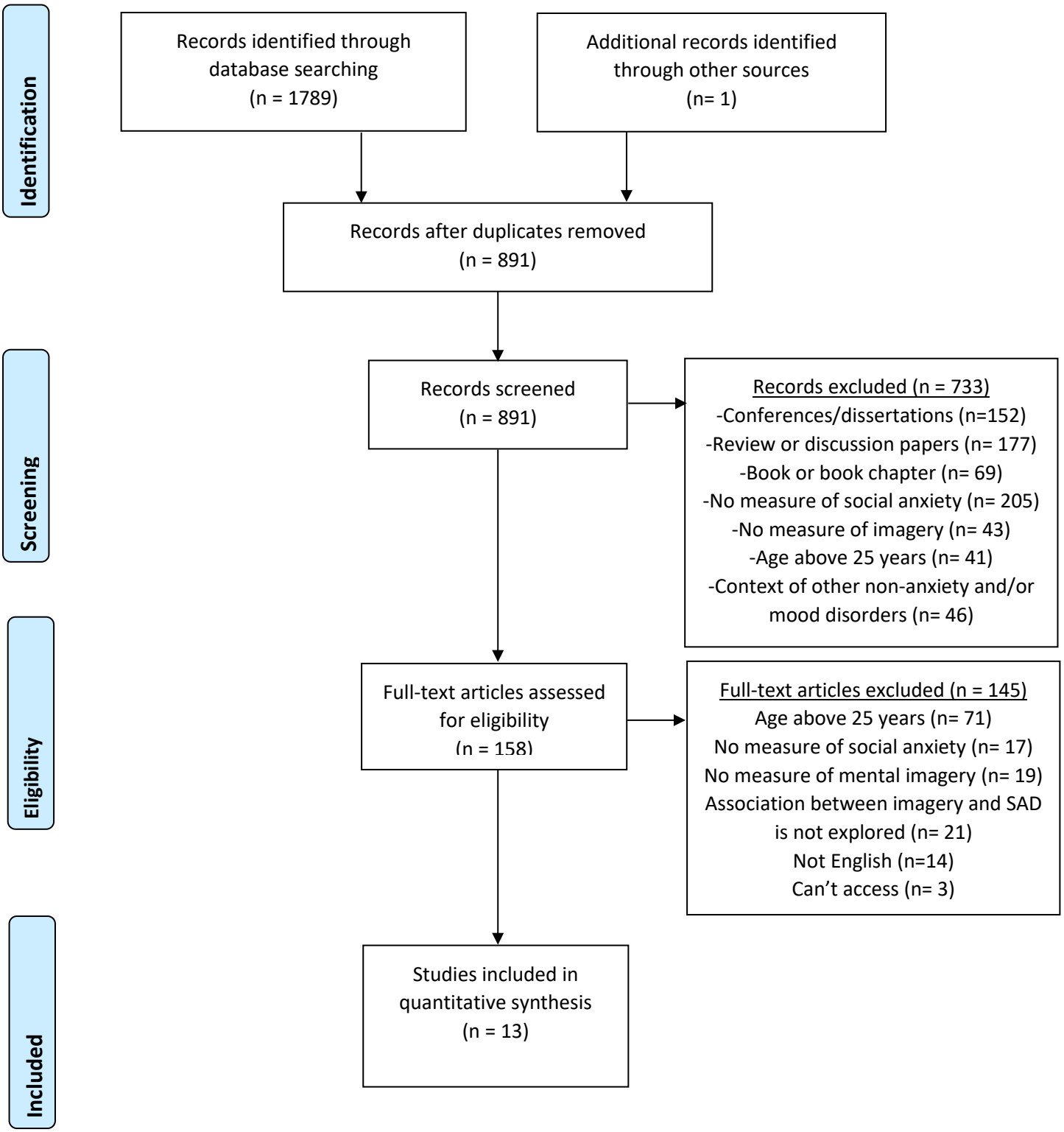


Figure 1.1 Flow Chart of Study Selection Process

Data Synthesis

The 13 included papers were reviewed, and the key findings extracted. Data were synthesised and organised by methodological comparisons, with key themes presented.

Measures were assessed based on their observed psychometric properties. They were deemed to have good psychometric properties if they had been validated with the target population.

Effect sizes in the form of Cohen's *d* were included for all studies that reported them. Where effect sizes were not reported, they were calculated, if possible, using an online calculator (http://www.psychometrica.de/effect_size.htm). Effect sizes were interpreted using conventions proposed by Cohen (1998). An effect size of 0.2 was categorised as small, 0.5 as a medium effect, and 0.8 as a large effect size.

Results

Description of Included Studies

In total, 13 studies were included with a total of n= 1,453 participants. The mean reported age of participants (in years) ranged from 10.2 to 21.3. Two studies included only samples with pre-adolescent children (age 10-12 years). The percentage of female participants ranged from 50% to 81% across studies, with five studies consisting of over 75% of females in the high socially anxious group. The studies were all conducted in developed countries, including: United Kingdom; United States of America; Greece; Finland; and Germany. Three research groups authored eight of the studies, and two studies shared the same dataset (Lang, Melamed, & Hart, 1970; Weerts, & Lang, 1978). The studies were

published between 1970 and 2014. Table 1.1 summarises the study characteristics of the included studies.

Only two studies employed a diagnostic interview to compare individuals with SAD to a low socially anxious group (Ranta, Tuomisto, Kaltiala-Heino, Rantanen, & Marttunen, 2014; Schreiber & Steil, 2013). Seven studies assigned non-clinical participants to groups based on social anxiety self-report measures. Of these seven studies, two compared participants with high self-reported social anxiety to those with low self-reported social anxiety (Morrison, Amir, & Taylor, 2011; Vassilopoulos, 2005). Three studies compared high self-reported social anxiety to a spider/snake phobia comparison group (Lang, Levin, Miller, & Kozak, 1983; Lang et al., 1970; Werts & Lang, 1978), and two studies had no comparison or control group (Anderson & Borkovec, 1980; Stopa & Jenkins, 2007). The final four studies (Hignett & Cartwright-Hatton, 2008; Schreiber, Höfling, Stangier, Bohn, & Steil, 2012; Vassilopoulos & Moberly, 2013; Vassilopoulos, Moberly, & Douratsou, 2011) analysed social anxiety as a continuum across the whole sample of a school aged population, although one study also completed an analysis of those high and low in self-reported social anxiety (Schreiber et al., 2012).

The 13 studies employed a range of methods to measure imagery. Ten of the 13 studies induced imagery by instructing participants to hold a particular image in mind. Four of these studies asked participants to hold a neutral or emotionally arousing image (Anderson & Borkovec, 1980; Lang et al., 1983; Lang et al., 1970; Weerts & Lang, 1978), three studies required participants to hold a negative or positive self-image (Stopa & Jenkins, 2007; Vassilopoulos, 2005; Vassilopoulos et al., 2011), two studies instructed participants to imagine an anxiety provoking past experience (Ranta et al., 2014; Schreiber

& Steil, 2013), and one study instructed participants to create an image of their recent speech performance (Hignett & Cartwright-Hatton, 2008). The remaining three studies did not induce imagery (Morrison et al., 2011; Schreiber, et al., 2012; Vassilopoulos & Morberly, 2013).

A summary of the results of the 13 studies is presented in Table 1.2. The results have been summarised in the table using the following structure:

(a) Findings that examine the *effects* of negative imagery for individuals with high social anxiety;

(b) Findings from studies that examine the association between imagery characteristics and social anxiety;

(c) Findings from studies that investigate imagery in high socially anxious and control/comparison groups.

Table 1.1. Summary of included studies

Citation	Objective/ Design	Participants (number and age)	Groups	Anxiety measure	Manipulation	Imagery measure	Other relevant measures	Mean quality rating (0 - 24)
Anderson, & Borkovec (1980) **USA**	To examine the fear reducing effects of stimulus and also stimulus plus response imagery scripts. Between groups	36 Undergraduate students	HSA	The public speaking item of the FSS (SR) (-)	Randomly assigned to training conditions	Content coding of the subjects narrated scenes (CR) (-)	Measures of physiological response	11.5
Hignett, & Cartwright-Hatton (2008) **UK**	To assess the relationship between social anxiety and perspective taking in adolescence Correlational	124 Age 12-14 M= 12.1 Age 16-18 M= 16.7	School aged sample Age 12-14 (n= 62) Age 16-18 (n= 62)	SPAI-C (SR) (+); FNE (SR) (+)	Completed PTRS and anxiety Likert scale speech task. Asked to imagine their performance.	PTRS (SR) (?)	Anxiety Rating Likert Scale during speech task (SR)(-)	22
Lang, Levin, Miller, Kozak (1983) ***Experiment 1*** ***Experiment 2*** **USA**	Experiment 1: to assess physiology against fear imagery Between groups, within groups Experiment 2: To examine the effects of stimulus vs. response training on emotional imagery. Between groups, within groups	Experiment 1: 25 Undergraduate students Experiment 2: 40 Undergraduate students	Experiment 1: HSA (n= 13) snake phobia (n=12) Experiment 2: HSA (n=20), snake phobia (n=20)	PRCS (SR) (-)	Experiment 1: Introduced to imagery scenes (fear, neutral, danger, action) Experiment 2: Stimulus group and response group were trained to focus on their corresponding stimuli. Then introduced to imagery scenes as in exp. 1.	Control of Visual Imagery Scale (SR) (-), Sheehan's modification of the Questionnaire Upon Mental Imagery (SR) (?)	SNAQ (SR) (-); Measures of physiological response	13.5

Lang, Melamed, & Hart (1970) ***Experiment 2*** **USA**	To examine the relationship between reported vividness and clarity of visualisation of image against anxiety hierarchy positon, verbal report of fear, and physiological activity Between groups, within groups	20 Undergraduate students	HSA (n= 10) Spider phobia (n= 10)	The public speaking item of the FSS (SR) (-); PRCS(SR) (-); Interview to assess fear (-); rate current anxiety on a scale (SR) (-)	Exposed to feared hierarchy and asked to imagine different items	Rated the vividness of the particular scene (SR) (-)	Snake item on FSS (SR) (-); SNAQ (SR) (-); Measures of physiological response	13.5
Morrison, Amir, & Taylor (2011) **USA**	To assess imagery (image generation ability) in social anxiety Between groups	40 Undergraduate students	HSA (n= 21) NSA (n=19)	LSAS (SR) (+); STAI (SR) (+)	No manipulation. Completed a computer task to assess imagery ability.	Computer image generation task	BDI-II (SR) (+)	22
Ranta, Tuomisto, Kaltiala-Heino, Rantanen, & Marttunen (2014) **Finland**	To test if biased cognition, imagery and safety behaviours were present among adolescents with social anxiety Between groups	133 (306 in initial screening) M= 15.9 (SD= 0.32)	(1) HSA (n= 43) NSA (n=90) (2) SAD (n= 10)/subclinical social anxiety (n= 7) No diagnosis (n= 116)	SPIN (SR) (+); interview with the K-SADS-PL (+)	No manipulation. Had to imagine past anxious event.	Semi-structured interview (-)	Semi-structured interview assessing most distressing situation, automatic thoughts, safety behaviours, and coping strategies (-)	21.5

Schreiber, Hofling, Stangier, Bohn, & Steil (2012) **Germany**	To investigate the validity of Clark and Wells's model of social phobia for use in adolescent populations Correlation (and between groups)	567 14-20 years old, M = 16.49 (SD = 1.67)	School aged sample	SPAI (SR) (+); Social Behaviour Questionnaire (SR) (?); Social Cognitions Questionnaire (SR) (?); Social Attitudes Questionnaire (SR) (?)	No manipulation.	QRI-SP (SR) (-)	DICA (SR) (+);	22.5
Schreiber & Steil (2013) **Germany**	To explore the nature of negative self-images in adolescents with SAD Between groups	62 14-20 years old SAD: M= 16.6 years (SD= 2.21) NAC: matched	SAD group (n= 31) NSA group (n=31)	SPAI-C (SR) (+)	No manipulation. Hold past negative image in mind whilst completing questionnaires.	QRI-SP (SR) (?)	DICA (SR) (+)	22
Stopa & Jenkins (2007) **UK**	To examine the effects of imagery on the retrieval of autobiographical memories Between groups	20 M= 19 (SD= 1.07)	HSA (n= 20)	FNE (SR) (+)	Instructed to hold positive or negative image in mind during speech task	Vividness scale and ability to produce image in manipulation (SR) (-)	BDI-II (SR) (+), Likert scale for anxiety and performance (SR) (-) Behaviour checklist for speech performance (SR/CR) (-)	18.5

Vassilopoulos (2005) **Greece**	To investigate whether negative distorted images play a role in the maintenance of social anxiety Between groups	80 Low anxious: M= 19.67 (SD= 0.92). High anxious: 19.70 (SD= 0.69)	HSA (n= 40) NSA (n=40)	FNE (SR) (+); SPAI (SR) (+); STAI (SR) (+)	High and low socially anxious were randomly allocated to positive and negative imagery conditions	Self-imagery questionnaire (SR) (-)	BDI – II (SR) (+); Body Sensations Questionnaire (SR) (?); state anxiety (SR) (-); behaviour checklist (SR/CR) (-)	20.5
Vassilopoulos, Moberly, & Douratsou (2011) **Greece**	To examine the casual role of self-imagery on interpretations and emotional reaction judgements Between groups	164 10-12 years old (M= 10.2, SD= 0.5)	School aged sample	SASC-R (SR) (+)	Instructed to form a positive or negative image (random allocation)	Self-imagery questionnaire (SR) (-)	CDI (SR) (+); Social Events Interpretation Questionnaire (SR) (-)	22
Vassilopoulos & Moberly (2013) **Greece**	To examine how interpretation bias and social anxiety interact to influence self-imagery in children. Correlational (and between groups)	115 10-12 years old (M= 10.2)	School aged sample	SASC-R (SR) (+)	Randomly assigned to benign or negative interpretation training condition.	Spontaneous Use of Imagery Scale (SR + CR) (-)	CDI (SR) (+)	20.5
Weerts & Lang (1978) ***Data from Lang, Melamed, & Hart (1970)*** **USA**	To assess vividness, emotional arousal, and physiological arousal for performance anxiety and spider phobia. Between groups, within groups	27 Undergraduate students	11 in spider phobia group (n=11) HSA group (n=16)	The public speaking item of the FSS (SR) (-)	Instructed to visualise different scenes	Reported emotional arousal, perceived movement, and image vividness (SR) (-)	Spider Fear Questionnaire (SR) (?); horizontal and vertical eye movement; skin conductance, and heart rate.	7.5

Note: SR= self-report; CR = Clinician rated; SAD = Social Anxiety Disorder; HSA = High socially anxious; NSA= non-socially anxious; SPAI-C = Social Phobia and Anxiety Inventory for Children; SPAI = Social Phobia and Anxiety Inventory; SNAQ = Snake Anxiety Questionnaire; FNE = Fear

of Negative Evaluation Scale; QRI-SP = Questionnaire of Recurrent Images in Social Phobia; STAI = State-Trait Anxiety Inventory; SASC-R = Social Anxiety Scale for Children-Revised; PTRS = Perspective-Taking Rating Scale; BDI- II = Beck Depression Inventory – II; CDI= Children's Depression Inventory; DICA = Depression Inventory for Children and Adolescents; LSAS = Liebowitz Social Anxiety Scale - self report version; SPIN = Social Phobia Inventory; FSS = Fear Survey Schedule; PRCS = Personal Report of Confidence as a Speaker questionnaire; K-SADS-PL = Schedule for Affective Disorders and Schizophrenia for School-Age Children - Present and Lifetime Version (see Appendix E for a full list of measures).

Psychometric properties (+) = good psychometric properties; (-) = poor psychometric properties; (?) = unknown psychometric properties.

Table 1.2. Summary of the results

Citation	**Effect of negative imagery for high social anxiety group**	**Associations between imagery characteristics and social anxiety**	**High socially anxious vs. control/comparison group**
Anderson & Borkovec (1980)	More variable heart rate decline in stimulus plus response condition vs. stimulus condition (+)	n/a	n/a
Hignett & Cartwright-Hatton (2008)	n/a	Increased observer perspective with higher social anxiety (+) (*d* = 0.37 to 0.61)	n/a
Lang, Levin, Miller, Kozak (1983) *Experiment 1*	Experiment 1: increased heart rate (fear relevant vs. irrelevant imagery) (-) Increased skin conductance (fear relevant vs. irrelevant imagery) (-) Increased anxiety (fear relevant vs. irrelevant imagery) (+)	Experiment 1: More vivid (fear relevant vs. fear irrelevant imagery) (+)	Experiment 1: Snake phobia group had higher overall vividness and anxiety ratings than high social anxiety group on exposure to fear relevant imagery (-) Snake phobia group had higher heart rate overall than high social anxiety group (+)
Experiment 2	Experiment 2: Increased anxiety (fear relevant vs. irrelevant imagery) (+) Response training increased heart rate compared to stimulus training (+) Response training increased respiration rate compared to stimulus training (+)	Experiment 2: Increased vividness (fear relevant vs. irrelevant imagery) (+)	Experiment 2: Snake phobic group had higher heart rate during exposure than high social anxiety group (+)

Lang, Melamed, & Hart (1970) *Experiment 2*	Increased anxiety (fear relevant vs. irrelevant imagery) (+) Increased skin conductance (fear relevant vs. irrelevant imagery) (-) Increased respiration (fear relevant vs. irrelevant imagery) (-) Increased heart rate (fear relevant vs. irrelevant imagery) (+)	Increased vividness (fear relevant vs. irrelevant imagery) (+)	Spider phobia group rated fear-relevant items as more vivid than high socially anxious group (+)
Morrison, Amir, & Taylor (2009)	n/a	n/a	Slower at generating neutral images (high vs. non-socially anxious) (+) (*d* = 0.67)
Ranta, Tuomisto, Kaltiala-Heino, Rantanen, & Marttunen (2014)	n/a	n/a	High anxiety group reported more frequent negative observer perspective images (high vs. low socially anxious) (+) SP/SSP reported more frequent negative observer perspective images than no diagnosis group (SAD vs. no diagnosis) (+)
Schreiber, Hofling, Strangier, Bohn, & Steil (2012)	n/a	Increased frequency of negative images for high anxiety (+)	Increased frequency of negative images (high vs. low socially anxious) (+)

Schreiber & Steil (2013)	n/a	n/a	Higher frequency (SAD vs. control) (+) Greater vividness (SAD vs. control) (+) Greater observer perspective (SAD vs. control) (+) (*d* = 0.65) More negative thoughts (SAD vs. control) (+) (*d* = 0.23 to 1.68) Negative emotional reactions (SAD vs. control) (+) (*d* = 0.17 to 1.44) More anxiety (SAD vs. control) (+) (*d* = 1.44)
Stopa & Jenkins (2007)	Increased anxiety (negative vs. positive imagery) (+) (*d* = 0.1 to 0.91) Poorer self-rated performance (negative vs. positive imagery) (+) (*d* = 0.86 to 2.12) Poorer observer rated performance (negative vs. positive imagery) (+) (*d* = 0.27)	Vividness (negative vs. positive imagery)(-) (*d* = 0.15 to 0.37)	n/a
Vassilopoulos (2005)	Increased anxiety (negative vs. positive imagery) (+) (*d* = 1.36) More bodily sensations negative vs. positive imagery) (+) (*d* = 1.27) Poorer self-rated performance (negative vs. positive imagery) (+) (*d* = 0.69 to 1.39) Poorer observer rated performance (negative vs. positive imagery) (-) (*d* = 0.12 - 0.32)	Vividness (negative vs. positive imagery) (-) (*d* = 0.33)	Formed more negative images overall (high vs. low socially anxious) (+) (*d* = 0.88) Negative imagery resulted in more bodily sensations than positive imagery for high social anxiety group only (+) Negative imagery produced greater anxiety in high social anxiety group (-) Negative imagery rated performance behaviours as more negative than positive imagery for high social anxiety group only (+) Negative imagery believed they appeared more anxious and came across less well than positive self-imagery when examining groups combined (-) Poorer observer performance ratings (-)

Vassilopoulos, Moberly, & Douratsou (2011)	More negative interpretations (negative vs. positive imagery) (+)	n/a	High social anxiety group in negative imagery condition resulted in more negative interpretations (+)
Vassilopoulos & Moberly (2013)	n/a	Negative self-imagery associated with social anxiety when examined as continuous variables (+)	n/a
Weerts & Lang (1978) *Data from Lang, Melamed, & Hart (1970)*	n/a	Vividness (fear relevant vs. irrelevant imagery) (-)	Spider phobic group rated all fear scenes as more vivid than high social anxiety group (+) Spider phobic group rated all fear scenes as more anxiety provoking than high social anxiety group (+)

(+) = Significant finding, $p < .05$
(-) = Non significant finding, $p > .05$

Effects of Negative Imagery for Social Anxiety Group

Eight studies investigated the effect of negative imagery on individuals with social anxiety. The dependent variables examined were; self-reported anxiety, bodily sensations, interpretations, and effect of imagery on performance. These will be considered in turn.

Self-reported anxiety. Three studies compared the effects of inducing negative imagery (i.e. public speaking imagery) against fear irrelevant/neutral imagery on self-reported anxiety among high socially anxious individuals (Lang et al., 1983; Lang et al., 1970; Weerts & Lang, 1978). Overall findings of these three studies revealed a significant increase in anxiety levels when exposed to negative imagery compared to fear irrelevant/neutral imagery conditions. Lang et al. (1970) exposed individuals with social anxiety to a graded hierarchy of fear relevant imagery (from neutral to negative imagery). The participants reported significantly higher levels of anxiety for the most feared image, compared to the neutral image. A significant difference between negative imagery and neutral/fear-irrelevant imagery was also reported by Lang et al. (1983). They presented both socially anxious and snake phobic groups with different imagery conditions (neutral, danger, action, snake, and public speaking). The results revealed that the socially anxious group and the snake phobia group, reported that fear-relevant imagery was more anxiety provoking than other imagery conditions. However, there was no significant difference in anxiety ratings between the social anxiety and snake phobic group when exposed to their fear-relevant imagery. Weerts and Lang (1978) used a similar methodology to Lang et al. (1983) and compared a socially anxious group to a spider phobic group, who were instructed to imagine different scenes based on written descriptions (8 scenes varying in emotional arousal and movement, 2 spider, and 2 public speaking). Contrary to the findings of Lang et al. (1983), Weerts and Lang (1983) found a significant difference in anxiety levels between the two

anxiety groups, with the spider phobic group reporting significantly higher levels of self-reported anxiety than the socially anxious group when exposed to the fear-relevant (i.e. social stress) imagery condition. Overall, these results suggest that on exposure to negative versus neutral/non-relevant fear imagery, high socially anxious individuals experienced increased levels of anxiety. However, this finding was also significant for individuals with spider and snake phobia, and therefore disorder specificity remains unclear.

In the only study to recruit from a clinical population, Schreiber and Steil (2013) examined the effects of negative imagery on young people with a diagnosis of SAD compared to non-anxious controls. They asked 31 young people with SAD, and 31 matched controls, to complete a set of questionnaires measuring recurrent images and depression, whilst holding a negative self-image in mind. The results revealed a significant increase in anxiety for the SAD group, compared to the control group (d = 1.44). These findings suggest that negative imagery leads to increased anxiety for those with a diagnosis of SAD.

The final two studies examined exposure to negative imagery against positive imagery for individuals with high social anxiety (Stopa & Jenkins, 2007; Vassilopoulos, 2005). Stopa and Jenkins (2007) assigned a group of individuals with high social anxiety to a positive or negative imagery condition. They were required to hold a positive or negative self-image of themselves in mind during a social stress task (delivering a speech). The findings revealed a significant increase in anxiety for those exposed to the negative compared to positive imagery condition (d = 0.1 before the speech, d = 0.91 during the speech), suggesting that negative imagery led to higher anxiety. A similar study was conducted by Vassilopoulos (2005), who compared high and low socially anxious participants in a positive or negative imagery condition. The negative imagery condition

required participants to imagine themselves appearing anxious and uncomfortable from an observer perspective. The positive imagery condition required participants to imagine themselves seeming comfortable, confident and relaxed. The participant then held the positive or negative image in mind whilst giving a two minute speech. Although high socially anxious participants in the negative compared to the positive imagery condition reported significantly higher levels of anxiety (d = 1.36), there were no significant differences between imagery conditions for the high and low socially anxious groups.

Combined, these findings suggest that negative imagery is associated with an increase in anxiety for those with a diagnosis of SAD and high social anxiety. However, individuals with low social anxiety, spider phobia, and snake phobia, also experience an increase in anxiety when exposed to negative fear-relevant imagery, suggesting that the effect of negative imagery on anxiety is not specific to those with high social anxiety.

Bodily sensations. Four studies (Anderson & Borkovec, 1980; Lang et al., 1983; Lang et al., 1970; Vassilopoulos, 2005) measured physiological response to negative imagery using self-report questionnaires, as well as with specific equipment, such as heart rate monitors. Using a questionnaire, Vassilopoulos (2005) found a significant increase in self-reported bodily sensations (for example, muscle tension and trembling hands) when high socially anxious participants imagined negative, compared to positive, self-images during a speech task (d = 1.27). This finding was not significant for the low socially anxious group.

A further three studies directly measured physiological changes in participants with high social anxiety in different imagery conditions. There was no significant difference for skin conductance or respiration rate, when high socially anxious participants were exposed to fear-relevant, compared to neutral or fear-irrelevant imagery (Lang et al., 1983; Lang et

al., 1970). However, it remains unclear whether socially anxious individuals showed an increase in heart rate when exposed to fear-relevant imagery. For example, Lang et al. (1970) found that socially anxious individuals had a significantly higher heart rate (measured by a cardio tachometer), when presented with fear imagery, compared to non-relevant fear imagery. However, Lang et al. (1983) did not find a significant difference in heart rate for individuals with high social anxiety, when presented with fear relevant, versus non-relevant, imagery. Notably, Lang et al. (1983) reported that a snake phobic group had significantly higher heart rate than the SAD group, when presented with the fear-relevant imagery (Lang et al., 1983).

Two studies (Anderson & Borkovec, 1980; Lang et al., 1983) examined the effect of imagery conditions, where the individual was trained to focus on their own physiological reaction in the imagery, or on the imagery content. The physiological condition was created through adding short descriptions of somatic and cognitive details when all participants were introduced to the social imagery scripts. In the first study, Anderson and Borkovec (1980) allocated high socially anxious participants to one of two training conditions. They would either focus on the imagery content, or on their own physiological response. The findings indicated that high socially anxious individuals, trained to focus on their physiological response, had a more variable decline in heart rate (i.e. it increased at points before continuing to decrease) over several exposures to the fear imagery. In comparison, there was a smoother decline in individuals trained to focus purely on the imagery content. Lang et al. (1983) using similar methodology found that high socially anxious participants, trained to focus on their own physiological response, had a significantly faster heart rate and respiration rate, compared to those participants trained to focus on the imagery content.

Overall, studies directly examining the physiological response amongst socially anxious individuals exposed to fear-relevant imagery, suggest that fear-relevant imagery does not affect skin conductance or respiration rate. One study reported an increase in heart rate when high socially anxious participants were exposed to fear-relevant imagery, but this finding was more significant for individuals with snake phobia. In addition, individuals with high social anxiety, exposed to fear-relevant imagery whilst focusing on their physiological response, experienced an increase in adverse bodily sensations.

Effect of imagery on performance. Two studies examined the effect of negative imagery on self-rated performance appraisals following a speech task (Stopa & Jenkins, 2007; Vassilopoulos, 2005). Both studies found that socially anxious groups rated their performance as significantly poorer when holding a negative compared to positive image in mind (d = 0.69 – 2.12). In addition Vassilopoulos (2005) examined performance appraisals comparing individuals with high and low social anxiety in positive and negative imagery conditions. The high socially anxious group rated their performance as significantly more negative in the negative, compared to positive, imagery condition, and also when compared to the low socially anxious group. There were no significant differences between the two imagery conditions for the low socially anxious group in their performance appraisals.

The studies also measured observer rated performance. Stopa and Jenkins (2007) found observer rated performance was significantly poorer for high socially anxious participants in the negative, compared to positive, imagery condition (d = 0.27). In contrast, Vassilopoulos (2005) found no significant difference in observer rated performance across positive and negative imagery conditions, or between high and low socially anxious participants.

Overall, the results indicate that high socially anxious individuals report significantly poorer self-rated performance when exposed to negative imagery. However, there were mixed findings for the effect of negative imagery on observer rated performance for high socially anxious participants.

Imagery and interpretations. One study investigated the association between imagery and social anxiety on the interpretation of an ambiguous situation. Vassilopoulos et al. (2011) allocated a non-clinical sample of children to a positive or negative imagery condition. They were instructed to hold a positive or negative self- image in mind whilst completing a social events interpretation questionnaire. The results revealed that high socially anxious individuals in the negative imagery condition reported more negative interpretations. That is, negative self-imagery was associated with more negative interpretations of an ambiguous situation than positive self-imagery, for individuals reporting high levels of social anxiety.

Additional findings. Schreiber and Steil (2013) found that, whilst holding a negative image in mind, compared to non-anxious controls, young people with SAD reported significantly higher levels of: shame (d = 1.19); embarrassment (d = 0.91); feeling foolish (d = 1.15); insecurity (d = 1.12); vulnerability (d = 1.00); humiliation (d = 1.44), and negative thoughts (d = 0.23 – 1.68).

Summary. There was a consistent association between negative imagery and increased anxiety for those with a diagnosis of SAD and high social anxiety. However, negative imagery also led to increased anxiety amongst those with spider and snake phobia, and low social anxiety, suggesting that disorder specificity remains unclear. When it comes to physiological response, individuals with high social anxiety self-report more adverse

bodily sensations when presented with negative compared to positive imagery. Though, when measured directly, there are no recorded changes in skin conductance and respiration rate across imagery conditions. One study found an increase in heart rate for individuals with high social anxiety in the negative imagery condition, although individuals with snake phobia responded to fear-relevant social imagery with a higher heart rate than individuals with high social anxiety. For individuals with high social anxiety, negative imagery was associated with significantly poorer self-rated performance. However, findings relating to observer rated performance were inconsistent. Finally, for individuals with high social anxiety, negative imagery was found to be associated with more negative interpretations than positive imagery.

Associations between Imagery Characteristics and Social Anxiety

Eleven studies reported on the association between imagery characteristics and social anxiety. The characteristics explored were imagery perspective, vividness, negative imagery, and image generation ability.

Imagery perspective. Three studies investigated imagery perspective on social anxiety, suggesting that observer perspective is associated with greater self-reported social anxiety (Hignett & Cartwright-Hatton, 2008; Ranta et al., 2014; Schreiber & Steil, 2013). Hignett and Cartwright-Hatton (2008) used a social-stress task where a sample of non-clinical adolescents were required to complete a three minute speech which they were told would be rated by a group of peers. The participants were asked to visualise an image of themselves completing the speech task, and subsequently asked to report the perspective taken in that image (field or observer). The results showed a significant positive correlation between self-reported social anxiety and observer perspective taking (d = 0.37 – 0.61). The

study also explored whether age moderated this relationship (12-14 year olds vs. 16-18 year olds), but it was not found to influence the reporting of perspective.

These significant findings were supported by Ranta et al. (2014), who investigated observer perspective in high and low socially anxious adolescents, as well as in SAD/sub clinical and non-clinical populations. They asked the participants to recall the most socially anxious situation they had experienced and, when imagining this, whether they adopted an observer or field perspective. Participants in the high socially anxious group reported significantly more negative observer perspective images than those in the non-anxious group. In addition, participants in the SAD/sub clinical social anxiety group reported significantly more negative observer perspective images than participants without a diagnosis.

Schreiber and Steil (2013) also asked adolescents with SAD, and matched non-anxious controls, to complete a questionnaire investigating imagery perspective. Participants with a diagnosis of SAD self-reported significantly more frequent observer perspective images than the control group (d = 0.65).

In summary, the results revealed that, when investigating children and young people with high social anxiety or a diagnosis of SAD, there was a positive association between increased social anxiety and observer perspective.

Vividness. Six of the above studies have also examined the clarity or vividness of negative images and social anxiety. The results are mixed, with two studies reporting exposure to fear-relevant imagery as significantly more vivid than non-relevant fear imagery in the socially anxious group (Lang et al., 1983; Lang et al., 1970). In contrast, three studies found no significant difference in vividness between fear-relevant and non-relevant fear

imagery (Weerts & Lang, 1978), or between negative and positive imagery for participants with high social anxiety (Stopa & Jenkins, 2007; Vassilopoulos, 2005). In addition, disorder specificity remains unclear, as two studies (Lang et al., 1970; Weerts & Lang, 1978) reported that individuals with spider phobia rated both social and spider scenes as significantly more vivid than individuals with social anxiety. This finding was not supported by Lang et al. (1983), who revealed no significant difference in vividness ratings between individuals with social anxiety and snake phobia when exposed to their fear-relevant imagery.

Finally, one study compared adolescents with SAD to non-anxious controls, and found that the SAD group self-reported significantly more vivid images than the control group during a description of a past anxiety provoking social situation (Schreiber & Steil, 2013).

Taken together, the findings on the association between imagery vividness and social anxiety are mixed, but suggest that any increase in imagery vividness is not specific to social anxiety.

Negative imagery. Four studies explored the presence of negative imagery for young people with high social anxiety or SAD, with all four studies revealing that high social anxiety was associated with a higher frequency of negative images (Schreiber et al., 2012; Schreiber & Steil, 2013; Vassilopoulos, 2005; Vassilopoulos & Moberly, 2013). However, when controlling for depression, Vassilopoulos and Moberly (2013) found that a shared variance meant that social anxiety alone did not predict more negative self-imagery. In contrast, Schreiber and Steil (2013) and Schreiber et al. (2012) found that social anxiety was significantly associated with negative imagery, whilst controlling for depression. Therefore, there is a clear agreement that negative imagery is associated with social anxiety when

investigating clinical and non-clinical populations. However, there are inconsistencies in the role of depression in this association.

Image generation ability. In an attempt to assess image generation ability in individuals with high and low social anxiety, Morrison et al. (2011) instructed socially anxious individuals, and non-anxious controls, to complete a computer programme. The programme measured image generation ability by recording the time taken to identify and respond to the presence of a neutral image. The results revealed that high socially anxious participants were significantly slower at generating neutral images compared to the non-anxious group (d = 0.67).

Summary. Overall, the results support a significant association between observer perspective, as well as image generation ability, with social anxiety in children and young people. A significant association has also been found between high social anxiety and increased frequency of negative images, although the role of depression in this association is less clear. The results for imagery vividness are mixed, but suggest that any increased vividness is not specific to social anxiety.

Methodological Comparison and Critical Evaluation

A methodological critique of the included studies was informed by the PRISMA guidelines (Moher et al., 2015). The quality of each of the studies was assessed through a modified version of the quality checklist (Kmet et al., 2004), with total quality scores reported in Table 1. The overall quality across the 13 studies ranged from low to high. The key findings from the quality checklist will be discussed below.

Research Question and Objectives

Nine studies examined various aspects of imagery and social anxiety as a primary aim of their research, including perspective taking and image generation ability. However, conclusions about imagery and social anxiety were also able to be drawn from four studies that adopted a broader focus in their study, such as exploring the relationship between social anxiety and several cognitive variables.

Study Design

Five studies did not employ any manipulation of imagery or stress condition in their design, and employed a between groups analysis (Hignett & Cartwright-Hatton, 2008; Morrison et al., 2011; Schreiber et al., 2012; Schreiber & Steil, 2013; Ranta et al., 2014), or explored social anxiety as a continuous variable (Schreiber et al., 2012). Although large samples were able to be examined within these studies, the cross-sectional design made it impossible to establish causality. The remaining eight studies employed an imagery manipulation. Five of these studies used a between group design (Anderson & Borkovec, 1980; Stopa & Jenkins, 2007; Vassilopoulos, 2005; Vassilopoulos et al., 2011; Vassilopoulos & Moberly, 2013) in which participants were assigned to different imagery conditions, and three studies compared social anxiety and comparison groups against multiple imagery conditions (Lang et al., 1970; Lang et al., 1983; Weerts & Lang, 1978). The lack of a control group in most of these studies meant that it was not possible to determine whether the results were due to the independent variable, or other confounding factors, such as the presence of positive imagery.

Assessment of Social Anxiety

Only two studies used a sample with clinically diagnosed social anxiety disorder, whereas the remaining 11 studies used several different self-report measures to assess social anxiety. The most prominent measure was the Social Phobia and Anxiety Inventory for Children (SPAI-C; Beidel, Turner, & Morris, 1998); other measures included the Social Anxiety Scale for Children-Revised (SASC-R; La Greca & Stone, 1993); State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983); and the Fear of Negative Evaluation Scale (FNE, Watson & Friend, 1969). In general, the reported psychometric properties of these measures indicate that they were reliable and valid. However, Anderson and Borkovec (1980), Lang et al. (1970), and Weerts and Lang (1978) identified socially anxious participants through a high rating on one item of The Fear Survey Schedule (FSS; Wolpe & Lang, 1969). This method has not been demonstrated as a reliable or valid measure of social anxiety, questioning the conclusions drawn from these studies.

In addition, the validity of solely using child self-report measures to assess social anxiety is questionable. Alfano, Beidel, and Turner (2002) highlighted problems with accurately completing questionnaires due to a possible lack of awareness of cognitions and emotions. This limitation could lead to the under or over reporting of symptoms. As many studies have allocated groups based on self-report measures, this criticism should be considered further when interpreting the findings of this review.

Recruitment and Sampling

One study recruited directly from a clinical population (Schreiber & Steil, 2013), whereas nine studies recruited from schools and colleges. Methods of recruitment were not described in three studies (Anderson & Borkovec, 1980; Vassilopoulos, 2005; Weerts, &

Lang, 1987). Most studies appeared to use opportunistic sampling, in which local students were invited to take part. As little information is known about the exact sampling methods employed it is not possible to assess the effect of this on the findings. However, the institutions approached may be biased by researcher selection, and sampling bias may be present with those opting to take part. In addition, recruiting from non-clinical samples means that the transferability of results to individuals with a diagnosis of social anxiety disorder should be drawn with caution.

Inclusion and Exclusion Criteria

Only one study provided detailed inclusion and exclusion criteria (Schreiber & Steil, 2013), whereas eight studies did not clearly define their inclusion criteria, and four studies provided no details of their exclusion criteria (Anderson & Borkovec, 1980; Morrison et al., 2011; Ranta et al, 2014; Vassilopoulos & Moberly, 2013). This limited information means that replication of the research is challenging. It also makes it difficult to draw conclusions about the representativeness of the sample to the wider population, weakening external validity.

Assessment of Imagery

Numerous imagery measures were used across the 13 studies. Because different dimensions of imagery were measured using a variety of methods, it could impede meaningful comparisons across studies. Two studies used the Questionnaire of Recurrent Images in Social Phobia (QRI-SP; Schreiber, Stangier, & Steil, 2009), which was developed for a treatment manual on cognitive therapy for social phobia. Other measures included a Likert scale to assess the vividness of an image, or content coding of the subjects narrated scenes. No studies assessed the measures against other measures of imagery, resulting in a lack of

concurrent validity, making it difficult to assess the accuracy or sensitivity of the measures. In addition, the use of retrospective self-report measures of imagery may be biased by socially desirability response and recollection bias. Finally, the validity of using self-report measures to assess highly complex variables, such as negative self-imagery, is thought to be questionable (Schreiber & Steil, 2013). These constructs may be more accurately assessed in children and young people with clinician rated measures.

Ethical Considerations

Four studies discussed ethical considerations of consent and ethical approval. Two studies considered participant consent, and a further two confirmed approval from an ethical committee. However, five studies (Anderson & Borkovec, 1980; Lang et al., 1970; Morrison et al., 2011; Vassilopoulos, 2005; Weerts & Lang, 1978), did not state any ethical considerations. It is therefore unclear what procedures were considered in ensuring participants were protected from harm.

Statistical Analysis and Sample Size

All 13 studies used statistical tests to analyse their main findings, however the level of reported detail varied across the studies. Six studies reported actual probability values, but only three reported effect sizes. The remaining studies reported the level of significance. Similarly, studies did not typically report on whether their data met the required assumptions of statistical tests used.

Sample sizes varied greatly, ranging from 20 (Lang et al., 1970; Stopa & Jenkins, 2007) to 567 (Schreiber et al., 2012). One study reported that they had sufficient power to detect a clinically meaningful effect (Hignett & Cartwright-Hatton, 2008), two studies commented that they were underpowered to detect more complex associations between

variables (Morrison et al., 2011; Schreiber & Steil, 2013), and one study combined groups in an effort to increase their statistical power (Ranta et al., 2014). However, most studies did not report their power calculations, making it difficult to assess whether their sample was large enough to provide reliable findings. Small sample sizes could equate to a study being underpowered, and may result in a Type II error.

Discussion

Overview of Findings

This review aimed to identify and critically evaluate research that has investigated the association between imagery and social anxiety in children and young people. More specifically, it aimed to examine the effects and characteristics of negative imagery for children and young people in the context of social anxiety. Thirteen studies met the inclusion criteria.

Eight studies investigated the *effect* of negative imagery on individuals with high social anxiety. Negative imagery was significantly associated with increased anxiety, heart rate, negative interpretations, poorer self-rated performance, and increased self-reported adverse bodily sensations. However, several of the effects of negative imagery were also found for individuals with spider and snake phobia, suggesting that these findings were not specific to those with high levels of social anxiety.

Similar patterns of findings were presented in the adult review paper by Ng et al. (2013), who found that negative imagery was associated with a range of adverse effects including, poorer self and observer-rated performance appraisals, greater anxiety, and increased negative thoughts. However, they reported limited evidence for disorder

specificity, as negative imagery had similar adverse effects on individuals with non-social anxiety disorder, although the effects were greater for socially anxious people.

Eleven studies reported on imagery characteristics and social anxiety for children and young people. Significant findings indicated a consistent relationship between high social anxiety and increased observer perspective images, increased frequency of negative imagery, and slower speed of image generation. There were mixed findings for the vividness of negative images among both high socially anxious and control groups.

These findings are also consistent with studies of adult populations. Ng et al. (2013) found no significant difference in vividness rating of negative images for high socially anxious individuals. However, they found that for socially anxious adults, images were more likely to be experienced from an observer perspective, and were negative in valance.

Theoretical Implications

Cognitive models of social anxiety disorder propose that negative self-imagery is a key maintenance factor of the disorder (Clark & Wells, 1995; Rapee & Heimberg, 1997). A number of findings in this review are consistent with the role of imagery in social anxiety, in particular, the association between high social anxiety and increased negative observer perspective images.

However, the results exploring the *effects* of negative imagery on individuals with high social anxiety are less clear. Introduction of negative imagery, as described by the cognitive models of SAD (e.g. Clark and Wells, 1995), would be hypothesised to be associated with an increase in negative symptoms, such as anxiety and negative thoughts, for individuals with high social anxiety. These findings were not supported in the current review with children and young people. As several of the studies included individuals with a

spider or snake phobia, it could be that the effect of negative social imagery is not specific to individuals with social anxiety. Alternatively, as only two studies used samples of children and young people with a diagnosis of SAD, it may be that only those reaching diagnostic criteria would experience the adverse effects of negative social imagery. The methodological flaws of the included studies, such as poor psychometric properties of imagery measures, could also account for the inconsistent and non-significant findings. It is also possible that the role of mental imagery, as described by the adult models of SAD, is different for children and young people compared to adults.

Clinical Implications

Due to the limited number of treatment studies, clinical implications should be considered tentatively, with further research needed to explore these findings. Imagery rescripting and video feedback have been found to reduce social anxiety in adults (Wild, Hackmann, & Clark, 2007; Lee & Kwon, 2013). The effectiveness of video feedback on self-performance appraisals, state anxiety, and future performance, has also been found with high socially anxious adolescents (Parr & Cartwright-Hatton, 2009). This review provides support for the association between SAD and negative observer perspective taking in adolescents. As the aim of video feedback is to provide realistic information about how they appear to others (Clark, 2001), and to challenge negative self-performance appraisals, these findings provide preliminary indirect support for the use of video feedback for this population. Other strategies, such as imagery rescripting, may play a vital role in correcting distorted images, and rescripting how one perceives others' views of them.

Limitations of the Review

A number of limitations of this review must be considered. Primarily, the lack of research in the area resulted in a broad approach to the review. For example, participants included those with a diagnosis of SAD, those with speech anxiety, and others with non-clinical levels of social anxiety. The overall sample was biased in other ways, for example, there were a high percentage of females across the studies, and of the studies that reported ethnicity, all participants identified as Caucasian (Vassilopoulos et al., 2011; Vassilopoulos & Moberly, 2013). In addition, despite the median age of onset of SAD of 12 years (Kessler et al., 2005), the majority of the included participants were older than this, implying that many adolescents are not captured in this review. As some studies only specified the mean age and SD, or indicated that they were undergraduates, it limited the conclusions drawn from these studies. Taken together the findings may lack ecological validity and be under representative of children and adolescents with high social anxiety.

The included studies also addressed a range of related but different research questions, with little replication. This wide-ranging remit questions the validity of drawing any conclusions about the observed effects. A broader perspective was also taken for the concept of 'imagery', which restricted the ability to synthesise findings and to evaluate the extent that findings could be replicated and/or compared.

A large number of studies used self-report measures of social anxiety and imagery. Several of these measures had poor psychometric properties, and had not been validated for use with the target population. The reliability of these results may therefore be questionable. In addition, although effect sizes were calculated, it was not possible to do this for every study due to lack of reported findings, further limiting the conclusions drawn.

Future Directions

Overall, these limitations highlight the need for higher quality, targeted research examining specific constructs of imagery in social anxiety with children and young people. It may be that larger effect sizes are found for studies that use clinically diagnosed individuals, as well as ensuring findings are appropriately generalised to clinical populations. Despite the lack of participants assessed for a diagnosis, the use of self-report measures has some advantages, including practically when recruiting large samples. Due to the associated biases with some of the measures, it would be advantageous to develop and validate developmentally appropriate measures. Promoting consistency in the use of specific measures will go some way to enable comparisons across studies.

As several studies used a cross-sectional design, it would be advantageous for subsequent research to employ an experimental design to explore the direction of the effect. Employing studies that use a control, as well as several imagery conditions, would also enable the strength of the effects to be determined. In addition, only one study compared age groups (Hignett & Cartwright-Hatton, 2008) to examine developmental differences. It would therefore be advantageous to explore the effects of negative imagery on social anxiety at different developmental levels.

These studies only provide the beginning of what we need to know about social anxiety and imagery in children and young people. It will be important to explore the content of the negative images for young people with high social anxiety, as well as undertaking further investigations into the effect of the images on the young person. In addition, consideration of developmental and contextual factors, such as changes in cognitive capacity and peer relationships, would provide further evidence about the role of

imagery in the development and maintenance of social anxiety in children and young people. An increase in the knowledge base may enable the development of more effective, and developmentally appropriate, treatments for children and young people with social anxiety disorder.

Conclusions

Due to the early stages of the literature in the field, it is not possible to draw firm conclusions. However, the findings provide some evidence in line with the cognitive models of social anxiety disorder, and suggest that imagery may have a role in the maintenance of social anxiety with children and young people. Despite the promising findings, any conclusions should be considered in light of the methodological issues discussed. Due to the growing interest in imagery based interventions, more conclusive evidence is necessary, ensuring treatment interventions are based on sound psychological theory and research.

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PAPER B

FOCUS OF ATTENTION AS A MAINTENANCE FACTOR FOR SOCIAL ANXIETY IN CHILDREN

Jennifer Chapman

A thesis submitted in partial fulfilment of the requirements of the degree of

Doctor of Clinical Psychology, validated by the University of Oxford

(Trinity Term)

July 2018

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Focus of Attention as a Maintenance Factor for Social Anxiety in Children

Jennifer Chapman, Harris Manchester College

University of Oxford, Doctorate in Clinical Psychology

Trinity Term, 2018

Abstract

There is a high prevalence of social anxiety disorder (SAD) in children, which can have a negative effect on many aspects of the child's life, for example, relationships and academic performance. Adult cognitive models of SAD provide a framework to understand the factors that maintain this disorder. One of the most significant mechanisms described in these models is attentional focus. Although the maintaining role of attentional focus is largely supported by empirical evidence with adults, far less is known about focus of attention and social anxiety among child populations. The present study explored the balance of internal and external focus of attention in pre-adolescent children. This was examined using self-reported focus of attention measures, as well as by examining the effects of experimentally manipulating anxiety on attentional focus among high and low socially anxious children.

A total of 283 children aged 9-11 years completed self-report questionnaires assessing social anxiety, and focus of attention. From this, 133 participants scoring high and low in social anxiety symptoms completed an attention task. Participants were instructed to detect internal and external probes in a high and low stress condition (before and after manipulation). The internal attention focus stimuli consisted of a light vibration to the index finger, which participants were led to believe represented an increase in heart rate. The

external attention focus stimulus was a small dot superimposed on a photograph of a child's face on the computer screen.

The findings from the questionnaires revealed a cross sectional association between focus of attention and self-reported social anxiety. However, the findings for the attention task provided no evidence to suggest that heightened anxiety led to increased internal, relative to external, focus of attention for high socially anxious, compared to low socially anxious, pre-adolescent children.

Highlights

- There was a significant cross sectional association between self-reported internal focus of attention and high social anxiety
- The social stress manipulation task was successful in increasing state anxiety levels
- There was no significant difference in attentional focus between social anxiety groups in the high and low stress conditions

Keywords: Social anxiety, focus of attention, children and adolescents

Proposed Journal: Behaviour Research and Therapy (see Appendix F for author guidelines)

Introduction

Social anxiety disorder (SAD) is characterised by fear, anxiety, or avoidance of social interactions or situations in which there is a possibility that a person may be scrutinised by others (American Psychiatric Association [APA], 2013). For a child to meet the diagnostic criteria for SAD, the fear or anxiety must occur in peer settings and not just with adults (APA, 2013). Children may manifest anxiety differently to adults with SAD, in that they may be more likely to cry, 'freeze', or show challenging behaviour (APA, 2013).

Prevalence estimates suggest that SAD is one of the most common anxiety disorders in the general population, with lifetime prevalence rates of up to 12% (Kessler et al., 2005). SAD typically develops in childhood or early adolescence, with 75% of individuals developing SAD between the age of 8 and 15 years (APA, 2013). However, it is also commonly diagnosed among children seeking treatment for anxiety, with rates as high as 45% for pre-adolescent children (Waite & Creswell, 2014). A developmental perspective can provide some insight into the potential triggers for symptoms of social anxiety in childhood, at which time the child is considered to place an increasingly greater emphasis on the importance of peer interactions and relationships, and therefore may feel the need to win their approval (Erikson, 1959). SAD in childhood has not only been found to be a risk factor for the development of other anxiety and mood disorders (Wittchen, Stein, & Kessler, 1999), it is also reported to have a negative impact on a broad range of psychosocial variables, including social functioning and academic performance (Wittchen et al., 1999; Ameringen, Mancini, & Farvolden, 2003).

Cognitive Models of Social Anxiety

A number of cognitive models of SAD have provided a disorder-specific framework outlining the factors thought to contribute to and maintain the symptoms (Clark & Wells, 1995; Rapee & Heimberg, 1997).

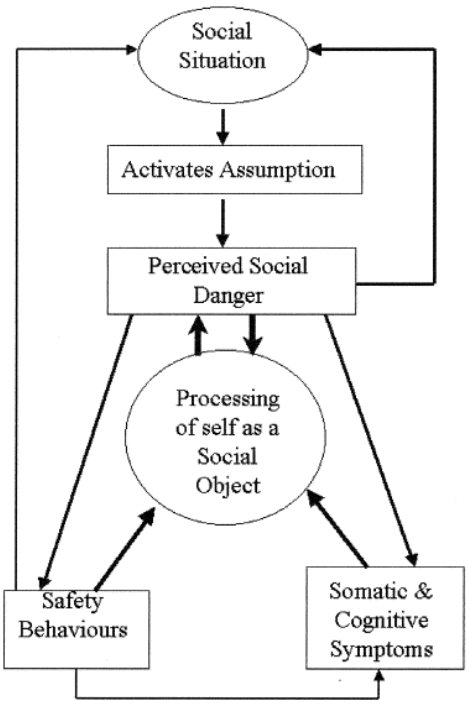


Figure 2.1. Clark and Wells (1995) Cognitive Model of Social Anxiety Disorder

Clark and Wells (1995) propose that when an individual with SAD enters a social situation, a set of assumptions/beliefs are activated (i.e. negative beliefs about oneself and the world) which lead the individual to interpret the social situation in a threatening way (see Figure 2.1). These negative interpretations are then maintained by several psychological processes. The individual shifts their attention to detailed monitoring of themselves, and then uses this internal information (feelings and self-images) to make excessively negative inferences about how one appears to others. Individuals also engage in the use of safety behaviours (including avoidance and escape), such as avoiding eye contact,

which aim to 'deal' with the perception of threat, but instead prevent the individual from disconfirming the belief. It is also possible that safety behaviours, such as standing away from the group, may make the individual come across in a less positive way (by appearing uninterested in the conversation, for example). Finally, the individual may engage in negative pre- and post-event processing. During pre-event processing, the individual may review past social failures and make predictions about negative future performances, feeding into the other maintenance cycles by increasing the self-focus of their attention, for example. Post-event processing involves reviewing past performance in a ruminative and negatively-biased manner, which may impact future events, by making it less likely that they will attend other social events, for example (Clark, 2001). Rapee and Heimberg (1997) also highlight the importance of cognitive processes in maintaining social anxiety (see Figure 2.2). They hypothesise that individuals interpret social situations as a threat due to the assumption that they will be negatively evaluated by others.

According to Clark and Wells (1995), upon entering a feared situation, an individual's attention shifts internally to monitor and observe themselves. This internal, self-focused attention is hypothesised to interfere with the individual's ability to process the situation and others' reactions. The information gathered from this monitoring is then used to create a negative impression of oneself that is believed to be available to be viewed by others. Although the model places particular emphasis on self-focused attention, Clark and Wells (1995) suggest that there is limited processing of external information, which is likely to be negatively biased (Clark, 2001). Like Clark and Wells (1995), Rapee and Heimberg (1997) also suggest that one of the most significant changes that happen to an individual with SAD is that their focus of attention shifts when entering into a feared situation. Although Clark and Wells (1995) acknowledge the impact of external cues, Rapee and Heimberg (1997) place an

additional emphasis on the monitoring of external threats through scanning the social environment for signs of negative evaluation. Although both models predict a significantly higher internal to external focus of attention, Clark and Wells (1995) may expect a greater shift away from external focus of attention.

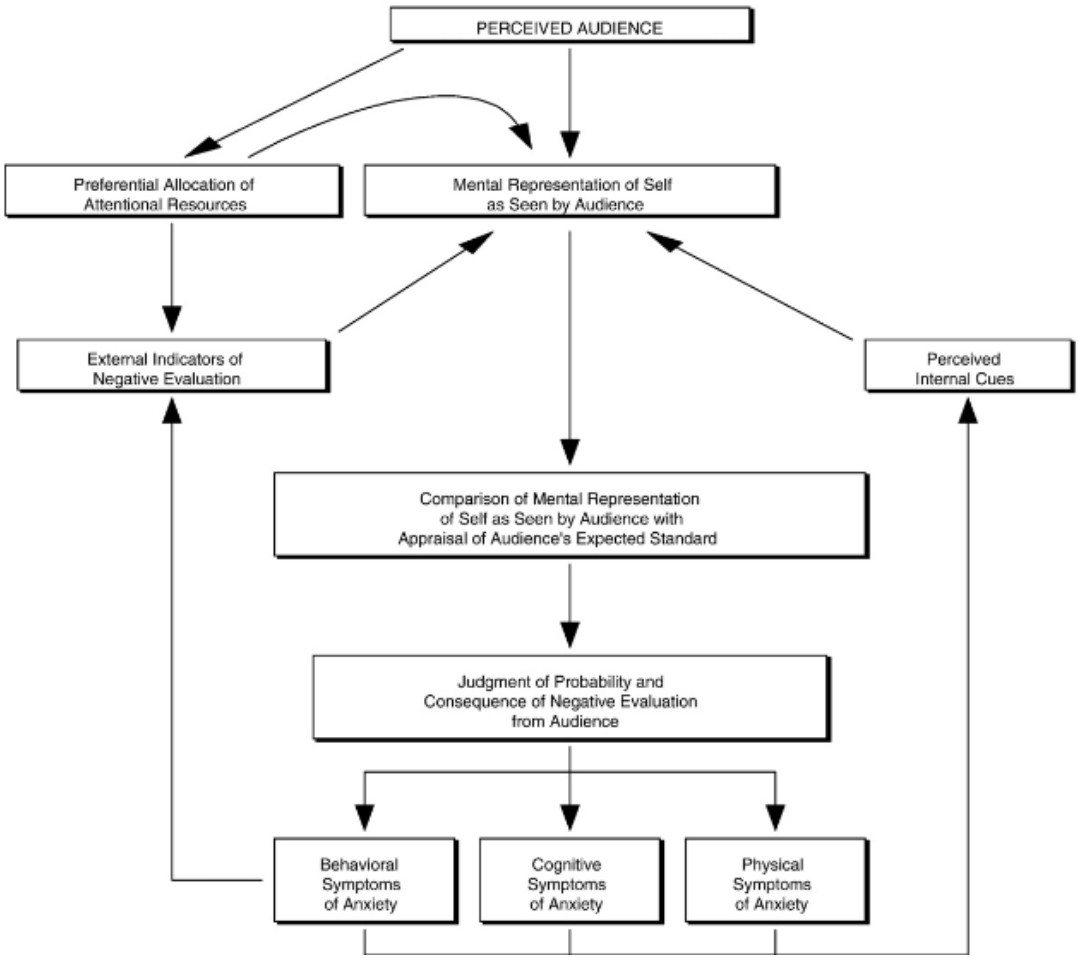


Figure 2.2. Rapee and Heimberg's (1997) Cognitive Model of Social Anxiety Disorder

Empirical Evidence with Adults

A large number of studies with socially anxious adults have provided strong support for the cognitive model's conception of focus of attention (Norton & Abbott, 2016; Schultz & Heimberg, 2008). Reviews of the literature have revealed consistent evidence for

increased self-focused attention for clinical and non-clinical high socially anxious adults in social situations (Bögels & Mansell, 2004; Spurr & Stopa, 2002).

An association has also frequently been reported between increased self-focused attention, and high state anxiety in individuals with high social anxiety and clinically diagnosed SAD (Chen, Rapee, & Abbott, 2013; Holzman, Valentiner, & McCraw, 2014). In addition, through experimental manipulation, studies have reported a causal effect of increased self-focused attention resulting in higher state anxiety levels (Bögels, Rijesmus, & de Jong, 2002; Makkar & Grisham, 2013).

Far fewer studies have examined the role of external focused attention, as highlighted by Rapee and Heimberg (1997), or examined the balance of internal and external focus of attention. Mansell, Clark, and Ehlers (2003) conducted the first study to directly investigate the balance between internal and external attention. Using a novel probe-detection paradigm, they simultaneously assessed attention to internal and external information in high and low socially anxious adults. Individuals were randomly assigned to a high or no social threat condition. Prior to the social threat task (a speech), participants were requested to complete a computer programme that measured their internal focus of attention (reaction time to finger vibration) and external focus of attention (reaction time to appearance of a letter on an image). The authors allocated individuals to the high and low socially anxious groups in two ways, their scores on the Brief Fear of Negative Evaluation Scale (FNE; Leary, 1983), and also on the Personal Report of Confidence as a Speaker (PRCS; Paul, 1966). When examining the groups based on the Brief FNE, they did not find a significant interaction between social anxiety and stress condition on focus of attention. However they did find a significant three-way interaction between social anxiety, stress

condition, and gender. In line with this, high socially anxious females in the high threat condition showed an increase in internal focus of attention. This finding was not significant for males.

When using the PRCS to allocate individuals to groups, Mansell et al. (2003) found that compared to individuals with low speech anxiety, those with high speech anxiety directed their attention towards internal information and away from external information in anticipation of a social threat task. The authors also found that high speech anxious individuals tended to show an attentional bias directed internally when presented with happy or angry faces.

Empirical Evidence with Pre-Adolescent Children

Although a large number of studies have provided support for the role of focus of attention in socially anxious adults (e.g. Norton & Abbott, 2016; Schultz & Heimberg, 2008), the applicability of the SAD cognitive models' (Clark & Wells, 1995; Rapee & Heimberg, 1997) conception of focus of attention to socially anxious children remains less clear. Due to unique developmental factors associated with childhood, such as influence of parenting (Wood, McLeod, Sigman, Hwang, & Chu, 2003) and reduced cognitive capacity (Yurgelun-Todd, 2007), it is possible that focus of attention, as described by adult cognitive models of SAD, may not apply to social anxiety in children.

Only a few empirical studies have examined focus of attention in pre-adolescent children. In a correlational study, Hodson, McManus, Clark and Doll (2008) examined the variables in the Clark and Wells' (1995) model in high and low socially anxious young people. Hodson et al. (2008) found that focus of attention was predictive of social anxiety in 11-14 year olds, with the high socially anxious group reporting significantly higher levels of self-

focused attention on the Focus of Attention Questionnaire (FAQ; Woody, 1996). These findings were supported by Higa and Daleiden (2008), who examined the association between self-focused attention and social anxiety in 175 non-referred socially anxious children aged 9-14 years. In addition to examining the relationship between social anxiety and self-focused attention using questionnaires, the authors also experimentally induced self-focused attention via a mirror manipulation procedure and examined the effect on social anxiety. The questionnaire results revealed a positive relationship between social anxiety and self-reported self-focused attention. However, the mirror manipulation procedure failed to induce self-focused attention. Therefore, although it was possible to draw conclusions about the cross sectional association between self-reported social anxiety and focus of attention, the direction of the association could not be examined.

In line with the findings from non-clinical populations, Kley, Tuschen-Caffier, and Heinrichs (2012) asked children aged 8-13 years to complete the FAQ following a public speaking task. The participants were split into three groups, SAD, high socially anxious (but non clinical), and non-anxious. The authors found a significant association between social anxiety and self-reported self-focus of attention on the FAQ. In addition, the SAD group reported significantly higher self-focused attention in the public speaking task, when compared to the high socially anxious and non-anxious group. They found no difference in levels of internal focus of attention between high socially anxious and non-anxious children. Participants with SAD also reported significantly higher external focused attention when compared to the non-anxious group. However, this finding was not significant when compared to the high socially anxious group. Using similar participant groups to Kley et al. (2012), Kley, Tuschen-Caffier, & Heinrichs (2011) instructed participants to focus internally or externally during a speaking task. Following a successful manipulation in focus of

attention, they found that all children in the internal focused condition reported higher state anxiety. In addition, they found that the SAD group experienced significantly higher levels of state anxiety than the high socially anxious group, and the high socially anxious group reported significantly more state anxiety than the non-anxious group. However, contrary to the cognitive models of social anxiety, they found no significant difference between the social anxiety groups in the internal and external focus of attention conditions.

Taken together, the evidence suggests that children with high social anxiety self-report more internal focus of attention than those with low social anxiety. However, this finding is not significant when high socially anxious individuals are separated from those with a diagnosis of SAD (Kley et al., 2011; Kley et al., 2012). Of the two studies that reported external focus of attention, one study found a significant difference between the SAD group and the non-anxious group, but not between the SAD and high socially anxious groups (Kley et al., 2012). The other study found no interaction between groups and manipulated focus of attention on state anxiety levels (Kley et al., 2011).

Current Study

The cognitive models of SAD suggest that under social stress, individuals with social anxiety disorder shift their attentional focus. Very few studies with pre-adolescent children explore focus of attention, and only one study successfully manipulated focus of attention to examine the causal direction of this on state anxiety levels. No studies have manipulated anxiety to measure changes in focus of attention. In addition, there are no studies that look at the balance of focus of attention (Halldorsson & Creswell, 2017). Therefore, this study aims to look at the balance of internal and external focus of attention in pre-adolescent children. This will be examined in three ways, firstly, through examining the continuous

association of self-reported focus of attention (internal and external) in a community population, secondly, comparing individuals with high and low social anxiety on self-reported internal and external focus of attention, and finally, using an experimental approach comparing high and low socially anxious participants on the balance of internal and external focus of attention in a stress manipulation attention task. This study will replicate some of the design used by Mansell et al. (2003). If the manipulation is successful, this will be the first study to examine the direction of the association of internal, relative to external, focus of attention and social anxiety in pre-adolescent children.

The following hypotheses were developed based upon adult cognitive models of SAD (Clark & Wells, 1995; Rapee & Heimberg, 1997), empirical evidence from socially anxious adults (especially Mansell et al., 2003), and the limited evidence for pre-adolescent children:

1. In a community population of children, high social anxiety will be significantly associated with internal, relative to external, focus of attention;

2. There will be a significant difference in internal and external focus of attention between high and low socially anxious children, with the high socially anxious children reporting higher levels of internal, relative to external, focus of attention;

3. There will be a significant difference in focus of attention in high and low socially anxious children. The high socially anxious children will show higher levels of internal, compared to external, focused attention compared to the low socially anxious children, whilst in the high compared to the low stress condition.

Method

Overview

The study was undertaken in two parts. Part one was a questionnaire study, and part two was a quasi-experimental study with a between-subjects, repeated measures design.

Part one. Paper copies of the following questionnaires were completed by the whole sample: Liebowitz Social Anxiety Scale for Children and Adolescents (LSAS –CA; Masia-Warner et al., 2003), the Focus of Attention Questionnaire (FAQ; Woody, 1996), and the Revised Child Anxiety and Depression Scale (RCADS; Chorpita, Yim, Moffitt, Umemot & Francis, 2000). In addition, demographic information was collected, including, age, gender, social economic status, ethnicity, and English as an additional language (EAL).

Part two. Participants who scored in the top and bottom 25% on the LSAS-CA were invited to take part in the second part of the study. Due to the small sample size, a repeated measures design was employed to eliminate baseline differences. Therefore, the study compared high versus low socially anxious children who each took part in both the low and high stress conditions.

Participants

Pre-adolescent children, aged 9-11 years, were invited to take part from four local primary schools. A power analysis was run for a mixed model ANCOVA with a medium effect size ($\alpha = .05$), suggesting a sample size of 128 participants to ensure adequate power for part two of the study. To accommodate an estimated dropout rate of 25%, the study aimed to recruit a total of 160 participants for part two. With the above calculations in mind, a total of 337 children were invited to take part in the study. However, as Figure 2.3 illustrates, 54 children were not included due to withdrawal of consent or the exclusion

criteria being met. Therefore, a total of 283 children were asked to complete the LSAS-CA, RCADS, and FAQ. In order to test hypotheses two and three, participants were selected using an extreme group approach (high versus low self-reported social anxiety). This method is beneficial for exploratory research when the exact functional form of a relationship is unknown but there is a hypothesis about the direction of the effect (Preacher, Rucker, MacCallum, & Nicewander, 2005). The children who scored within the top and bottom 25% on the LSAS-CA were identified for part two of the study, that is, the attention task. Individuals who scored in the top 25% (> 67 score) on the LSAS-CA formed the 'high social anxiety' (HSA) group (n= 65), and the individuals who scored in the bottom 25% (< 28 score) formed the 'low social anxiety' (LSA) group (n= 67).

Exclusion criteria.

1. Not in full time education
2. Not fluent in English language
3. Identified by the school as highly traumatised, at risk, looked after, having experienced a recent bereavement, witnessed domestic violence, or if they were considered vulnerable for other reasons.
4. Children who had specific learning needs, if it was deemed that they would struggle to understand the task.
5. If the child had a diagnosis of Autism Spectrum Disorder
6. If the teacher felt that a pupil was not suitable for the research

In order to increase the homogeneity of the sample, all schools were recruited from the local primary schools in Oxfordshire and were deemed to represent the local demographics.

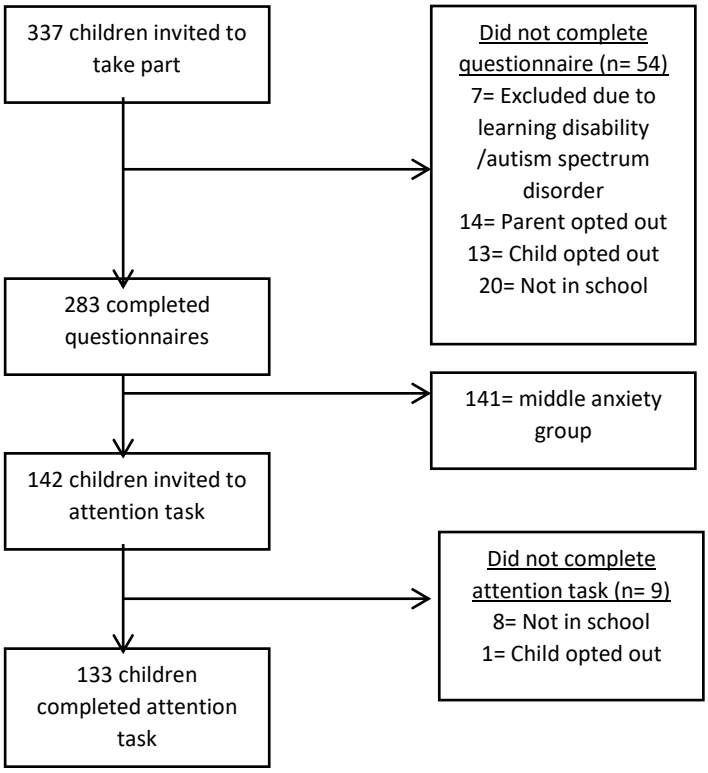


Figure 2.3. Participant Flowchart

Ethical Considerations

Ethical approval was granted by the Central University Research Ethics Committee (CUREC), University of Oxford (Medical Sciences Interdivisional Research Ethics Committee). See Appendix G for confirmation of ethical approval. Following the pilot phase, an amendment requiring CUREC approval was subsequently submitted, and approved, as detailed in Appendix H (See Appendix I for Research Sub-Committee approval).

Consent was initially sought from the head teachers, and then parents had the opportunity to opt their child out of the study. Written assent was gained from the children prior to completing the questionnaires and verbal assent was obtained on the date of the attention task. It was clearly explained to participants that they had the right to withdraw from the study at any point. They were also debriefed at the end of the study.

If a participant showed distress during the study, they were given the opportunity to withdraw. This only happened on one occasion, and the child reported that they wanted to continue.

To ensure confidentiality, all data were anonymised immediately. Participants were allocated a number which was used on both the questionnaires and attention task results. The raw data were entered electronically at the first opportunity, and stored on a password protected computer.

Measures

Part One

All participants completed the LSAS-CA, RCADS, and the FAQ.

The LSAS-CA is a 24 item clinician administered questionnaire that assesses anxiety and avoidance in 24 situations. Twelve of the questions focus on performance-related situations and 12 focus on social interaction situations. The situations are then rated separately on anxiety and avoidance using a four-point Likert scale. The questionnaire has been shown to have high test-retest reliability (Masia-Warner et al., 2003). It also shows high convergent validity with other social anxiety measures, as well as high levels of construct validity - 95.9% of individuals with social anxiety disorder were correctly classified and none of the non-psychiatric comparisons was misclassified (Masia-Warner et al., 2003). The questionnaire has also been used effectively as a self-report tool (Olivares, Sánchez-García, & López-Pina, 2009; Schmits, Heeren, & Quertemont, 2014). In this sample, the LSAS-CA showed excellent internal consistency (Cronbach's alpha coefficient of .95).

The RCADS is a self-report questionnaire consisting of 47 items. It has six subscales, including separation anxiety disorder, social anxiety disorder, generalised anxiety disorder,

panic disorder, and major depressive disorder. For the purpose of this study, the depression subscale score was used to examine the impact of low mood on the findings. The RCADS has been shown to have favourable internal consistency, and a factor structure consistent with Diagnostic and Statistical Manual of Mental Disorders IV (DSM IV; Chorpita et al., 2000). In this sample, the RCADS depression subscale showed good internal consistency (Cronbach's alpha coefficient of .84).

The FAQ contains 10 items and consists of two subscales (self-focused attention and other-focused attention). It is designed to assess the extent to which a person has focused on either internal or external stimuli during a previous social interaction, for example, 'I was focusing on what I would say or do next'. The FAQ has not been validated for use with children and young people, but the questionnaire was chosen due to a lack of other validated measures of attentional focus, and also due to its frequent use in adult populations. The FAQ showed satisfactory internal consistency (Cronbach's alpha coefficient of .73) for the self-focus of attention subscale, but a poor internal consistency (Cronbach's alpha coefficient of .50) for the external focus of attention subscale. The questions that make up the external FAQ were explored independently. Deleting any one of these items did not improve the internal consistency of the scale.

Following a consultation with a group of young people with mental health difficulties, and their parents, the wording of some of the questions was changed, with agreement from the author. For example, 'A moderate degree' on the Likert scale was changed to 'A medium amount'.

Demographic information. Demographic information was collected from schools, and included, date of birth, gender, social economic status (based on free school meals), ethnicity, and whether English was an additional language (EAL).

Part Two

Attention task. A computerised reaction time attention task was created to assess the balance of internal and external focus of attention. The external stimuli consisted of a green dot in the middle of an image of a child's face using E-Prime computer software (Schneider, Eschman, & Zuccolotto, 2002) and the internal stimuli was a finger probe that vibrated. The child was asked to respond to the presence of the dot or vibration as quickly as possible. The time that it took for the child to respond to the presence of each stimulus was recorded and compared across the conditions. The reaction time taken to respond to the vibrating probe measured internal focus of attention, and the time taken to respond to the presence of the dot measured external focus of attention. An average of the reaction times for each participant was computed across conditions.

Pictures. The picture stimuli (children's faces) were drawn from the National Institute of Mental Health Child Emotional Faces Picture Set (NIMH-ChEFS; Egger et al., 2011). The picture set contained images of young people between the ages of 10-17 years. Photographs of younger children were selected to match the age of the sample. The faces depict different emotions (fearful, angry, happy, sad, and neutral). The facial expressions have been validity tested by 20 healthy adult raters (Egger et al., 2011). Based on the findings from Mansell et al. (2003), faces displaying anger were used to maximise any effect. A total of four images were selected, two of each gender. Each image was 19cm by 16cm, and was displayed one at a time in the centre of the screen on a 19inch monitor. Each

picture remained on the screen for approximately 25 seconds, whilst the internal and external stimuli were presented. The pictures were presented in a fixed random order, with each face only presented once in each condition, and no sequential repetitions occurred.

Internal and external stimuli. The *internal stimuli* consisted of a light finger vibration using a finger probe. A rubber tube was attached to the child's index finger, with a modelling motor (from a model helicopter) at the end. A square wave signal was produced using an online tone generator. A 50hz signal lasting 1000ms was fed into a transistor configured as a switch, powering the motor, and creating a light vibration in the rubber tube. The device was powered by 2x AA batteries. The pilot stage ensured the vibration was as light as possible, whilst consistently detected. The *external* stimuli consisted of a 3mm green dot positioned between the eyes when the face was displayed.

Timing of internal and external probes. Whilst each picture was displayed, four internal and four external stimuli were presented, one at a time. The first stimulus was presented 650ms after the picture was uploaded. The gap between the presentation of each stimulus followed one of two patterns, option 1 (3750ms; 3000ms; 3250ms; 3000ms; 3750ms; 3250ms; 3000ms), or option 2 (3000ms; 3550ms; 3000ms; 3250ms; 3000ms; 2250ms; 3750ms). There was a delay of 150ms before the computer recorded the response, and there was a wait of up to 3000ms for the participant to respond, before it was coded as an error.

Manipulation. In order to create the stress condition, participants were told that they would be asked to complete a 5 minute speech in front of peers on the computer screen at the end of the attention task. They were shown a short clip of children walking into a classroom, sitting on the floor, and turning to look at the camera. The clip lasted 40

seconds. It was paused with the image of the children looking towards the camera, expectantly. Following this, the participants were provided with a list of three topics (Appendix J), and told that they would be asked to present their opinion on one of these topics to the audience. They were informed that the peers would be rating their performance.

To increase the success of the manipulation, participants were asked to wear a Fitbit. They were told that the Fitbit measured their heart rate and the vibration of the probe occurred in response to an increase in heart rate. To make this plausible, the participants were asked to complete a short burst of exercise (running on the spot or star jumps). The finger vibration was induced to indicate that it had been triggered due to an increase in their heart rate. This manipulation was also displayed visually for the participant to see (Appendix K).

Manipulation check. In order to assess whether the stress manipulation had been successful, participants were asked to rate their state anxiety on a simple, unpublished, self-report 0-10 Likert Scale (see Appendix L). The scores ranged from 0 (not at all anxious) to 10 (extremely anxious). Baseline scores were obtained once the overall study had been introduced. Further ratings were noted before and after the stress induction.

Procedure

Feedback about the information sheets, questionnaires, and the procedure was gathered from teachers, children, service users, and parents. The information sheets, and overall procedure, were adapted following this feedback, for example, the language was simplified and the exclusion criteria were altered. A pilot test was then completed with four children to test the questionnaires and attention task, as well as to run through the

procedure. This resulted in increased clarity in the instructions, and a visual aid to describe the Fitbit manipulation. The procedure was divided into nine stages, as depicted by Figure 2.4.

Consent and introduction. Consent was first gathered from the head teachers of four local primary schools. An information leaflet and opt out form was then sent to parents and carers of the children, who had the opportunity to opt out of the study (see Appendix M). The information leaflet contained information about both parts of the study.

Introduction and self-report measures. The researcher visited each class, and introduced the topic of anxiety. The nature of the study was explained to all participants who had not been excluded following the opt-out procedure, and they had the opportunity to ask questions. They were provided with a leaflet about the study (Appendix N), and an assent form (Appendix O). It was explained that they would have the opportunity to opt out of the study at any point. A questionnaire pack containing the LSAS-CA, RCADS and FAQ (Appendix P) was administered to all participants where assent was gained. The researcher completed the questionnaires with the children as a whole class, with support from teaching staff. Demographic information was also collected at this stage. The final sample was identified through the results of the LSAS-CA.

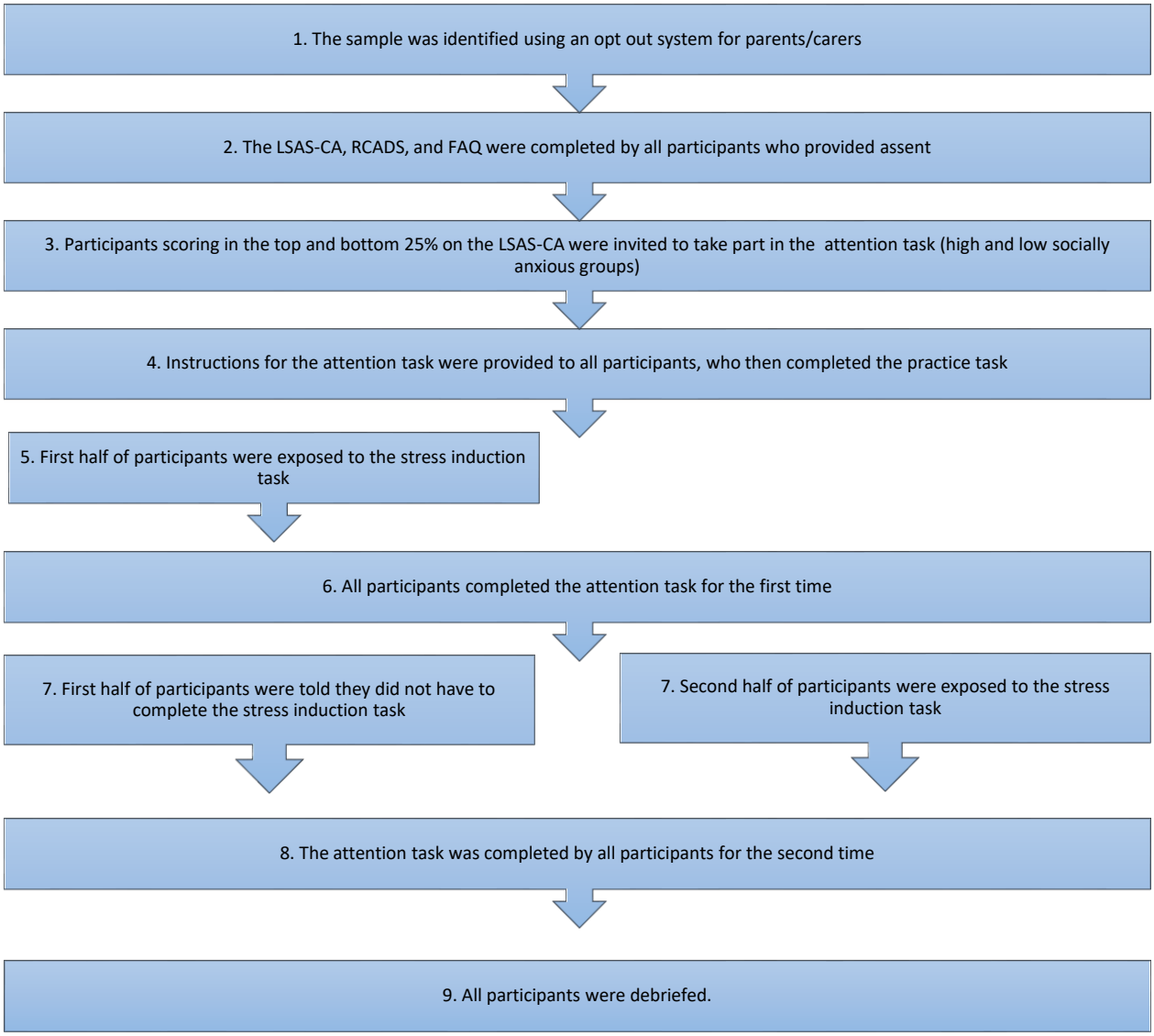


Figure 2.4. A Graphic Overview of the Procedure

Key: LSAS-CA = Liebowitz Social Anxiety Scale for Children and Adolescents (Masia-Warner et al., 2003), RCADS = The Revised Child Anxiety and Depression Scale (Chorpita et al., 2000), FAQ = Focus of Attention Questionnaire (Woody, 1996).

Attention task. The attention task was completed on a separate occasion to the questionnaires. The participants were selected one at a time, and brought into a quiet room. They were seated facing a monitor and a computer screen (see Appendix Q for a

photo of the set up). The mouse, finger probe, and Fitbit were placed in front of them, and the instructions for the task were read aloud (Appendix R). The participants were asked to wear the Fitbit, and undertake a short burst of exercise to experience the finger probe vibrating, exposing them to one aspect of the manipulation. The participants were instructed to press the mouse button as soon as they detected either of the two signals. They were also required to rate their state anxiety at different points in the task.

Practice task. Participants practiced responding to a random sequence of four internal and four external stimuli whilst viewing one photo. If they missed more than 25% of the stimuli, the investigator talked the participant through the procedure until the participant responded consistently.

Stress induction. Random allocation ensured that half the participants were introduced to the social threat first, whilst the other half received it at a later point. As indicated in Figure 2.4, half the participants were shown the video clip and were told that they will be asked to complete a speech following the attention task. All participants completed the attention task for the first time. After the first attention task was completed, the second half of the participants were introduced to the social threat and the first half were told that the social threat was no longer applicable. All participants completed the attention task for the second time. The children were fully debriefed following the second attention task (Appendix S).

Data Analysis

Data were analysed using IBM SPSS version 24.0 (IBM Corp, 2016). Parametric statistical tests were used, where possible. Prior to analysis, the data were screened for missing values, and correctness of data entry. If more than 25% of questionnaire or

attention task data were missing, the participant's data were removed from the analysis. Missing data for the attention task consisted of a response quicker than 150ms, or slower than 3000ms. This screening resulted in the removal of one participant's questionnaires and two participant's reaction time total scores. There was a total of 0.2 % missing values across all included questionnaires. Since there were very few missing values, and they appeared to be at random, the imputation of missing data was undertaken using the mean for each of the questionnaires. On the attention task, thirty eight participants missed at least one internal or external reaction time probe within the 3000ms time period (15 in the low socially anxious group and 23 in the high socially anxious group). The mean reaction time was computed without the inclusion of these missing values.

FAQ using a continuous sample. In order to assess the balance of focus of attention when examining social anxiety as a continuous variable, an FAQ difference score was computed (internal FAQ - external FAQ). A positive number indicated more internal focus of attention, and a negative number indicated more external focus of attention. Hypothesis one (i.e. in a community population of children, high social anxiety will be significantly associated with internal, relative to external, focus of attention) was tested using a hierarchical multiple linear regression.

In order to assess which variables to include in the regression, bivariate correlations were carried out. A bivariate correlation (Point biserial or Spearmans) was computed to assess the relationship between FAQ difference scores and RCADS depression, age, SES, gender, and ethnicity. There was a significant positive correlation between FAQ difference scores and RCADS depression ($\rho = .245$, $n = 282$, $p < .001$), and social economic status ($r = .117$, $n = 281$, $p = .049$). This indicates that higher levels of depression, and lower SES, are correlated with increased self-focus of attention. There was a non-significant correlation

between FAQ difference scores and age (ρ = .052, n = 282, *p* = .382), gender (r = .059, n = 282, *p* = .325), and ethnicity (r = -.041, n = 280, *p* = .499).

Demographic variables that were significantly correlated with the dependant variable (FAQ difference score) were controlled through entry in block 1 to account for potential confounds. The social anxiety variable, assessed through the LSAS-CA, was entered in block 2. Data characteristics and test assumptions were assessed in line with guidance from Field (2013). All assumptions were met.

Baseline group differences. In order to compare baseline difference between groups in preparation for testing hypotheses two and three, demographic variables were compared across the LSA and HSA groups. A chi-square analysis was completed for the categorical variables; namely gender, ethnicity, EAL, and SES.

As demonstrated in Table 2.2, there were no significant differences between the HSA and LSA groups on age, gender, SES, and EAL. There was a significant difference between social anxiety groups and ethnicity, with the HSA group containing significantly more Caucasian participants. An independent t-test was completed for the normally distributed, continuous variable (RCADS depression). A Mann-Whitney U test was computed for the non-normally distributed continuous variable (age). The results revealed that participants in the HSA group reported significantly higher levels of depression than those in the LSA group ($t(130) = 8.42$, $p < .001$).

Table 2.2. Sample characteristic, with means (and standard deviations), if appropriate.

Variable	**Overall sample n=283**	**LSA group n=67**	**HSA group n=65**	**Test statistics**
Age	10.21 (0.7)	10.25 (0.68)	10.2 (0.67)	U = 2,106.50, p = .72
Gender (% female)	48.6%	44.1%	55.4%	X^2 (1) = 1.688, p=.194
Ethnicity (% Caucasian) n=251	89%	(n=66) 81.8%	93.8%	X^2 (1) = 4.419, p = .03*
SES n=244 (% low SES)	13.8%	14.7%	16.9%	X^2 (1) = .123, p = .726
EAL (% of EAL) n=283	15.9%	19.1%	9.2%	X^2 (1) = 2.653, p = .103
LSAS n=284	49.68 (27.55)	17.03 (8.89)	85 (14.14)	n/a
RCADS depression n=282	9.91 (5.76)	6.58 (4.22)	13.71 (5.43)	t(130) = 8.42, p < .001***

p < .05*, p < .005**, p < .001***

Key: LSA = Low socially anxious; HSA = High socially anxious; SES = Social economic status; EAL = English as an additional language; LSAS-CA = Liebowitz Social Anxiety Scale for Children and Adolescents; FAQ = Focus of Attention Questionnaire, RCADS depression = Revised Children's Anxiety and Depression Scale.

FAQ between groups. In order to compare the two social anxiety groups, a mixed model ANCOVA was employed. The between subjects factor was social anxiety group (high-low) and the within subjects factor was FAQ scores (internal and external). RCADS depression and ethnicity were controlled for due to differences between the social anxiety groups in these variables. All assumptions were met, with the exception of normality for RCADS depression in the LSA group, and normality for internal FAQ for the LSA group. The

square root transformation was successful for RCADS depression, however it was not possible to successfully transform internal FAQ. Although ANCOVA is relatively robust to normality violations (Laerd Statistics, 2017), where attempts to transform the data were not successful, non-parametric tests were completed for individual significant findings (Appendix T). In all cases, the results were consistent; therefore, to aid simplicity, only the parametric statistics are reported in the main text.

Attention task data. The raw reaction times were examined during the analysis. In order to compare the findings to Mansell et al. (2003), a difference score was calculated by subtracting the reaction times of the external stimuli from that of the internal stimuli. The main analysis was a mixed model ANCOVA. The between subjects factor was social anxiety group (high-low), and the within subjects factors was condition (high-low stress) and stimuli (internal-external). RCADS depression and ethnicity were controlled for due to differences between the social anxiety groups in these variables. Reaction time data was non-normally distributed, but was successfully transformed using a reciprocal transformation. All other assumptions for these tests were met. In line with Mansell et al. (2003) the impact of gender on reaction time difference scores was examined, and presented below. The results were also explored without controlling for covariates (Appendix T), and as the overall conclusions remained consistent, only the ANCOVA findings are reported below.

Results

Analysis of Missing Data

Due to a programming error for the internal stimuli (finger probe), the two female faces were not recorded for the first 114 participants. Therefore, the data is based on the mean of 16 internal reaction times for two male faces, as opposed to the mean of 32

internal reaction times. In order to examine whether the gender of the face had an impact on the internal reaction time, the final 19 participants' reaction times were explored, comparing their internal reaction time for the male and female faces. A paired t-test investigated the difference between an individual's mean internal reaction time for male faces vs. female faces. The results showed that there was no significant difference between the internal reaction time across the faces for these participants ($t(18) = 1.43$, $p = .170$) and also when the male and female participants were examined separately (male participants $t(7) = 1.68$ $p = .137$; female participants $t(10) = .544$, $p = .598$). The following analysis will therefore consist of the mean reaction time for all four faces for the external stimuli, and two faces for the internal stimuli.

Hypothesis One

A hierarchical multiple regression was employed to examine whether LSAS-CA predicted FAQ difference score over and above RCADS depression and social economic status. Regression statistics are available in Table 2.1. RCADS depression and social economic status in block 1 accounted for 6% of the variance, and significantly predicted internal focus of attention, ($F(2,276) = 9.29$, $p < .001$). This demonstrates that participants who reported higher levels of depression and were classed as low in social economic status also reported greater internal focus of attention. The results of the addition of social anxiety in block 2 of the regression model revealed that as participants reported higher levels of social anxiety, they also reported a greater internal focus of attention. The inclusion of the LSAS-CA led to a significant increase in the variance accounted for in the model by 4% and was a significant predictor of internal focus of attention, ($F(3,275) = 10.68$, $p < .001$). LSAS-CA provided the greatest contribution to the final model, followed by depressive symptoms

and social economic status. Results of the hierarchical regression analysis suggest that internal focus of attention is most strongly associated with high social anxiety.

Table 2.1 Results of regression for RCADS depression, social economic status, LSAS-CA as predictors of FAQ difference score

	Predictors	**Unstandardised Coefficients b (CI)**	**Standard Error of B**	**β**	**Significance (p)**
Step 1	(Constant)	-2.02 (-3.41, -0.63)	0.71		.005**
	RCADS depression	0.86 (0.42, 1.30)	0.22	.23	.001***
	SES	1.23 (-0.05, 2.51)	0.65	.11	.06
Step 2	(Constant)	-2.26 (-3.62, -0.89)	0.70		.001***
	RCADS depression	0.41 (-0.09, 0.90)	0.25	.11	.11
	SES	1.13 (-0.13, 2.38)	0.64	.10	.08
	LSAS-CA	0.03 (0.02, 0.51)	0.01	.24	.001***

Note: R^2= .06 for step 1 (p < .001), $\triangle R^2$=.04 for step 2 (p < .001), RCADS depression = Revised Children's Anxiety and Depression Scale, SES = social economic status, LSAS-CA = Liebowitz Social Anxiety Scale for Children and Adolescents

To further explore the findings, the regression was re-run with internal and external FAQ entered separately (Appendix T). The results revealed that LSAS-CA led to an increase in variance in the model by 0.9% for internal FAQ (F(3,275) = 45.19, p < .001), and 0.3% for external FAQ (F(3,275) = 21.20, p < .001). Therefore, high social anxiety was a significant

predictor of both increased internal and external focus of attention. However, the increase in variance was greater for internal, compared to external, focus of attention.

Hypothesis Two

A mixed model ANCOVA group (HSA vs. LSA) x subscale (internal vs. external FAQ) was completed. RCADS depression and ethnicity were controlled for.

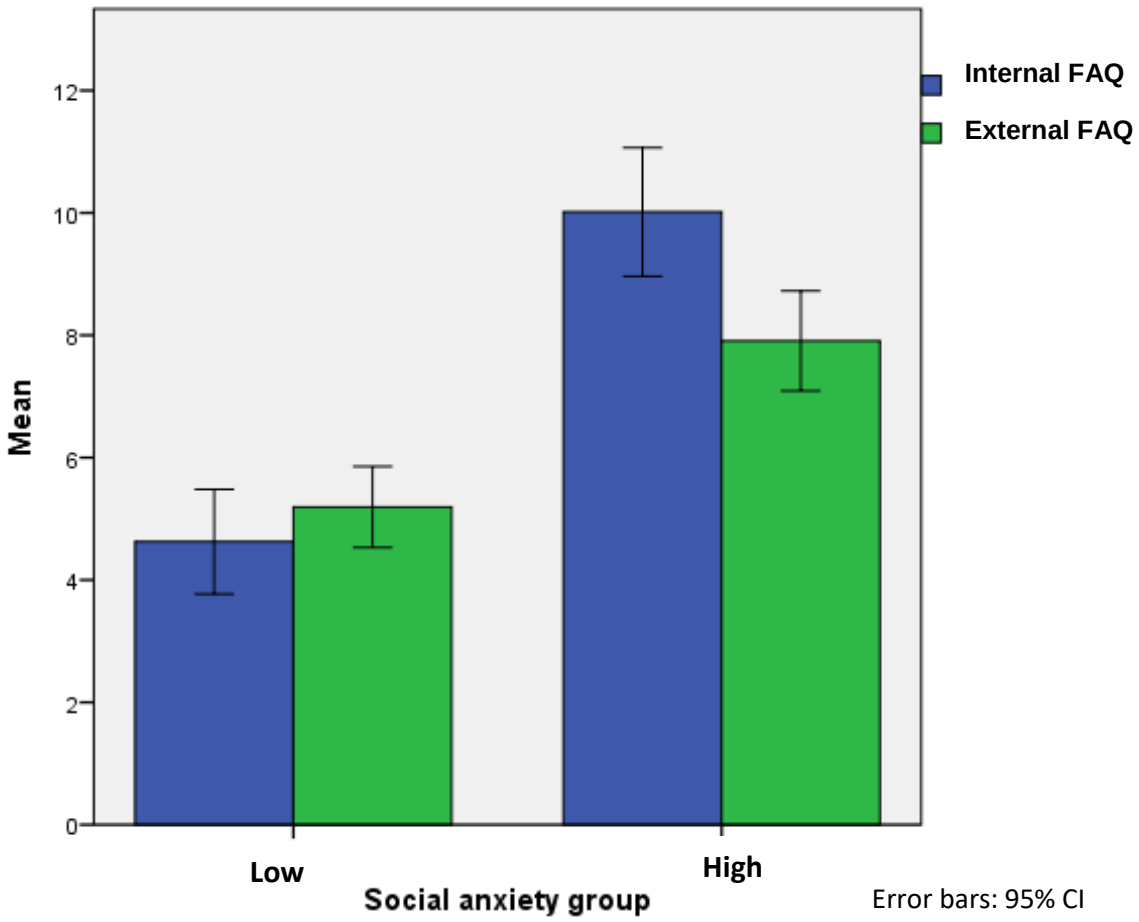


Figure 2.5. Mean FAQ Subscale Scores (with 95% confidence intervals)

The results of the ANCOVA revealed a non-significant main effect of FAQ subscale ($F(1, 126) = 2.71$, $p = .10$, $\eta_p^2 = .02$), but a significant main effect of social anxiety group ($F(1, 126) = 10.08$, $p = .002$ $\eta_p^2 = .07$). These effects were modified by a significant interaction between subscale and group, whilst adjusting for depression and ethnicity ($F(1, 126) = 5.00$,

p = .03 η_p^2 = .04). Examination of the covariates, revealed that higher RCADS depression score was significantly related to greater internal, relative to external, FAQ subscale (F(1, 126) = 6.45, p = .01, η_p^2 = .05). However, there was no significant association between ethnicity and FAQ subscales (F(1, 137) = .003, p = .95, η_p^2 = .00). These findings are depicted in Figure 2.5.

Table 2.3. Mean and standard deviations for internal and external FAQ in the high and low socially anxious groups

		Mean	**Std. Deviation**	**N**
FAQ internal	Low socially anxious	4.63	3.51	67
	High socially anxious	10.02	4.24	65
	Total	7.28	4.73	132
FAQ external	Low socially anxious	5.19	2.72	67
	High socially anxious	7.91	3.30	65
	Total	6.53	3.30	132

FAQ = Focus of Attention Questionnaire

The interactions were explored further. The results in Table 2.3. show the breakdown of groups by subscale. An independent samples t-test revealed a significant difference between groups in both internal and external focus of attention. The results indicated that internal FAQ was significantly higher for the HSA group (M = 10.02, SD = 4.2) than the LSA group (M = 4.63, SD = 3.51), t(130) = 7.96, p < .001, d = 1.39. Similarly, external

FAQ was significantly higher for the HSA group (M = 7.91, SD = 3.30) than the LSA group (M = 6.53, SD = 3.30), $t(130) = 5.17$, $p < .001$, $d = .90$.

A paired t-test revealed that there was no significant difference between internal and external focus of attention for the LSA group ($t(66) = 1.74$, $p = .087$, $d = .19$). However, the HSA group had a significantly higher internal rather than external focus of attention ($t(64) = 4.4$, $p < .001$, $d = .52$).

Overall, the HSA group self-reported higher levels of both internal and external focus of attention than the LSA group, and this was particularly the case for internal focus of attention.

Hypothesis Three

Manipulation check. A manipulation check was carried out to check that the stress induction was successful. The state anxiety measure was obtained at three points, baseline, task one, and task two. As the sample was split into two (those who received the stress induction first and those who received it second), the results are reported for each group separately. As the data were not normally distributed, an equivalent non-parametric test was used. Results are displayed in Figure 2.6.

When examining the individuals who received the low stress condition for their first task, a Friedman's ANOVA revealed that the state anxiety ratings changed significantly over the three time points, $X^2(2) = 49.38$, $p < .001$. Wilcoxon tests were used to follow up this finding. It appeared that the anxiety rating did not change significantly from baseline (*Mdn* = 1) to task one (*Mdn* = 1), Z = .17, $p = .86$, $r = .017$. However, there was a significant difference between task one (*Mdn* = 1) and task two (*Mdn* = 3), which was at the point of

stress induction, Z = 5.69, $p < .001$, $r = .50$. In addition, there was also a significant difference between baseline score, and task two, Z = 4.72, $p < .001$, $r = .41$.

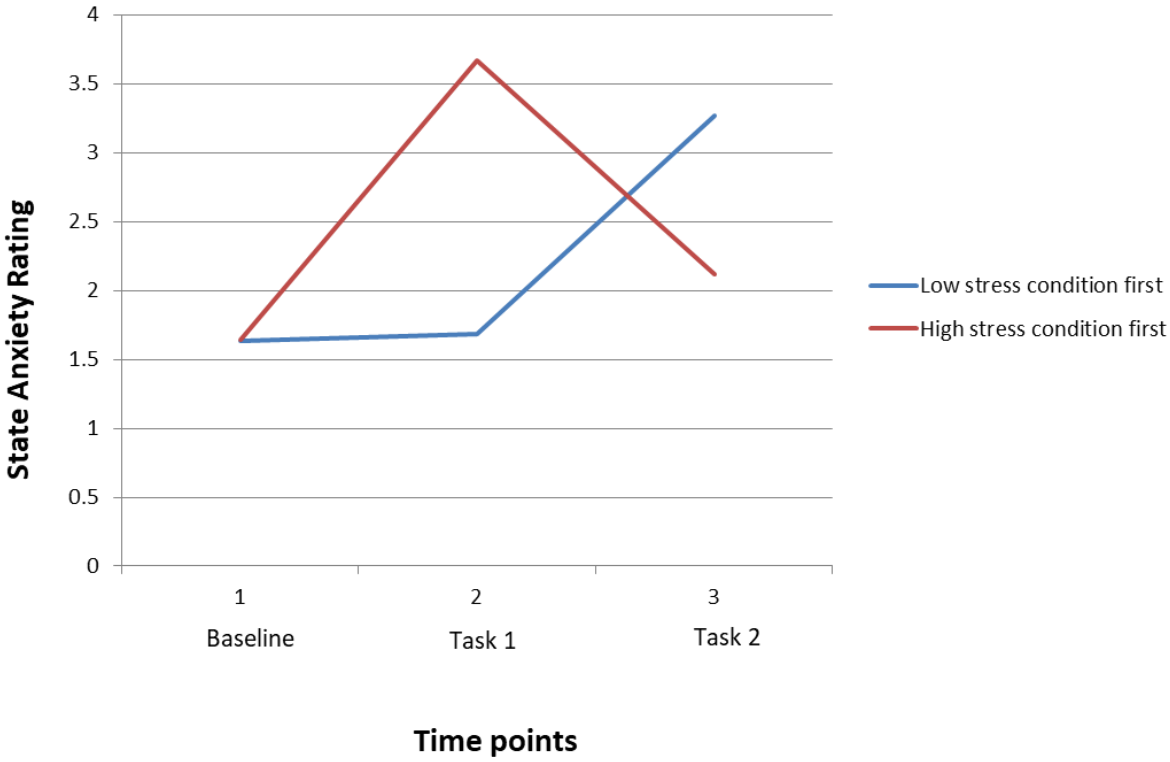


Figure 2.6. Mean State Anxiety Rating Scale to Compare Group and Time Points

When examining the individuals who received the high stress condition for their first task, a Friedman's ANOVA revealed that the state anxiety ratings changed significantly over the three time points, X^2 (2) = 82.20 $p < .001$. Wilcoxon tests were used to follow up this finding. It appeared that the anxiety rating changed significantly from baseline (*Mdn* = 1) to task one (*Mdn* = 4), which was at stress induction, Z = 6.68 $p < .001$, $r = .58$. There was also a significant change from task one (*Mdn* = 4) to task two (*Mdn* = 2), which was following the debrief, Z = 5.99 $p < .001$, $r = .52$, and from baseline to task two, Z = 3.06, $p = .002$, $r = .27$.

Overall, the results revealed that for both groups, the stress induction task successfully manipulated state anxiety levels between time points. For the group who

received the low stress condition first, there was no significant difference in anxiety between baseline and their first task. However, there was a significant increase in their state anxiety score between the first and second task. These findings are similar for the group who received the high stress condition first. They reported a significant increase in their state anxiety score between baseline, and first task for the high stress condition. In addition, there was a significant decrease in their scores between the high stress condition, and the subsequent low stress condition. However, their low stress condition score was significantly higher than their baseline score.

Testing the hypothesis. In order to test the hypothesis, the data were explored in two ways. First, the mean reaction time of raw data was examined, and secondly, to compare the results to Mansell et al. (2003), a difference score (internal mean reaction time – external mean reaction time) was examined. These results will be presented in turn below.

Raw reaction times. The mean raw reaction time scores for the anxiety groups are displayed in Table 2.4. A mixed model ANCOVA group (HSA vs. LSA) x condition (high vs. low stress, internal vs. external stimuli reaction time) was completed to explore the relationship between reaction times across conditions, whilst controlling for RCADS depression and ethnicity. The results revealed a non-significant difference between social anxiety groups, when examining internal and external reaction times across the high and low stress conditions ($F(1, 124) = .004$, $p = .952$, $\eta_p^2 = .00$). However, there was a main effect of group, with the HSA group responding more slowly than the LSA group across conditions ($F(1, 124) = 7.48$, $p = .007$, $\eta_p^2 = .06$). There was also a main effect of stress conditions, with all participants responding quicker in the low stress condition ($F(1, 124) = 5.55$, $p = .02$, $\eta_p^2 = .04$).

Table 2.4. Attention task reaction times (in milliseconds)

		LSA group Mean (SD)	HSA group Mean (SD)	Overall sample Mean (SD)
Low stress	Internal stimuli	598.22 (127.83)	695.70 (205.10)	646.70 (178.35)
	External stimuli	498.40 (102.24)	574.42 (120.96)	535.24 (118.21)
High stress	Internal stimuli	600.89 (127.83)	721.40 (229.12)	660.47 (193.86)
	External stimuli	493.18 (88.54)	561.66 (113.61)	527.10 (106.76)

Difference in reaction times. When examining the difference in reaction times, a mixed model ANCOVA group (LSA vs. HSA) x condition (high vs. low stress) was completed, whilst controlling for RCADS depression and ethnicity. The results of the mixed model ANCOVA revealed a non-significant difference between social anxiety groups, when comparing the high and low stress conditions ($F(1, 124) = .19$, $p = .67$, $\eta_p^2 = .002$). No significant findings were found.

Exploratory analyses. Further exploratory analyses were conducted for males and females separately. When examining the difference in reaction time for *male* participants, a mixed model ANCOVA group (high vs. low anxiety) x condition (high vs. low stress) was completed, whilst controlling for RCADS depression and ethnicity. The results revealed a non-significant difference between social anxiety groups, when comparing the high and low stress conditions ($F(1, 60) = .24$, $p = .63$, $\eta_p^2 = .004$). No significant findings were presented. However, the effect of group was approaching significance, with the high anxious group responding slower than the low anxious group ($F(1, 60) = 3.90$, $p = .053$, $\eta_p^2 = .06$).

The difference in reaction time was also explored for *females*. A mixed model ANCOVA group (high vs. low anxiety) x condition (high vs. low stress) was completed, whilst controlling for RCADS depression and ethnicity. The results of the mixed model ANCOVA revealed a non-significant difference between social anxiety groups, when comparing the high and low stress conditions ($F(1, 60) = 1.03$, $p = .32$, $\eta_p^2 = .017$). No significant findings were presented.

Discussion

This study aimed to investigate the balance of internal and external focus of attention in a non-clinical sample of pre-adolescent children. This was explored in three ways, firstly, through the examination of self-reported focus of attention in a community population; secondly, by comparing high and low socially anxious participants against self-reported internal and external focus of attention; thirdly, through measuring the balance of observed internal and external focus of attention in high and low socially anxious participants across high and low stress conditions. This was the first study to successfully manipulate anxiety levels to explore the balance of internal and external focus of attention in pre-adolescent children.

It was hypothesised that, in a community population, high social anxiety would be significantly associated with internal, relative to external, focus of attention. As anticipated, a small significant effect revealed that internal focus of attention was most strongly predicted by high social anxiety, over and above that predicted by depression and social economic status. When explored further, high social anxiety was a predictor for both internal, and external, focus of attention, although the amount of variance predicted by internal focus of attention was greater.

When examining HSA and LSA groups, the HSA group reported higher overall (internal and external) focus of attention compared to the LSA group, and had significantly higher internal, relative to external, focus of attention. When considered together, a small significant effect revealed the HSA group reported more internal relative to external focus of attention, compared to the LSA group. This finding was significant after controlling for observed differences in RCADS depression and ethnicity between the groups. There was no significant difference between internal and external focus of attention for the LSA group.

The findings are consistent with existing adult (Bögels &Mansell, 2004; Spurr & Stopa, 2002), and child literature (Higa & Daleiden, 2008; Hodson et al., 2008; Kley et al., 2012) in demonstrating a significant positive association between internal focus of attention and social anxiety. Interestingly, when Kley et al. (2012) examined SAD, high socially anxious and non-socially anxious groups, they found a significant difference in internal focus of attention between the SAD, and the high socially anxious and non-socially anxious groups. However, they found no significant difference in internal focus of attention between the high socially anxious and non-socially anxious groups. This finding contradicts the current study, and may be explained by the fact that the HSA group in the present study were not split into SAD and high socially anxious groups, potentially increasing the mean social anxiety level in the HSA group. Similarly to the current study, Kley et al. (2012) also found higher levels of external focus of attention for the SAD group, when compared to the non-anxious group (but not the high anxious group).

In accordance with cognitive models of SAD (Clark & Wells, 1995; Rapee & Heimberg, 1997), the results from hypothesis one and two provide evidence for the notion that individuals with HSA experience heightened internal focus of attention. The findings also

suggest, in line with Rapee & Heimberg (1997), that individuals with HSA experience higher external focus of attention compared to those with LSA.

The final hypothesis aimed to build on the self-report findings from the FAQ through examining the direction of the effect. It was predicted that the HSA group would show higher levels of internal, relative to external, focus of attention in the high stress condition, compared to the LSA group. The stress manipulation was shown to be successful in increasing state anxiety levels through the introduction of a social task. After controlling for depression and ethnicity, there was a significant difference between HSA and LSA groups, with the HSA group responding more slowly overall than the LSA group (regardless of condition). In contrast with the questionnaire study, these findings would appear to suggest that HSA children have *lower* levels of both internal and external focus of attention than the LSA children. There was also a significant effect of condition, with all participants responding quicker in the low stress, compared to high stress condition. The findings indicated that when exposed to a social stress condition, children of this age have a reduced focus of attention. However, when examining internal and external focus of attention across the high and low stress conditions, the results reveal that there was no significant difference between social anxiety groups.

These experimental findings do not support the proposed hypothesis. The apparent reduction in focus of attention in the high stress task could be explained by an attentional bias towards a threat. Seefeldt, Krämer, Tuschen-Caffier, and Heinrichs (2014) reported that children with a diagnosis of SAD showed significantly higher levels of hypervigilance towards a threat, compared to the control group. In the present study, the main threat is likely to be the group of children staring at them, expectantly, from the computer screen.

The suggestion that the high socially anxious children showed attentional bias towards the threat (and away from the attention task) is supported by a higher proportion of the HSA group (n = 23) missing more attention task stimuli than the LSA group (n = 15).

The experimental findings are also not consistent with those reported by Mansell et al. (2003), who used a similar methodological approach. Mansell et al. (2003) found that, compared to individuals with low speech anxiety, adults with high speech anxiety directed their attention towards internal information and away from external information in the high stress condition. It should also be noted that when the authors used the Brief FNE to allocate individuals to high and low social anxiety groups, they only found a significant interaction between social anxiety and stress condition when gender was included as a three way interaction. They reported that females with high social anxiety showed an increase in internal focus of attention, but this finding was not significant for males. In the present study, when the groups were explored separately for gender, the results remained non-significant.

As suggested by the cognitive models of SAD, there is a reciprocal relationship between increased social anxiety leading to changes in focus of attention, as well as change in focus of attention increasing one's anxiety. If applied to children, the model suggests that when children with high social anxiety are in a situation that causes them stress, they will experience increased internal focus of attention. According to Rapee and Heimberg (1997), they should also have an increased external focus of attention. Although the cross sectional correlational findings suggest that individuals with high social anxiety experience higher internal focus of attention, when examining the impact of increased anxiety levels, the results suggested that high social anxiety did not lead to increased internal focus of

attention. In fact, when comparing the groups together, the high stress condition led to a reduction in focus of attention.

Overall, the findings suggest that there is a cross sectional association, with individuals with high social anxiety having higher internal focus of attention than those with low social anxiety. However, there is no evidence to suggest that an increase in stress led to an increase in internal focus of attention for the high socially anxious group.

When considering these findings, it may be that there is a correlational effect, but it is not in the direction explored in this study, i.e., that increased anxiety in social situations leads to internal focus of attention and/or that there are reciprocal effects. However, Kley et al. (2011) explored the impact of internal or external focus of attention on state anxiety levels, and found no significant difference in state anxiety levels between high and low socially anxious participants in the internal and external focus of attention conditions. This would suggest that the mechanisms underpinning high social anxiety in pre-adolescent children may be different to those presented in the adult cognitive models of SAD and adult literature.

Strengths, Limitations, and Future Research

Strengths of this study include the large sample size, which ensured adequate power for the primary statistical analysis. Appropriate statistical power is essential when ensuring that a statistically significant result is indicative of a real effect (Cohen, 1992). In addition, the study used both subjective and objective measures to assess the balance of internal and external focus of attention. This was the first study to examine the balance of internal and external focus of attention in pre-adolescent children, adding to the very limited literature examining focus of attention in this age group.

Several limitations will now be considered, alongside suggestions for future research. The FAQ has not been validated for use with children and young people, and in this study, the external subscale was shown to have a poor Cronbach's alpha coefficient (.50). Despite exploring the option to delete items within this subscale, this did not improve the internal consistency of the scale. It would therefore be advantageous to explore alternative measures of focus of attention that are valid with this population. In the meantime, the results from the FAQ should be interpreted with caution.

In addition, although the LSAS-CA has been shown to have good psychometric properties in measuring social anxiety in children, it may be that the LSAS-CA was not sensitive enough to recruit individuals with specific speech anxiety. Mansell et al. (2003) found their most significant findings when the groups were split using a specific speech anxiety measure (PRCS). Allocating participants to the HSA group using a more general social anxiety measure may explain the difference in findings. A further limitation of using only the LSAS-CA is that our assessment is based on a single, self-report of SAD, increasing bias and reducing validity. These limitations could be addressed by multiple informants, or through recruiting a clinical sample of children with SAD.

The repeated measures design differs from the randomised control design used by Mansell et al. (2003). Although the participants were randomly assigned to a high or low stress condition first, the lack of a control group, and the repeated measures design, meant that it was not possible to infer causality (Barker & Pistrang, 2015). This is highlighted through the results of the manipulation check, in which there was significant difference of anxiety levels between the baseline and low stress task for the group who received the high

stress condition first. Allocating participants to independent conditions would enable the effects of the repeated measures design to be examined.

The objective measure of focus of attention was adapted from that used by Mansell et al. (2003). However, it is possible that the internal and external stimuli did not successfully measure focus of attention. It may be that the strength of the internal and external stimuli were not appropriate, that children were distracted by other stimuli, or that it was not possible to measure focus of attention with the equipment employed.

As focus of attention was measured in anticipation of a speech, it is also possible that the manipulation did not increase anxiety to the same level as would be experienced during a real-life social stress task. As both the high and low socially anxious groups reported an increase in state anxiety levels following the manipulation, the stress induction may not have created the necessary difference between the high and low socially anxious groups to elicit differences in how the groups respond in more realistic social stress conditions. As discussed previously, the presence of the stress manipulation during the attention task may have also affected the results.

Although quasi-experimental conditions allow the researcher to control for extraneous variables, their ecological validity remains to be explored. Whilst these results were achieved in a controlled setting, further research is required to explore the findings within naturalistic conditions in order to confirm the generalisability of the results.

Additionally, the current sample was predominately Caucasian and of generally average or high socio-economic status. As this factor limits the extent to which conclusions can be drawn, it would be advantageous to explore these findings in different populations.

Ethical reflections. The study aimed to increase the state anxiety of the individual in order to explore focus of attention. The manipulation checks demonstrate that this was successful. Despite careful consideration of the nature of the stress induction, and discussions about adjusting the intensity of the task, it must be acknowledged that for some children, the task led to high levels of anxiety. All participants were offered the opportunity to contact the researcher following participation should any of them experience prolonged anxiety symptoms, however, none of them did. Although outside the scope of the present study due to time constraints, a follow up session with the children who took part might also be considered in future research to ensure none of them experienced any future anxiety. Additionally, it would be interesting to explore the impact of altering focus of attention for individuals with high social anxiety who display high internal focus of attention.

Clinical Implications

Maintenance models have formed the basis for effective psychological interventions, for example, treatments based on the cognitive models of SAD (such as, Clark & Wells, 1995; Rapee & Heimberg, 1997). These interventions have a solid evidence base (at least with adults) and the models are extensively drawn from when working with both adults and children with SAD (National Institute for Health and Clinical Excellence [NICE], 2013). This application is despite the lack of research investigating the effectiveness of each of these mechanisms with children.

Although the current study did not employ clinical samples, the results are able to provide some tentative conclusions about focus of attention in socially anxious pre-adolescent children. The outcome from the self-report focus of attention measures provides support for the notion of increased attentional focus, and in particular, internal focus of

attention, for children with high social anxiety. However, the study does not support a key aspect of the relationship between social anxiety and focus of attention, as described in the cognitive models of SAD in adults. Some of the recommended treatments of SAD in adults relate specifically to altering focus of attention, such as, systematic training in externally focused attention (NICE, 2013). Therefore, it is vital that the role of focus of attention is explored further before implementing such treatment approaches with pre-adolescent children.

Conclusion

This study replicated findings on children's self-reported focus of attention and social anxiety (for example, Higa & Daleiden, 2008; Hodson et al., 2008), and, to the best of the author's knowledge, was the first study of its kind to successfully manipulate state anxiety levels to investigate the balance of internal and external focus of attention in pre-adolescent children.

The present study provides evidence for a cross sectional association between focus of attention and self-reported social anxiety in pre-adolescent children. However, there is no evidence to support the hypothesis that heightened anxiety leads to an increase in internal, relative to external, focus of attention for the HSA compared to LSA group. It is unclear whether these findings differ from those with adults due to different mechanisms involved in social anxiety for children, or if the contrasting findings are due to methodological reasons, or both. It would be advantageous for future research to continue to explore these mechanisms in order to ensure developmentally appropriate treatment is available for children with high social anxiety.

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6. ((mute* OR mutism) ADJ2 (elective* OR selective*))	615 and 432 and 308 and 83
7. (interpersonal ADJ2 (aversion* OR aversiv* OR confiden* OR difficult* OR disorder* OR distress* OR fear*))	2611 and 1533 and 1394 and 358
8. ('inter personal' ADJ2 (aversion* OR aversiv* OR confiden* OR difficult* OR disorder* OR distress* OR fear*))	25 and 9 and 23 and 5
9. ((social* OR socio*) ADJ2 (aversion* OR aversiv* OR confiden* OR difficult* OR disorder* OR distress* OR fear*))	15,614 and 11,809 and 11,135 and 2920
10. ('negative evaluation' ADJ3 (anxiet* OR anxious* OR distress* OR fear*))	1020 and 455 and 463 and 280
11. (speak* ADJ3 (anxiet* OR anxious* OR distress* OR fear*))	718 and 341 and 291 and 86
12. Paruresis	41 and 39 and 31 and 4
13. (((personalit* OR phobi* OR social* OR socio*) ADJ2 avoid*) OR avoidant disorder)	5080 and 2722 and 3349 and 661
14. (phobi* ADJ2 neuros*)	226 and 131 and 104 and 1
15. ((school* ADJ2 (anxiet* OR anxious* OR phobi* OR refuse OR refusal)) OR (shy OR shyness) OR specific phobia*)	7956 and 4857 and 5124 and 777
16. (phobic disorder*)	1843 and 485 and 1437 and 115
17. 1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16	49,964 and 36,433 and 33,977 and 7149
18. Imagery	46,396
19. representation*	299,499
20. 'observer perspective'	671
21. 18 OR 19 OR 20	111,381 and 116,802 and 104,921 and 11,084
22. 17 AND 21	861 and 445 and 423 and 60 = 1789

Appendix C: Data extraction form

Number	
Authors	
Year	
Title	
Journal	
Volume	
Pages	
Country of origin	
Aims and objectives of study	
Study design	
Population description	
Number of participants and characteristics	
Age of participants (at start of study)	
% female	
Race/ethnicity	
Method of recruitment of participants	

Inclusion/exclusion criteria for participants	
Setting of study	
Informed consent obtained?	
Ethical approval?	
Social anxiety characteristics (assessed how?)	
Measure of imagery	
Other outcome measures	
Manipulation	
Statistical methods and their appropriateness	
Implications in relation to imagery	
Conclusions	

Appendix D: Quality rating checklist

	Yes (2)/Partial (1)/No (0)
Number	
Authors	
Year	
Title	
Journal	
Volume	
Pages	
Question/objective sufficiently described	
Study design evident and appropriate	
Method of participant selection described and appropriate	
Sample size appropriate?	
Participant characteristics sufficiently described	
Measure of social anxiety well defined	
Is the measure robust?	
Measure of imagery well defined	
Is the measure robust?	
Analyses described/justified and appropriate?	
Results reported in sufficient detail	
Conclusions support results	
Total	
Notes	

Appendix E: References for outcome measures used in reviewed studies

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Appendix F: Journal submission guidelines for Behaviour Research and Therapy



BEHAVIOUR RESEARCH AND THERAPY

AUTHOR INFORMATION PACK

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Mettam, G. R., & Adams, L. B. (2009). How to prepare an electronic version of your article. In B. S. Jones, & R. Z. Smith (Eds.), *Introduction to the electronic age* (pp. 281–304). New York: E-Publishing Inc.
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Engle, E.K., Cash, T.F., & Jarry, J.L. (2009, November). The Body Image Behaviours Inventory-3: Development and validation of the Body Image Compulsive Actions and Body Image Avoidance Scales. Poster session presentation at the meeting of the Association for Behavioural and Cognitive Therapies, New York, NY.

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Appendix G: CUREC confirmation of ethical approval

MEDICAL SCIENCES INTER-DIVISIONAL RESEARCH ETHICS COMMITTEE

Research Services, University of Oxford, Wellington Square, Oxford, OX1 2JD
Tel: +44(0)1865 616577 Fax: +44(0)1865 280467
ethics@medsci.ox.ac.uk

UNIVERSITY OF OXFORD

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Ref: R52087/RE001

11th August 2017

Jennifer Chapman
The Oxford Institute of Clinical Psychology Training
Isis Education Centre
Warneford Hospital
Oxford
OX3 7JX

Dear Jennifer

Research Ethics Approval - CUREC 2

Study Title: Focus of attention as a maintenance factor for social anxiety in children

The above application has been considered on behalf of the Medical Sciences Inter-divisional Research Ethics Committee (IDREC) in accordance with the procedures laid down by the University for Ethical Approval of all research involving human participants.

I am pleased to inform you that, on the basis of the information provided to the IDREC, the proposed research has been judged as meeting appropriate ethical standards, and approval has been granted for a period of **14 months**, commencing on **11th August 2017**. The reference number for this study is **R52087/RE001**.

This is **subject to:**

a) **it is your responsibility to comply with the requirements for administering any tests or questionnaires and if in doubt to contact the publisher of those tests or questionnaires.**

b) **if new research staff are engaged, the PI is responsible for ensuring they are suitably qualified by training and/or experience**

I would like to remind you that you will be required to submit an annual progress report on each anniversary of study approval, until the study is completed, and that your study may be selected for review by the MS IDREC during an annual audit.

Amendments

Should there be any subsequent changes to the study, which raise ethical issues not covered in the original application, you should submit details to the IDREC for consideration and approval. If there are significant alterations then the Committee will require a succinct letter explaining these. If your study received University Sponsorship through CTRG, then the amendment will first need to be submitted to CTRG for approval of continued Sponsorship.

Please do not hesitate to contact me if you have any queries.

Yours sincerely

H. Barnby-Porritt

Dr. Helen Barnby-Porritt
Research Ethics Manager, Medical Sciences

Appendix H: CUREC confirmation of ethical approval following revisions

MEDICAL SCIENCES INTERDIVISIONAL RESEARCH ETHICS COMMITTEE

Research Services, University of Oxford, Wellington Square, Oxford, OX1 2JD
Tel: +44(0)1865 616577 Fax: +44(0)1865 280467
ethics@medsci.ox.ac.uk

CONFIDENTIAL

19th October 2017

Jennifer Chapman
The Oxford Institute of Clinical Psychology Training
Isis Education Centre
Warneford Hospital
Oxford

Dear Jennifer

Amendment of Research Ethics Application

Ref No: R52087/RE002

Study Title: Focus of attention as a maintenance factor for social anxiety in children

Thank you for submitting a request for an amendment to the above study, which has been reviewed on behalf of the Medical Sciences Interdivisional Research Ethics Committee (IDREC).

I am pleased to inform you that your requests to:

- ask participants to wear a FitBit and deceive them into believing that this will measure their heart rate and vibrate when their heart rate increases.
- update the Debriefing document to reflect the above changes.
- replace American wording on the questionnaires to fit the UK population and simplify some of the terminology.
- exclude children with a diagnosis of Autism.
- increase the sample size to 320 (previously 214).

have been judged as meeting appropriate ethical standards, on the basis of the information provided to the IDREC.

Please do not hesitate to contact me if you have any queries.

Yours Sincerely

H. Barnby-Porritt

Dr. Helen Barnby-Porritt
Research Ethics Manager, Medical Sciences

Appendix I: Research Sub-Committee approval letter

Oxford Health NHS
NHS Foundation Trust

The Oxford Institute of Clinical Psychology Training

UNIVERSITY OF OXFORD

Oxford Doctoral Course in Clinical Psychology
An NHS Course validated by the University of Oxford

Isis Education Centre, Warneford Hospital, Oxford OX3 7JX
Tel: +44(0)1865 226431
Website: www.oxicpt.co.uk

28th February, 2017

Jennifer Chapman
Trainee Clinical Psychologist
Oxford Doctoral Course in Clinical Psychology
Isis Education Centre
Warneford Hospital

Dear Jennifer,

Thank you for replying to the Research Sub Committee. You now have full approval for your dissertation.

We wish you all the very best with your research.

Yours sincerely,

Myra

Dr Myra Cooper
Chair, Research Sub-Committee

c.c. Cathy Creswell
Brynjar Halldorsson

Senior Research Tutor and Interim Deputy Director:
Dr Myra Cooper, M.A. (Hons)., M.Phil., D.Phil., C.Psychol.
Tel: (01865) 226375 myra.cooper@hmc.ox.ac.uk

jchapmandissapp

Appendix J: Speech topics

Topics

1. What rights should children be able to have e.g. should they be able to choose what time they go to bed?

2. Should zoos exist? Discuss what is good and bad about zoos

3. Should people in prisons be punished or helped?

You will need to speak about one of these topics for roughly 5 minutes. You will need to say what you think and why.

Appendix K: Visual representation of manipulation



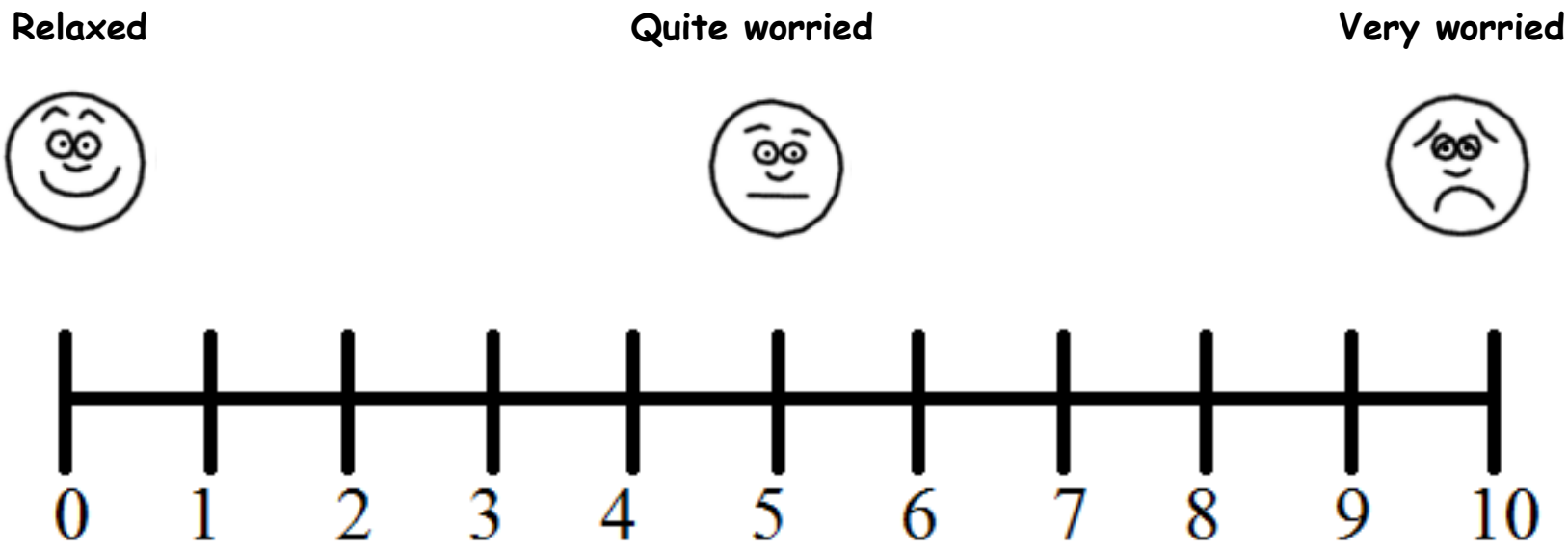




The Fitbit records your heartbeat. When your heart beats fast, the finger thing moves

Appendix L: State anxiety Likert scale for manipulation check

Worry Scale: How are you feeling?



Appendix M: Information leaflet and opt out form for parents

Advantages and disadvantages of taking part?

Advantages: The aim of the study is to find out more information about what keeps worries going in social situations. It is anticipated that the findings will inform the development of treatment programmes for children with social anxiety disorder in the future.

Disadvantages: It is hoped that taking part will be an enjoyable and educational experience for your child. However, If your child does become upset for any reason then your child's teacher and I will be available to discuss this with them.

WHAT HAPPENS NOW?

If you are happy for your son/daughter to take part:

- You do not need to do anything more

If you do not wish for your child to take part:

- Please let me know before [date]. You can do this by emailing me on the details below or by returning the attached slip to your child's class teacher.

Thank you for considering taking part in this study.

If you have any other questions or concerns…

If you have any questions or concerns about any aspect of this research, please contact me on the details below.



Jennie Chapman
Trainee Clinical Psychologist
Email: jennifer.chapman@hmc.ox.ac.uk
Office number: 0118 3786798
Study number: R52087/RE001

Oxford Health NHS
NHS Foundation Trust

UNDERSTANDING WHAT KEEPS CHILDREN'S SOCIAL WORRIES GOING

PARENT/GUARDIAN INFORMATION LEAFLET.



University of Reading

University of Oxford

OVERVIEW:

What is it all about?

We are carrying out a school-based research project investigating what keeps children's worries going. The focus of the project will be on social situations, as we know these can cause worries for many children.

We would like to invite your child to take part.

What would my child need to do?:

Stage 1.

>Your child will be asked to complete three short questionnaires in small groups at their school.

>The questions ask your child how they find different social situations (such as speaking out in class), what they tend to focus on, and if they have any other worries about social situations.

>They will take 5 minutes each and will not be completed during core subjects, so it will not impact their learning.

Stage 2.

>This will take place a few weeks later and only involve half the children from stage one (based on the results of the questionnaires)

>Your child will be asked to press a button on a computer in response to seeing a picture on a screen or feeling a small vibration (this will be a lighter vibration than what a phone produces).

>Their reaction times will be measured. Your child will complete this task twice, once when they are relaxed and once in anticipation of another exercise. They will be asked to wear a Fitbit for the exercise (looks like a watch).

>This task will take no longer than 20 minutes, and again, will be arranged with the school to ensure it causes as little disruption as possible to teaching. The second task will be completed with children individually and will take place in their school.

Other information

As part of the study, we will get basic information from schools, e.g. gender, age, free school meals. If you do not want the school to disclose this information to the researcher, then please return the slip attached to say that you do not want your child to take part.

When will this happen?

In [date] , I will come and talk to your child's class about the project, and will ask each of them whether they are happy to take part. If your child agrees, I will complete the questionnaire with them in a small group. For the children who are invited to complete part two of the study, I will meet with them individually a few weeks after part one.

Does my child have to take part?

No, it is entirely up to you and your child as to whether your child takes part in the research. If your child does take part, they can withdraw at any time and will not have to give a reason.

How will the information be kept safe?

Your child's results will be kept confidential and not be shared with anyone, including yourself or the teachers. Only the researchers will have access to the data. The results will be reported on in a way that does not identify any child, family, or school. All data anonymised data will be stored electronically and destroyed within 5 years. Electronic copies of the forms that the children sign when agreeing to take part will also be kept for 5 years.

What happens to the results?

Your child's school will be given a summary of the research findings. You are also very welcome to have a copy of the results. If you are interested in this, please email me on the address at the top of the letter and I will be able to send them to you. The study will be written up as part of a student thesis. We also aim to publish our findings in a scientific journal, but this may be a couple of years from the end of the study.

If you, or your child, has concerns about their worries, we have provided your child's teacher with information of local services.

This study has received approval from University of Oxford Ethic's Committee

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Website: www.oxicpt.co.uk

[date]

Dear Parents/Carers,

Understanding what keeps children's social worries going

Ethics Approval Reference: R52087/RE001

We would like to invite your son/daughter to take part in a study that we are undertaking at their school about anxiety in social situations.

This is an opportunity for your child to take part in real-life research, which will contribute to our understanding of social anxiety disorder in children. Around 220 children from the local area will be invited to take part in this study. Please find enclosed an information leaflet with details of what will be involved if your son/daughter takes part.

The study is being funded by the NHS, through the Doctoral Programme in Clinical Psychology at the University of Oxford. The research will be carried out by Jennifer Chapman (Trainee Clinical Psychologist) and the project is being supervised by Professor Cathy Creswell and Dr Brynjar Halldorsson (Clinical Psychologists and researchers at the University of Reading). This study has been reviewed by, and received ethics clearance from, the University of Oxford Central University Research Ethics Committee.

If you **do not wish** your child to take part in the project, please let us know before [date]. You can do this by emailing Jennifer Chapman (Jennifer.chapman@hmc.ox.ac.uk), or by returning the attached slip to your child's class teacher. **If you are happy for your child to take part, then there is no need to do anything.**

We hope you will consider your son/daughter taking part in this study. If you have any questions or would like further information, please contact me on Jennifer.chapman@hmc.ox.ac.uk or 0118 3786798.

Thank you for taking time to read this information.

Yours Sincerely,

Jennifer Chapman
Trainee Clinical Psychologist

If you have a concern about any aspect of this study, please speak to the relevant researcher [Jennifer Chapman-0118 3786798] or their supervisor [Professor Cathy Creswell/Dr Brynjar Halldorsson -0118 3786798], who will do their best to answer your query. The researcher should acknowledge your concern within 10 working days and give you an indication of how they intend to deal with it. If you remain unhappy or wish to make a formal complaint, please contact the chair of the Medical Sciences Inter-Divisional Research Ethics Committee at the University of Oxford who will seek to resolve the matter in a reasonably expeditious manner: Email: ethics@medsci.ox.ac.uk; Address: Research Services, University of Oxford, Wellington Square, Oxford OX1 2JD

OPT OUT FORM

If you **DO NOT** want your child to participate in the research, 'Understanding what keeps our children's social worries going', please fill out the form below and return it to the school by [dd/mm/yyyy]. If we do not receive an opt-out form from you by this date, your child may be invited to take part in this study, as described in the accompanying information leaflet.

I, the undersigned, hereby DO NOT give permission for my child to take part in the study titled 'Understanding what keeps our children's social worries going'.

Name of child: _____

Name of parent/guardian: _____

Signature: _____ Date: _____

School and Class teacher _____

Appendix N: Information leaflet for children

Why should I take part?

Benefits

It will hopefully be fun. It will also help us to find out more information about children's worries. The results of this study could change how we work with children in the future.

Challenges

You may feel worried when doing the task.

Is this study OK to do?

This study has been checked by the Ethics Committee at the University of Oxford to make sure that it is fair.

What happens now?

If you are happy to take part:

- I will meet you at your school to explain the project in more detail.

If you do not wish to take part:

- Just let me know that you do not want to take part and you will not be asked to complete anything.

If you have any questions or concerns…

If you have any questions you can email me or I will be visiting your school so you will have time to ask questions then.



Jennie Chapman
Trainee Clinical Psychologist
Email: jennifer.chapman@hmc.ox.ac.uk

3.

Oxford Health NHS
NHS Foundation Trust

UNDERSTANDING WHAT KEEPS OUR SOCIAL WORRIES GOING

CHILD INFORMATION

University of Reading

UNIVERSITY OF OXFORD

OVERVIEW:

What is it?

We are carrying out a research project to investigate what children focus their attention on at different points in the day.

Why have I been asked?

We are asking you if you would like to take part because you are between 9 and 11 years old.
We are asking 320 children to help us.

When will this happen?

I will visit your class in [date] to talk to you all about the project. If you would like to take part, I will complete the questionnaires with you in a small group on this day.
I will then come back a few weeks later and meet some of you again to complete the computer task.

Do I have to join in?

No you don't have to if you don't want to! You can ask questions before choosing whether you want to join in. You can change your mind at any time by telling me or your teacher. You don't have to say why.
If you decide to stop, no one will be upset with you.

Who will be there?

I will help you to complete the questionnaires. This will be completed in small groups at your school. The computer task will be in a separate room to your classroom, and this time I will meet you on your own.

What do I need to do?:



Stage 1.

Three lists of questions

1. The first will ask about how you cope in different situations
2. The second will ask you where you focus your attention
3. The third will ask you about your feelings

They will take 5 minutes each and will be completed together in a group



Stage 2.

Computer task

Stage 2 will take place a few weeks later and only some children will be asked to do this stage.

You will be asked to press a button as soon as you see a picture on the computer screen or feel a light vibration on your finger. You will also wear a Fitbit during the exercise.

You will do this task twice.

This task will take about 20 minutes, and will be during the school day.

Will the information be kept private ?

When we collect information from you we will keep it in a safe place and only the people doing the research, or helping with the research, can look at it. We will use the information to write a paper for people to read.

Appendix O: Assent form for children

Jennifer Chapman
jennie.chapman@hmc.ox.ac.uk

ASSENT FORM FOR CHILDREN

Understanding what keeps our worries going

Please answer the questions below:

- Has somebody else explained this project to you? Yes/No
- Do you understand what this project is about? Yes/No
- Have you asked all the questions you want? Yes/No
- Have you had your questions answered in a way you understand? Yes/No
- Do you understand it's OK to stop taking part at any time? Yes/No
- Are you happy to take part? Yes/No

If any answers are "no" or you don't want to take part, that's OK! No one will be cross with you.

If you do want to take part, please write your name below

Your name _____

Date _____

The researcher who explained this project to you needs to sign too:

Print Name _____

Sign _____

Date _____

Thank you!

Appendix P: The questionnaire pack

Today's date:



Question Pack



UNIVERSITY OF OXFORD

Oxford Health NHS
NHS Foundation Trust

University of Reading

LIEBOWITZ SOCIAL ANXIETY SCALE (LSAS-C/A)

This questionnaire assesses the way that social phobia plays a role in your life across a variety of situations. Read each situation carefully and answer two questions about that situation. The first question asks how anxious or fearful you feel in the situation. The second question asks how often you avoid the situation.

If you come across a situation that you ordinarily do not experience, we ask that you imagine "what if you were faced with that situation," and then, rate the degree to which you would fear this hypothetical situation and how often you would tend to avoid it.

Please base your ratings on the way that the situations have affected you **in the last week.** Fill out the following scale with the most suitable answer provided below:

Fear or Anxiety	**Avoidance**
0 = None	0 = Never (0%)
1 = Mild	1 = Occasionally (1-33%)
2 = Moderate	2 = Often (34-67%)
3 = Severe	3 = Usually (68-100%)

	Fear or anxiety	**Avoidance**
1. Talking to classmates or others on the telephone		
2. Participating in work groups in the classroom		
3. Eating in front of others (e.g. lunch hall, restaurants)		
4. Asking an adult you don't know well, like a shop assistant, headteacher, or policeman for help (e.g., for directions or to explain something that you don't understand)		
5. Giving a verbal report or presentation in class (e.g., show and tell for younger children)		
6. Going to parties, dances, or school activities		
7. Working on the whiteboard or in front of others		
8. Talking with other kids you don't know well		
9. Starting a conversation with people you don't know well		
10.Using school or public toilets		
11.Going into a classroom or another place (e.g. lunch hall) when others are already seated		

	Fear or anxiety	Avoidance
12.Having people pay close attention to you or being the centre of attention (e.g., your own birthday party)		
13. Asking questions in class		
14.Answering questions in class		
15.Reading out loud in class		
16.Taking tests		
17.Saying “no” to others when they ask you to do something that you don’t want to do (like borrow something or look at your homework)		
18.Telling others that you disagree or that you are angry with them		
19.Looking at people you don’t know well in the eyes		
20.Returning something in a shop		
21.Playing a sport or performing in front of other people (e.g., gym class, dancing school performance, musical concert)		
22.Joining a club or organization		
23.Meeting new people (or strangers)		
24.Asking a teacher permission to leave the classroom (like to go to the toilet or to the office)		

Fear or Anxiety	**Avoidance**
0 = None	0 = Never (0%)
1 = Mild	1 = Occasionally (1-33%)
2 = Moderate	2 = Often (34-67%)
3 = Severe	3 = Usually (68-100%)

Focus of Attention Questionnaire

Please put a circle around the word that best describes you when you talk to other children (Think about talking in class, at lunchtime, playtime, after school activities)

1. I was focusing on the other person's appearance or dress	1. Not at all	2. Somewhat	3. A medium amount	4. Mostly	5. Totally
2. I was focusing on the features or conditions of the physical surroundings (e.g. appearance, temperature).	1. Not at all	2. Somewhat	3. A medium amount	4. Mostly	5. Totally
3. I was focusing on what I would say or do next.	1. Not at all	2. Somewhat	3. A medium amount	4. Mostly	5. Totally
4. I was focusing on the impression I was making on the other person.	1. Not at all	2. Somewhat	3. A medium amount	4. Mostly	5. Totally
5. I was focusing on how the other person might be feeling about himself/herself.	1. Not at all	2. Somewhat	3. A medium amount	4. Mostly	5. Totally
6. I was focusing on what I thought of the other person.	1. Not at all	2. Somewhat	3. A medium amount	4. Mostly	5. Totally
7. I was focusing on my level of anxiety.	1. Not at all	2. Somewhat	3. A medium amount	4. Mostly	5. Totally
8. I was focusing on what the other person was saying or doing.	1. Not at all	2. Somewhat	3. A medium amount	4. Mostly	5. Totally
9. I was focusing on my internal bodily reactions (for example, heart rate).	1. Not at all	2. Somewhat	3. A medium amount	4. Mostly	5. Totally
10. I was focusing on past social failures.	1. Not at all	2. Somewhat	3. A medium amount	4. Mostly	5. Totally

REVISED CHILDREN'S ANXIETY AND DEPRESSION SCALE (RCADS)

Please put a circle around the word that shows how often each of these things happen to you. There are no right or wrong answers.

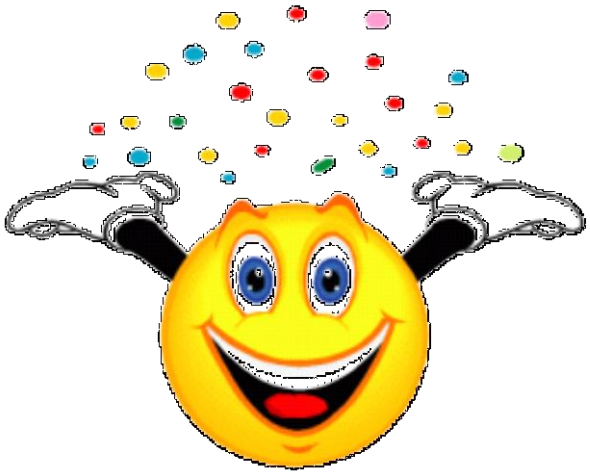
1. I worry about things	Never	Sometimes	Often	Always
2. I feel sad or empty	Never	Sometimes	Often	Always
3. When I have a problem, I get a funny feeling in my stomach	Never	Sometimes	Often	Always
4. I worry when I think I have done poorly at something	Never	Sometimes	Often	Always
5. I would feel afraid of being on my own at home	Never	Sometimes	Often	Always
6. Nothing is much fun anymore	Never	Sometimes	Often	Always
7. I feel scared when I have to take a test	Never	Sometimes	Often	Always
8. I feel worried when I think someone is angry with me	Never	Sometimes	Often	Always
9. I worry about being away from my parents	Never	Sometimes	Often	Always
10. I get bothered by bad or silly thoughts or pictures in my mind	Never	Sometimes	Often	Always
11. I have trouble sleeping	Never	Sometimes	Often	Always
12. I worry that I will do badly at my school work	Never	Sometimes	Often	Always
13. I worry that something awful will happen to someone in my family	Never	Sometimes	Often	Always
14. I suddenly feel as if I can't breathe when there is no reason for this	Never	Sometimes	Often	Always
15. I have problems with my appetite	Never	Sometimes	Often	Always
16. I have to keep checking that I have done things right (like the switch is off, or the door is locked)	Never	Sometimes	Often	Always
17. I feel scared if I have to sleep on my own	Never	Sometimes	Often	Always
18. I have trouble going to school in the mornings because I feel nervous or afraid	Never	Sometimes	Often	Always
19. I have no energy for things	Never	Sometimes	Often	Always
20. I worry I might look foolish	Never	Sometimes	Often	Always
21. I am tired a lot	Never	Sometimes	Often	Always
22. I worry that bad things will happen to me	Never	Sometimes	Often	Always
23. I can't seem to get bad or silly thoughts out of my head	Never	Sometimes	Often	Always

24. When I have a problem, my heart beats really fast	Never	Sometimes	Often	Always
25. I cannot think clearly	Never	Sometimes	Often	Always
26. I suddenly start to tremble or shake when there is no reason for this	Never	Sometimes	Often	Always
27. I worry that something bad will happen to me	Never	Sometimes	Often	Always
28. When I have a problem, I feel shaky	Never	Sometimes	Often	Always
29. I feel worthless	Never	Sometimes	Often	Always
30. I worry about making mistakes	Never	Sometimes	Often	Always
31. I have to think of special thoughts (like numbers or words) to stop bad things from happening	Never	Sometimes	Often	Always
32. I worry what other people think of me	Never	Sometimes	Often	Always
33. I am afraid of being in crowded places (like shopping centres, the cinema, buses, busy playgrounds)	Never	Sometimes	Often	Always
34. All of a sudden I feel really scared for no reason at all	Never	Sometimes	Often	Always
35. I worry about what is going to happen	Never	Sometimes	Often	Always
36. I suddenly become dizzy or faint when there is no reason for this	Never	Sometimes	Often	Always
37. I think about death	Never	Sometimes	Often	Always
38. I feel afraid if I have to talk in front of my class	Never	Sometimes	Often	Always
39. My heart suddenly starts to beat too quickly for no reason	Never	Sometimes	Often	Always
40. I feel like I don't want to move	Never	Sometimes	Often	Always
41. I worry that I will suddenly get a scared feeling when there is nothing to be afraid of	Never	Sometimes	Often	Always
42. I have to do some things over and over again (like washing my hands, cleaning or putting things in a certain order)	Never	Sometimes	Often	Always
43. I feel afraid that I will make a fool of myself in front of people	Never	Sometimes	Often	Always
44. I have to do some things in just the right way to stop bad things from happening	Never	Sometimes	Often	Always
45. I worry when I go to bed at night	Never	Sometimes	Often	Always
46. I would feel scared if I had to stay away from home overnight	Never	Sometimes	Often	Always
47. I feel restless	Never	Sometimes	Often	Always

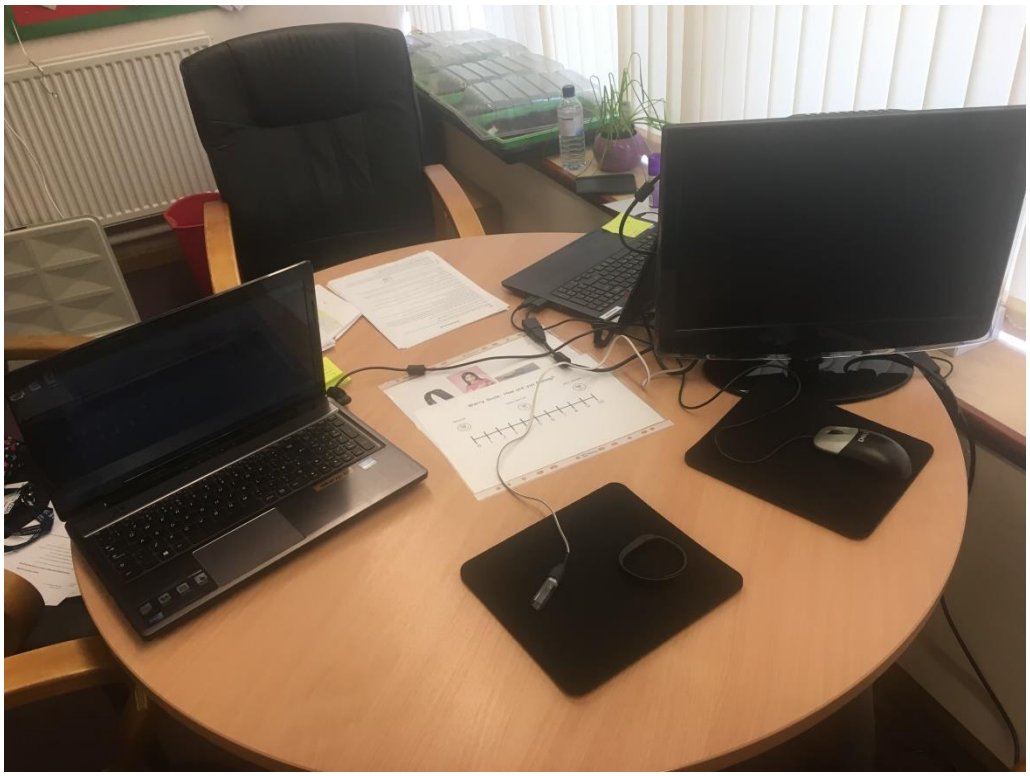
You've finished. That's all our questions.

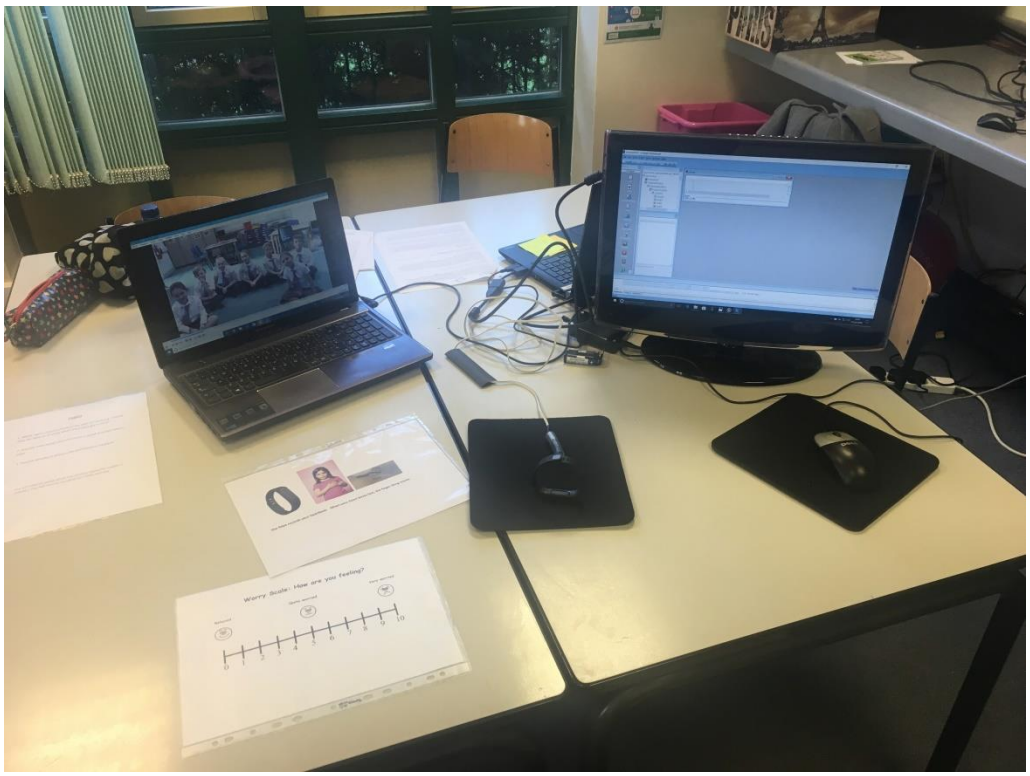
If you have time, please can you now check that you have put an answer to every question?

Thank you so much for taking part in this study.



Appendix Q: The attention task





Appendix R: Instructions for the attention task

I will be reading the instructions to you to make sure they are just right.

Remember we met a few weeks ago, and I asked you to complete some questions. We are meeting today for the second part of the project. Today we are going to complete a short computer task, which will last about 20minutes. The aim of the task is to press the mouse button as soon as you see something on the screen, **or** as soon as you feel this finger thing move slightly (I will show you this in a minute). We will do it twice, but before we start we will have a practice go so you can get the hang of it.

I AM GOING TO TALK YOU THROUGH THE EQUIPMENT AND SHOW YOU HOW IT ALL WORKS
-Here is the screen- this is what you will be looking at.
-This is for your finger- it will move very lightly, so you may only just about feel it. You pop your finger in here, and you should be able to feel it.
-Mouse - you click the left button.
-This is the Fitbit, you wear it like a watch but it can record your heart rate.

[Put Fitbit on]

I need you to wear this Fitbit. This will record how much your heart is beating, and as your heart beats faster, it will cause the finger thing to move (see pictures).

Let me show you how this works.. do a couple of star jumps.. put finger in here (set off vibration). As your heart beats faster, it makes it start to move.

[Bring up PHOTO]

This is a photo of a child with a dot on their face. The face will stay on the screen but the dot will only appear sometimes. You will need to press the mouse button when you see the dot appear on the face or feel the finger thing move.

RATE ANXIETY: I will also ask you to record how you are feeling throughout the task. I will ask you to point to a number on this scale to say how relaxed or worried you feel. 10 means that you are feeling very worried, 5 is a bit worried, and 0 is not at all worried. All the other numbers in between.

(1)Let's try that now- how are you feeling now?

Record rating scale number on a spreadsheet with client details.

<u>Practice session:</u>
Lets do a practice session. As I said, the aim of the task is to click the mouse button each time you feel this move on your finger (which will be because your heart is beating faster) OR if you see a dot appear on the face on the screen. You need to press the button only once but do it as quickly as you can. This will happen a few times. Remember to press the mouse only once each time you see a dot or feel the movement.
[BRING UP EPRIME – *PRACTICE TASK]*

OPTION 1 (no stress first)
Non stress:

Now we are going to start the real task. It is no different to what you have just done, but will last for a bit longer. Do you have any questions?

(2) How are you feeling now?

[PLAY EPRIME] *Stop when the child reaches the break screen.*

Stress induction:

Well done. We are now half way through. Next, I am going to ask you to give a speech in front of some children on this screen. I will set the video up now, so you can see them (***play video and pause with screen showing*****).** These are the topics that you can pick from **(show list of topics).** You will complete the speech after the next computer task. It only needs to last for a few minutes- but I can answer any questions about it shortly. You need to tell the other children what you think about the topic and why. The children will then rate your performance. Before doing this, I need you to complete the computer task one last time.

(3) How you feeling now?

[PLAY FINAL EPRIME]

Debrief: [**TAKE OFF FITBIT]**

Congratulations. You have now finished.
"You may remember that I asked you to complete a speech in front of the other children on the screen. You no longer need complete this speech and I will not ask you do to this at any point in the project. I had to ask you to do a speech as I wanted to see what impact being asked to do a speech would have on how you performed on the computer task. I am looking into how people feel when they are worried about being judged by other people. By asking someone to do a speech, it may make them feel worried about being judged by others. I will look into how this impacts people on the computer task. But actually you did not need to do one".

"I also told you that the Fitbit was measuring your heart rate and the vibration was triggered when your heart rate increased. Although the Fitbit has the ability to record your heart rate, we were not measuring this during the exercise, and it is not linked to the vibration. The reason I told you this was to make you think that your heart rate was increasing, which may have distracted you from the task and slowed down your response rate. If someone was feeling worried, it is likely that by wearing the Fitbit, it would have increased their attention on their heart rate. We are really interested in whether people focus their attention on their body when they are feeling worried, and the Fitbit helped us to investigate this ".

Do you have any questions? How are you feeling about it?

Please do not talk to anyone else about the tasks, as it is important they do not know what I am asking them to do otherwise it could change some of the results. You can tell your family at home, but not anyone in school until next week.

OPTION 2 (stress first)
Stress induction:

We are going to start the real task now, but firstly I am going to ask you to give a speech in front of some children on this screen. I will set the video up now, so you can see them (***play video and pause with screen showing*****).** These are the topics that you can pick from **(show list of topics**). You will complete the speech after the next computer task. It only needs to last for a few minutes- but I can answer any questions about it shortly. You need to tell the other children what you think about the topic and why. The children will then rate your performance. Before doing this, I need you to complete the computer task.

(2) How you feeling now?

[EPRIME PLAY] *Stop when the child reaches the break screen.*

Non stress:

Well done. We are now half way through.

"You may remember that I asked you to complete a speech in front of the other children on the screen. You no longer need complete this speech and I will not ask you do to this at any point in the project. I had to ask you to do a speech as I wanted to see what impact being asked to do a speech would have on how you performed on the computer task. I am looking into how people feel when they are worried about being judged by other people. By asking someone to do a speech, it may make them feel worried about being judged by others. I will look into how this impacts people on the computer task. But actually you did not need to do one".

I can answer questions about it after

(3) How you feeling now?

However, we still need to complete the second part of the computer task. It is no different to the first half that you have done. Are you ready to go? **[PLAY FINAL EPRIME]**

Debrief: [**TAKE OFF FITBIT]**

Congratulations. You have now finished.

"I also told you that the Fitbit was measuring your heart rate and the vibration was triggered when your heart rate increased. Although the Fitbit has the ability to record your heart rate, we were not measuring this during the exercise, and it is not linked to the vibration. The reason I told you this was to make you think that your heart rate was increasing, which may have distracted you from the task and slowed down your response rate. If someone was feeling worried, it is likely that by wearing the Fitbit, it would have increased their attention on their heart rate. We are really interested in whether people focus their attention on their body when they are feeling worried, and the Fitbit helped us to investigate this ".

Appendix S: Debrief script

Debriefing script

"You may remember that I asked you to complete a speech in front of the other children on the screen. You no longer need complete this speech and I will not ask you do to this at any point in the project. I had to ask you to do a speech as I wanted to see what impact being asked to do a speech would have on how you performed on the computer task. I am looking into how people feel when they are worried about being judged by other people. By asking someone to do a speech, it may make them feel worried about being judged by others. I will look into how this impacts people on the computer task. But actually you did not need to do one".

"I also told you that the Fitbit was measuring your heart rate and the vibration was triggered when your heart rate increased. Although the Fitbit has the ability to record your heart rate, we were not measuring this during the exercise, and it is not linked to the vibration. The reason I told you this was to make you think that your heart rate was increasing, which may have distracted you from the task and slowed down your response rate. If someone was feeling worried, it is likely that by wearing the Fitbit, it would have increased their attention on their heart rate. We are really interested in whether people focus their attention on their body when they are feeling worried, and the Fitbit helped us to investigate this ".

Do you have any questions? How are you feeling about it?

[time will be allocated to allow for questions]

Possible questions and answers

Why did you ask me to do a speech?

I asked you to do a speech because I am looking into how people feel when they are worried about being judged by other people. By asking someone to do a speech, it may make them feel worried about being judged by others. I will look into how this impacts people on the computer task.

Will you ask me to do a speech another time?

You will not need to do a speech, and I will not ask you to do one again. We are coming to the end of the task, so you do not need to do anything else.

Appendix T: Additional analysis

Hypothesis 1

Internal and External FAQ

In order to further understand the significant findings, the multiple regression was run with internal and external FAQ separately.

Internal FAQ. Internal FAQ was entered into the regression instead of the FAQ difference score. RCADS depression and social economic status in block 1 accounted for 2% of the variance, and was a significant predictor of internal focus of attention, (F(2,276) = 44.07, p < .001). This demonstrates that participants who reported greater internal focus of attention, also reported higher levels of depression and were classed as low in social economic status. The results of the addition of social anxiety in block 2 of the regression model revealed that as participants reported a greater internal focus of attention, they also reported higher levels of social anxiety. The inclusion of the LSAS led to a significant increase in the amount of variance accounted for by the model by 0.9% and this was a significant predictor of internal focus of attention, (F(3,275) = 45.19, p < .001).

External FAQ. External FAQ was entered into the regression instead of the FAQ difference score. RCADS depression and social economic status in block 1 accounted for 2% of the variance, and was a significant predictor of external focus of attention, (F(2,276) = 26.18, p < .001). This demonstrates that participants who reported greater internal focus of attention, also reported higher levels of depression and were classed as low in social economic status. The results of the addition of social anxiety in block 2 of the regression model revealed that as participants reported a greater external focus of attention, they also reported higher levels of social anxiety. The inclusion of the LSAS led to a significant increase

in the amount of variance accounted for by the model by 0.3% and this was a significant predictor of external focus of attention, ($F(3,275) = 21.20$, $p < .001$).

Hypothesis 2

In addition to the independent samples t test, a Mann-Whitney U test was performed to ensure the significant results were upheld using a non-parametric test. The results revealed that the high anxious group (*Mdn* = 10.00) had a significantly higher internal FAQ score than the low socially anxious group (*Mdn* = 4.00), U = 3657.50, $p < .001$. They also revealed that the high anxious group (*Mdn* = 8.00) had a significantly higher external FAQ than the low socially anxious group (*Mdn* = 5.00), U = 3241.50, $p < .001$.

In addition to a paired t test, a Wilcoxon Signed Rank test was performed to ensure the significant results were upheld using a non-parametric test. This analysis revealed no significant difference between internal and external FAQ for the low socially anxious group (Z = -1.18, $p = .08$). However, the high social anxious group reported significantly higher internal than external FAQ (Z = -3.90, $p < .001$).

Run using an ANOVA

The overall results remained significant when they were run using an ANOVA (without controlling for depression and ethnicity). In addition, there was a main effect of FAQ subscale, with there being a higher overall internal focus.

The results of the ANOVA revealed a significant main effect of FAQ subscale ($F(1, 130) = 7.135$, $p = .009$, $\eta_p^2 = .05$), and a significant main effect of social anxiety group ($F(1, 130) = 57.81$, $p < .001$ $\eta_p^2 = .31$). These effects were modified by a significant interaction between subscale and group ($F(1, 130) = 5.00$, $p < .001$ $\eta_p^2 = .14$).

Hypothesis 3

Run using ANOVA – Raw Scores

A mixed model ANOVA group (high vs. low anxiety) x condition (high vs. low stress, internal vs. external stimuli reaction time) was completed to explore the relationship between reaction times across conditions (without controlling for potential confounds). The results revealed a non-significant difference between social anxiety groups, when examining internal and external reaction times across the high and low stress conditions ($F(1, 124) = .014$, $p = .91$, $\eta_p^2 = .00$). However, there was a main effect of group, with the high anxious group responding slower than the low anxious group ($F(1, 128) = 16.85$, $p < .001$, $\eta_p^2 = .12$). There was also a main effect of stress conditions, with the participants responding more quickly in the low stress condition ($F(1, 128) = 123.79$, $p < .001$, $\eta_p^2 = .49$).

Run using ANOVA – Difference in Reaction Time

When examining the difference in reaction times, a mixed model ANOVA group (high vs. low anxiety) x condition (high vs. low stress) was completed. The results revealed a non-significant difference between social anxiety groups, when comparing the high and low stress conditions ($F(1, 128) = .13$, $p = .72$, $\eta_p^2 = .001$). No other findings were significant.

Examining Gender Separately using ANCOVA – Raw Scores

Males. A mixed model ANCOVA group (high vs. low anxiety) x condition (high vs. low stress, internal vs. external stimuli reaction time) was completed to explore the relationship between reaction times across conditions for male participants. RCADS depression and ethnicity were controlled for. The results of the mixed model ANCOVA revealed a non-significant difference between social anxiety groups, when examining internal and external

reaction times across the high and low stress conditions ($F(1, 60) = .251$, $p = .62$, $\eta_p^2 = .004$). No significant findings were reported across the rest of the analysis.

Females. A mixed model ANCOVA group (high vs. low anxiety) x condition (high vs. low stress, internal vs. external stimuli reaction time) was completed to explore the relationship between reaction times across conditions for female participants. RCADS depression and ethnicity were controlled for. The results of the mixed model ANCOVA revealed a non-significant difference between social anxiety groups, when examining internal and external reaction times across the high and low stress conditions ($F(1, 60) = .156$, $p = .69$, $\eta_p^2 = .003$). No significant findings were reported across the rest of the analysis.

Appendix U: Personal reflections

Reflective notes were kept for the duration of the research process, with an aim to further researcher reflexivity. This appendix will begin by describing the motivation behind exploring this area of research, and will then provide some key reflections from the process.

The Topic

My desire to undertake research relating to social anxiety stemmed from a professional interest in the area, but also a personal connection with the symptoms that one may experience. Prior to training, I worked at the Centre for Anxiety Disorders and Trauma (CADAT) in London. During this time, I was fortunate to work alongside colleagues who adhered to cognitive models in their purest form. As I learnt more about the cognitive models of social anxiety, and recommended treatment protocols, I was also able to relate this to my own experiences of anxiety. I began to experiment with certain aspects of the model myself, for example, altering my focus of attention, whilst exposed to anxiety provoking social situations. Although I was able to connect to the model personally, I was also fascinated by the complexity of the cognitions that one may experience, and how these relate to different levels of development in childhood and adolescence.

The role of mental imagery in the aetiology and maintenance of psychological distress, as well as a mechanism to promote change, has remained a strong interest of mine throughout clinical training. Although the concept of imagery is used in everyday language, I believe the challenges to conceptualise, measure, and manipulate imagery has resulted in a gap in the knowledge base. Similarly, although focus of attention is perhaps a more

recognised component in social anxiety, I believe it is vital to discover more about each of the mechanisms in the cognitive model in order to incorporate developmental factors unique to children and adolescents. In this respect, I hoped that synthesising and exploring two different concepts would improve our understanding of the area more generally.

The Research Process

Working with schools. I anticipated that recruitment and gaining access to schools would be extremely challenging. However, I was pleasantly surprised by the commitment and interest from the head teachers who were contacted. I met with each school prior to data collection to discuss the practical aspects of completing the study. I was particularly struck by comments suggesting that children should not be offered a choice to take part, as they are not typically given this option at school. I also witnessed this during questionnaire completion, where some children decided not to take part, but were still encouraged to do so by teaching staff. As I was present for the completion of all questionnaires, I was able to ensure the child's preference was adhered to. However, it made me question whether ethical procedures would be followed if researchers were not present. I also reflected on the amount of choice that children are given in psychological contexts, and how this may differ in education.

The equipment. When deciding on the research question and design, I hadn't considered the time and complexity involved in developing the equipment required for the project. I was fortunate to have the backing of two universities, whom I was able to draw on for support and expertise. I manged to work with a lab technician in the Department of Engineering to design the finger probe. I also worked with a computer programmer to design the E prime programme. I thoroughly enjoyed working with other departments, and

collaborating with other professionals to create the equipment. This process also made me realise the challenges associated with carrying out research in a clinical setting, where access to resources and skills are often limited. Although I enjoyed creating the equipment, I held an underlying fear that the equipment would fail in the middle of the study. This fear came true on one occasion (the wire on the finger probe disconnected), and I needed to terminate the computer tasks that day whilst the equipment was fixed.

Power dynamics and increasing levels of anxiety for 'research'. Despite careful ethical considerations, the aspect of the study that I found most challenging was the process of subjecting participants to an anxiety provoking situation. I had not anticipated the personal impact that this experience would have on me, but also on the child. As clinical psychologists, we frequently ask clients to enter situations that may increase their anxiety or distress, but with the expectation that this action will result in a long term reduction in symptoms. It therefore felt counter-intuitive to subject an individual to a stressful situation without any direct benefit to that individual. When I introduced the stress task, I observed some children taking long, deep, breaths in an effort to slow down their heart rate, and others criticised their own performance, for example, 'I am going to screw up badly'. On the second day of the computer task, one child became upset when the manipulation was introduced. This was unexpected, but I was fortunate to be able to draw on my clinical skills to reassure and support them. However, it led me to question the intensity of the stress task. Following a discussion with my supervisors, we reviewed the self-reported state anxiety levels, and agreed that as most of the ratings only increased marginally, and typically fell in the low to medium stress level, there was no need to change the task. However, following this, I found it anxiety provoking to introduce the stress task, and

needed to resist the urge to reassure participants, as doing so would violate the procedure, and impact the results.

Balancing the researcher and the clinician. I found the dual role of a clinician and a researcher difficult to balance. Although I acknowledged that it was outside of my role, I noticed myself wanting to provide further information and support to the highly anxious children. For those children who did show an interest or asked questions about the study, I spent time talking to them about anxiety, normalising it, and also provided basic psychoeducation about focus of attention. Although this slightly prolonged the data collection period, I hoped that it provided them with an understanding of anxiety, and also that they benefitted in some way from taking part.