Optimising Exposure for Children and Young People with Anxiety

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Declaration

I confirm that this is my own work and the use of all material from other sources has been properly and fully acknowledged.

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Table of Contents

Abstract

Anxiety disorders in children and adolescents are highly prevalent and without treatment, are associated with a range of difficulties and poor outcomes. Cognitive behavioural therapy (CBT) is the first line treatment of child and adolescent anxiety disorders. The critical ingredient of CBT is believed to be exposure; a controlled therapeutic technique whereby a person faces an anxiety-provoking stimulus or situation. While exposure-based treatments are effective, 40-50% of young people do not benefit, and almost half of initial treatment responders relapse after treatment. The major focus of exposure therapy has recently moved away from within and between session fear reduction (habituation), and towards the retrievability of new, non-threatening inhibitory associations. Research with adults has identified several strategies to optimise learning during exposure, however, the current state of evidence concerning exposure optimisation, and questions about how best to design exposures in the treatment of childhood anxiety disorders, is unclear.

The aim of the studies in this thesis was to address gaps within the literature and to develop a better understanding of potential optimisation strategies for children and young people. Specifically, the thesis aimed to gain a greater understanding of the current state of empirical evidence concerning the optimisation of exposure therapy for child and adolescent anxiety disorders and to explore the effects of adding different verbalisation strategies to exposure on fear responding for adolescents with public speaking anxiety.

A systematic review looking at factors associated with differential outcomes from exposure in children and young people with anxiety symptoms/disorders found a distinct lack of replication within the field. The findings generally failed to support a role of habituation-based fear reduction and there was preliminary evidence that some specific strategies may enhance the effects of exposure, such as dropping safety behaviours, parents and therapists discouraging avoidance, and the use of homework, however, methodological limitations precluded firm conclusions from being drawn. A preclinical, experimental study with public speaking fearful adolescents found that neither affect labelling or positive coping statements enhanced exposure on any measure of anxiety (self-rated anxiety, heart rate, or observer ratings of expressed anxiety) from pre-test to 1-week follow-up as participants delivered a series of speeches in front of a pre-recorded classroom audience. Although exposure with positive coping statements yielded a significantly greater reduction in self-rated anxiety compared to exposure with affect labelling and neutral statements immediately post-exposure, there was no

advantage in the longer term. The findings also suggested that extinction learning generalised when participants delivered a speech in a novel context. Again however, there was no advantage of any verbalisation strategy on anxiety measures. Finally, there were improvements in social anxiety symptoms, cognitions and use of safety behaviours across all conditions from pre-test to 1-month and 3-month follow up, suggesting that a recorded audience may be a valuable exposure stimulus in the treatment of social anxiety. However, notable methodological limitations prevent firm conclusions from being made.

Taken together, the results highlight that evidence concerning exposure optimisation in children and young people is at a very early stage, and that methodologically robust research will be vital for developing the field and improving exposure outcomes in the treatment of child and adolescent anxiety disorders.

Chapter 1

General Introduction

1.1 Anxiety Disorders in Children and Adolescents

Anxiety disorders are among the most common and impairing psychiatric disorders in children and adolescents (Costello, Egger, & Angold, 2005), with worldwide prevalence rates estimated at 6.5% (Polanczyk, Salum, Sugaya, Caye, & Rohde, 2015). Anxiety disorders in children and adolescents often co-occur with other anxiety disorders, mood, and behavioural difficulties (Brady & Kendall, 1992), and if left untreated can run a chronic course (Bittner et al., 2007; Broeren, Muris, Diamantopoulou, & Baker, 2013) and are associated with a range of adverse outcomes such as educational underachievement (Matthew Owens, Stevenson, Hadwin, & Norgate, 2012), poor peer relationships (Asendorpf, Denissen, & van Aken, 2008), poor social (Settipani & Kendall, 2013) and occupational functioning (Swan & Kendall, 2016), and anxiety, depression and illicit drug dependency in young adulthood (Kessler et al., 2011; Woodward & Fergusson, 2001).

According to the Diagnostic and Statistical Manual-Fifth Edition (DSM-V) (American Psychiatric Association, 2013) anxiety disorders include specific phobia, panic disorder, separation anxiety disorder, social anxiety disorder, generalised anxiety disorder and agoraphobia Collectively, these disorders are characterised by clinically significant fear, anxiety, and distress in response to stimuli and/or situational cues perceived as threats (Beesdo, Knappe, & Pine, 2009), and physiological arousal, behavioural disturbance (e.g., extreme avoidance of the feared situation/stimuli) and functional impairment are common (Silverman & Ollendick, 2005).

1.2 Treatment Effectiveness for Child and Adolescent Anxiety Disorders

Cognitive Behavioural Therapy (CBT) for the treatment of child and adolescent anxiety disorders is effective, however many (approximately 41%) do not benefit (James, James, Cowdrey, Soler, & Choke, 2015; Walkup et al., 2008) and almost half of initial treatment responders relapse following treatment (Ginsburg et al., 2014). CBT programmes are typically delivered over 16-20 weeks, involve child and parent components and focus on the identification of thoughts, behaviours, maintenance, exposure, alternative responses and breaking cycles (Kendall, Choudhury, Hudson, & Webb, 2002; Kendall & Hedtke, 2006). Whilst James et al.'s (2015) meta-analysis found that CBT is effective for approximately 60% of patients, only 3 studies included an assessment phase beyond post-treatment, therefore

longer-term outcomes were not clear. However, in a large CAMS randomized controlled trial (RCT) for the treatment of childhood anxiety disorders (n=488) (Walkup et al., 2008), 40% of youth who received CBT did not benefit significantly from treatment, and 50% retained their anxiety diagnosis at 6-month follow-up (Piacentini et al., 2014). Furthermore, outcomes appear to be particularly poor for adolescents (64% of adolescents aged 12-17 years with mixed anxiety disorders did not recover compared to 48% of children aged 7-12 years with mixed anxiety disorders). This is problematic as CBT is typically the first-line treatment for child and adolescent anxiety disorders (e.g. National Institute for Health and Care Excellence, 2014; World Health Organization, 2015).

1.3 Exposure as the Key Component of CBT

Although the critical ingredient of CBT appears to be exposure (Ale, McCarthy, Rothschild, & Whiteside, 2015; Whiteside et al., 2015, 2019), it is not currently clear how best to design, conduct, and process exposure tasks with children and young people. Exposure involves the confrontation of a feared situation or stimulus to break a negative reinforcement cycle of anxiety. It is proposed that when a feared situation/stimulus is avoided, distress is temporarily relieved (negative reinforcement), thus maintaining avoidance and anxiety longer term. Exposure can take several forms, such as in vivo (directly facing the fear in real life), imaginal (vividly imagining the fear), virtual reality (using technology to face a virtual reality version of the fear) and interoceptive (deliberately bringing on physical sensations that are feared). Exposure practice can be paced in different ways; graded (using a fear hierarchy to start with mildly or moderately difficult exposures), flooding (using a fear hierarchy to start with the most difficult exposure task) and systematic desensitization (combining exposure with relaxation exercises in order to make them feel more manageable and/or to associate the fear with relaxation) are common approaches. Examples of exposure include a person with panic disorder exercising to increase their heart rate (to learn that the sensation is not dangerous), someone with a spider phobia handling a spider and someone with social anxiety delivering a speech in front of an audience.

The theoretical foundations of exposure therapy have important implications for how exposure sessions are planned, conducted and appraised (Abramowitz, 2013). The use of exposure in therapy was first derived from principles of associative learning through fear conditioning (learning to predict an aversive event) and crucially, extinction (the disappearance of a previously learnt association when it is no longer reinforced) (Wolpe, 1968), and there is

suggestion that therapeutic techniques which target anxiety can be enhanced by using conditioning as a framework for understanding fear, its acquisition and extinction (Field, 2006). The basic principle of conditioning is that fears are acquired when a neutral stimulus (the conditional stimulus, CS, such as a neutral picture) is followed by an aversive stimulus (the unconditional stimulus, US, such as an electric shock). After a number of pairings, the neutral CS will come to elicit anticipatory fear reactions (or a conditional response, CR). Extinction on the other hand, refers to the effect that occurs when the predictor (or feared situation/stimulus) (CS) is presented alone (in the absence of the feared outcome; US), eventually the strength of the response declines and the predictor no longer elicits a CR (Vervliet, Craske, & Hermans, 2013). The clinical implication, therefore, is that exposure to the feared situation/stimulus (CS) without the feared outcome (US) allows the anxious response (CR) to extinguish over time.

1.4 Challenges to Traditional Models of Exposure

Traditional habituation-based models, which emphasise the reduction in fear throughout exposure (e.g. Emotion Processing Theory; Foa & McNally, 1996), are viewed by many as the backbone to exposure therapy, however, preliminary research with adults now suggests that there is no relationship between within and between session habituation and treatment outcomes (Kircanski, Mortazavi, et al., 2012). In fact, sustained arousal and variability in subjective fear responding (i.e., subjective units of distress; SUDS) during exposure have been shown to be better predictors of long-term outcomes than habituation of fear across exposure (Culver, Stoyanova, & Craske, 2012). Further, research with animals has found that rather than facilitate exposure, rapid habitation actually impedes long term learning (Woods & Bouton, 2008).

Historically, exposure therapy was guided by Emotion Processing Theory (EPT); originally proposed by Rachman (1980) and later expanded on by Foa & Kozak (1986). The model assumes that there are three key processes for exposure to be effective i) activation of the initial fear structure, ii) within-session habituation and iii) habituation between exposure trials. EPT advocates habituation between exposure trials as a key source for long-term learning/effective exposure. Notably, the model puts forward the erasure, or "un-learning", of fearful memories, as the key mechanism of change. That is, during exposure, the original "excitatory" association (CS – US) is un-learned. This process is achieved during exposure by the activation of a fear structure (cognitive representations) stored in memory, about a feared

situation/stimulus, physiological reaction[s], and anticipated negative (feared) outcome[s] (Foa & Kozak, 1986; Lang, 1971). The model suggests that fear structures can be activated when the individual comes into contact with the stimulus/situation and experiences anxious feeling[s] or thoughts, leading to escape/avoidance behaviours, which temporarily switch off the fear structure, and maintain anxiety. It is proposed that during exposure, the fear structure is activated for a prolonged period that prevents avoidance and allows for new learning to take place. As a result, fearful individuals learn new information that is incompatible with the original fear structure. For example, an individual with arachnophobia may initially think "The spider will run onto my body and bite my skin", but through prolonged exposure, come to think "The spider is just unpleasant to look at, it is not interested in biting me". Crucially, the theory argues that the new, non-fear structure *replaces* the original fear structure. Thus, the process of fear reduction (habituation) indicates that new non-fearful learning has taken place.

Given that EPT largely emphasises the importance of within and between session habituation as the fundamental process of successful exposure (Foa, Huppert, & Cahill, 2006), treatment manuals for children and adolescents have been designed using a habituation model (e.g., (Kendall et al., 2002; Kendall & Hedtke, 2006). Further, many clinicians may design exposures with a focus on within and between session habituation and apply the '50% rule' (a minimum 50% reduction in subjective units of distress (SUDS) during exposure) before terminating the exposure task (Peterman, Carper, & Kendall, 2016).

1.5 Inhibitory Retrieval Model of Extinction

Research with adults has used experimental research on extinction to inform clinical science research and practice (e.g., Craske, Hermans, & Vervliet, 2018; Vervliet et al., 2013). More specifically, translational research with animals and adult humans has shed light on the processes which underpin extinction, and generated substantial evidence that shifts the major focus of exposure therapy away from within and between session fear reduction, towards the retrievability of new, non-threatening inhibitory associations (Craske et al., 2018; Vervliet et al., 2013). Notably, the strategies and theories are not clear cut. Given that the relationship between within and between session habituation and the retrievability of new, non-threatening associations is unclear, the inhibitory retrieval model of extinction can be considered as complimentary, rather than competing or opposing, evidence for a role of habituation in exposure.

A “Retrieval Model” of extinction was originally developed through research with animals (Bouton, 2000). The model proposes that fear structures are not un-learnt during extinction, but instead, the feared stimulus/situation (i.e., CS) takes on two meanings: the original threat meaning (CS-US) and an additional non-threatening inhibitory association (CS-no US) (Bouton, 2002; Vervliet et al., 2013). In contrast with habituation focussed models, the Retrieval Model suggests that extinction success is represented by the successful activation and retrieval of the inhibitory association which concurrently acts as a suppressant to the original excitatory (fearful) association. As such, a key implication is that the long-term success of extinction depends on the retrievability of the inhibitory association (Bouton, 2002; Craske, Liao, Brown, & Vervliet, 2012). Clinically, this means that a crucial challenge of exposure therapy is the sustainability and retrievability of new non-fearful beliefs, over and above original fearful beliefs. The Retrieval Model is exclusively based on rat conditioning research; however, it has led to the development and application of fear conditioning research with humans, and subsequently; the Inhibitory Learning Theory account of extinction.

Inhibitory Learning Theory has been applied to explain many of the phenomena that can occur following successful extinction in aversive (e.g., something unpleasant such as pain from an electric shock or a loud noise) fear conditioning and extinction studies (Dirikx, Hermans, Vansteenwegen, Baeyens, & Eelen, 2004; Hermans et al., 2005; Kindt, Soeter, & Vervliet, 2009; Neumann, Waters, Westbury, & Henry, 2008; Norrholm et al., 2006) and successful exposure therapy, such as renewal, spontaneous recovery, and reinstatement. For example, renewal refers to a return of fear when the previously extinguished conditioned stimulus is experienced in a difference context (Rescorla & Heth, 1975) such as a person with panic disorder interpreting bodily sensations as dangerous in public areas, but not in therapist’s office building, someone with spider phobia responding fearfully towards a spider presented by a different therapist or in a different room to the therapist’s, and someone with social anxiety fearing judgement by a different audience after successfully delivering a presentation in a therapy session. Spontaneous recovery refers to the re-emergence of a previously extinguished conditioned response after a passage of time (Quirk, 2002) such as a person with panic disorder interpreting increased heart rate as dangerous after learning several months before that the sensation is not dangerous, someone with spider phobia responding fearfully towards a house spider after handling a tarantula several years before and someone with social anxiety fearing judgement during a casual social encounter after successfully delivering a speech in front of an audience at college the previous term. Finally, reinstatement refers to the re-emergence of a

previously extinguished conditioned response following the presentation of the US on its own (Rescorla & Heth, 1975) such as a person with panic disorder experiencing a re-emergence of interpreting increased heart rate as dangerous after experiencing an out of the blue panic attack (unrelated to increased heart rate), a person with spider phobia responding fearfully towards spiders after being bitten by an insect or someone with social anxiety fearing judgement after feeling embarrassed whilst alone.

Inhibitory Learning Theory is well supported by research into the neural mechanisms involved during extinction (Greco & Liberzon, 2016; Maren & Holmes, 2016). For example, there is evidence that key neural networks are activated when a conditioned stimulus is encountered within the extinction context, but not if the conditioned stimulus is encountered outside of the extinction context (Milad & Quirk, 2012). Key neurological regions that have been implicated during extinction include the amygdala, hippocampus, and ventromedial prefrontal cortex (vmPFC) with research supporting the role of a hippocampal-vmPFC network whereby the hippocampus signals the vmPFC to activate an inhibitory influence over the amygdala (Milad & Quirk, 2012; Quirk, 2002; Quirk, Russo, Barron, & Lebron, 2000). Notably, the amygdala plays a crucial role in the fear system, particularly in the expression of conditioned fear, as its activation in response to perceived threat influences central processes which drive fear expression (i.e., the stimulation of the fight-flight response) (Davis, 2006; Phelps, Delgado, Nearing, & Ledoux, 2004). Behavioural research with adults suggests that individuals with anxiety disorders show deficits in key mechanisms believed to underlie exposure, and that failure to benefit from exposure may be due to deficits in cognitive mechanisms such as inhibitory (safety) learning (Vervliet et al., 2013). More specifically, there is evidence that compared to non-anxious individuals, individuals with anxiety disorders continue to react fearfully towards stimuli that no longer signal danger indicating diminished fear extinction and retrieval of non-fearful, inhibitory information. For example, a meta-analysis of behavioural studies found that anxious adults exhibit stronger physiological responses (e.g., skin conductance, startle reflex) towards conditioned stimuli during extinction (i.e., delayed extinction) compared to non-anxious individuals (Lissek et al., 2005), and similar findings have been observed in clinically anxious adults such as panic disorder (Michael, Blechert, Vriends, Margraf, & Wilhelm, 2007) and PTSD (Michael et al., 2007; Milad et al., 2009). Furthermore, compared to non-anxious individuals, individuals with anxiety disorders exhibit deficits in extinction retention as demonstrated by elevated responding to previously extinguished conditioned stimuli at later retest (Blechert, Michael, Vriends, Margraf, &

Wilhelm, 2007; Craske, Waters, et al., 2008; Michael et al., 2007; Milad et al., 2009). Inhibitory learning deficits are also observed at the neural level, as adults with anxiety disorders such as PTSD have been found to exhibit decreased vmPFC during extinction and at extinction retest compared to non-anxious individuals (Bremner et al., 2005; Milad et al., 2009; Rougemont-Bücking et al., 2011). Together, the findings suggest that individuals with anxiety disorders possess inhibitory learning deficits, and therefore, may find it harder than non-anxious individuals to recall non-fearful learning acquired during exposure therapy (e.g., that the feared situation / stimulus is not dangerous), and inhibitory learning deficits may contribute towards the high rates of relapse following treatment.

1.6 The Optimisation of Exposure in Adults

Strategies that target inhibitory learning mechanisms have been developed to improve the efficacy of exposure-based treatments in adults (Craske, 2015; Craske, Treanor, Conway, Zbozinek, & Vervliet, 2014a). As can be seen in Figure 1, a range of experimental investigations including animal, non-anxious human, clinical analogue and clinical samples have been used to develop extinction informed strategies for optimising exposure by enhancing inhibitory learning. (Craske et al., 2018; Craske, Treanor, Conway, Zbozinek, & Vervliet, 2014b; Craske, Kircanski, et al., 2008). Although not an exhaustive review, several of the most widely researched strategies, along with corresponding theories, will now be considered.

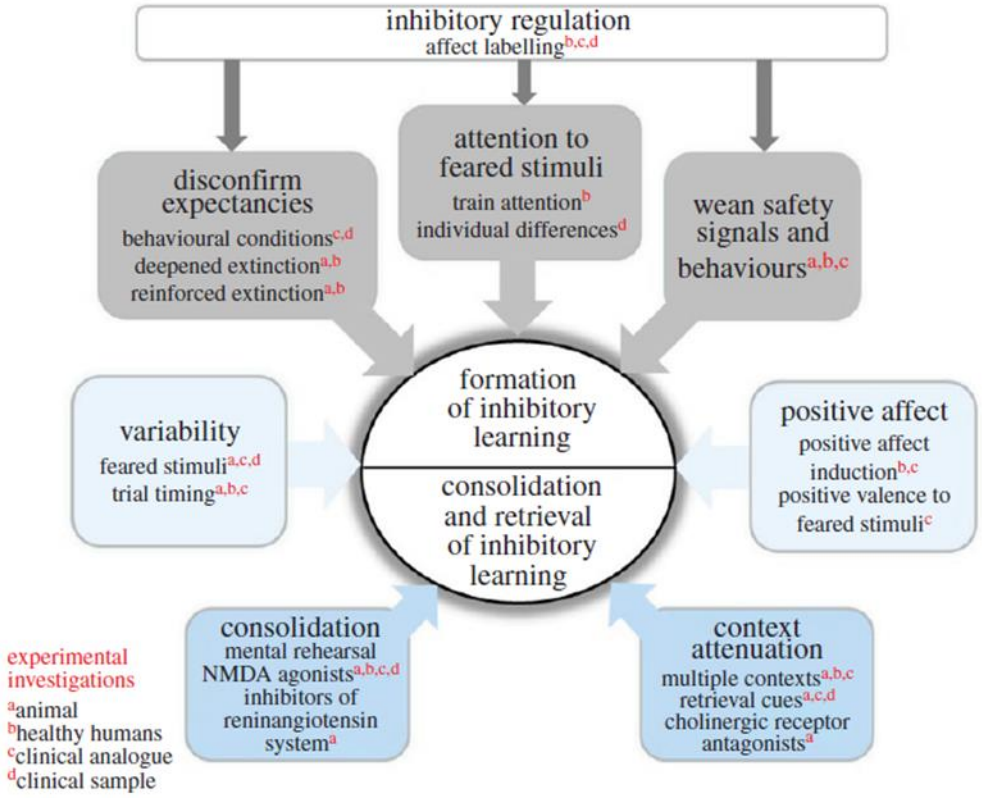

Figure 1. Extinction derived strategies for optimising exposure therapy taken from Craske et al., (2018)

Consolidation

There is evidence from research with animals, non-anxious and anxious adult humans that pharmacological consolidation of extinction learning may serve as a valuable adjunct to exposure therapy. D-Cycloserine (DCS) is a partial N-methyl-D-aspartate (NMDA; a neural receptor agonist) involved in learning and memory (Castellano et al, 2001; Newcomer & Krystal, 2001). Neurological research with rats suggests that NMDA receptors within the amygdala, in part, support the consolidation of extinction learning, and that DCS functions as an inhibitory learning strategy by strengthening inhibitory memories during the extinction process (Walker, Rattiner, & Davis, 2002). Although the precise mechanisms of DCS augmentation in humans is not clear, its administration as a pharmacological strategy to enhance memory consolidation has been shown to enhance extinction when paired with extinction trials in animals (Norberg, Krystal, & Tolin, 2008). In humans, there is evidence from pharmacological research with adults that compared to placebo control, DCS is associated

with a small augmentation effect on exposure-based psychotherapy for anxiety, obsessive-compulsive and post-traumatic stress disorders (Mataix-Cols et al., 2017).

Disconfirm expectancies

There is evidence from research with adults that outcomes can be enhanced by designing exposures that specifically provide disconfirmatory learning experiences (Baker et al., 2010; Deacon et al., 2013). The expectancy violation approach is derived from the idea that opportunities for learning are enhanced when there is a greater mismatch between what is expected and what actually occurs (Rescorla & Wagner, 1972). For example, an individual with a spider phobia who believes that they will get bitten if they hold a spider for more than 10 seconds would have their belief violated if they held the spider for 1-minute and were not bitten. Evidence in support of a disconfirmation approach originally developed from preclinical research with adults. For example, Baker et al., (2010) randomly allocated university students with moderate to severe levels of acrophobia to complete in vivo exposure that either specifically exceeded the durations at which they believed a negative event (e.g., falling off the roof of a building after approaching a gap and looking over the edge for 20 seconds) was likely to occur (disconfirmation) or discontinued before the duration when they believed the negative event was likely to occur (non-disconfirmation). The study found that one 'disconfirmation' exposure (e.g., looking over the edge for more than 20 seconds) each day was as effective at post-treatment and 2-week follow-up as multiple exposure trials of 'non-disconfirmation' (e.g. looking over the edge for 3 seconds, then for 7 seconds and then for 9 seconds). Similar findings have been found for adults with symptoms of panic disorder (e.g., elevated levels of anxiety sensitivity). Deacon et al., (2013), found that university students with elevated anxiety sensitivity that completed interoceptive exposure trials (e.g., hyperventilating for 60 seconds at a rate of 45 breaths per minutes) beyond their expected aversive outcome (e.g., believing that they would pass out after 30 seconds of hyperventilating at a rate of 25 breaths per minute) experienced superior outcomes compared to those who completed standard interoceptive exposures (i.e., a small and fixed number of interoceptive exposure trials, with or without controlled breathing). More recently, clinical case studies illustrating the application of the disconfirmation approach recommend that strategies which reduce expectancy prior to exposure (e.g., positive reframing and cognitive restructuring designed to lesson probability overestimation concerning feared outcomes) should be avoided as their use can negatively impact on the extinction learning process (Craske et al., 2018, 2014b). For example, in a paper

by Craske (2015) it is suggested that exposure trials are designed to disconfirm expectancies regarding a range of factors such as the temporal latency, frequency and intensity of negative outcomes (e.g., at what point, how often and how bad will the negative outcome be). It is recommended that the therapist supports the patient to establish what they are most worried about, and that exposures are designed in such a way as to disconfirm the feared expectation, and highlighted that focussing on fear reduction may miss the key point of exposure (i.e., disconfirming expectancies). Notably, these clinical implications, and the above mentioned evidence in favour of the disconfirmation approach, conflict with traditional habituation models, and move away from a "fear reduction" approach, and towards a "what needs to be learnt?" approach.

Wean safety signals and behaviours

There is also evidence from experimental research with adults that exposure outcomes can be enhanced by the removal of safety behaviours. Safety behaviours are defined as behaviours that are carried out (either overtly or covertly) in anxiety provoking situations in order to prevent the feared outcome from occurring (Salkovskis, 1991). General examples of safety behaviours include the presence of another person such as a parent or therapist, mobile phone, medication, food, and drink. More disorder specific examples of safety behaviours may include a person with OCD washing their hands more times than needed and avoiding potential contaminants by not shaking hands, a person with social anxiety looking at the floor and avoiding eye contact with others, or a person with panic disorder controlling their breathing or holding onto a ledge. Although safety behaviours may alleviate distress in the short term, long term, they may prevent the formation of new, inhibitory associations during extinction (Craske et al., 2014a) and maintain anxiety (Salkovskis, 1991). For example, there is evidence from a laboratory based, conditioning study with adults that safety behaviours disrupt extinction learning (the forming of new associations) whereas the removal of safety behaviours is associated with enhanced inhibitory learning (Lovibond, Davis, & O'Flaherty, 2000). These findings have been extended to research with specific phobias, for example, a study by Sloan & Telch (2002) found that claustrophobic individuals who were encouraged to use safety behaviours during exposure (e.g., opening a window and checking that the door lock unlocks) reported greater fear at post-test and follow-up than participants who were encouraged to focus on their fear during exposure. As such, it is recommended that during exposure, patients are encouraged to refrain from using within session safety behaviours to allow for greater new,

inhibitory learning to occur (e.g., "I do not need to use safety behaviours to be safe" and "I am able to cope with feeling anxious") (Craske, Kircanski, et al., 2008).

Variability

Greater variability during exposure (e.g., varied stimuli/contexts, greater increases and decreases in distress) is also associated with improved outcomes (Culver et al., 2012). Support for this approach comes from two studies demonstrating that compared to a traditional, graded approach (e.g., moving through a graded fear hierarchy beginning with easier exposures), a random/variable approach leads to enhanced outcomes for individuals with specific phobia. Rowe & Craske (1998) found that university students with spider phobia who were exposed to different types of spiders (e.g., colour, size, breed) experienced better outcomes at 3-week follow-up compared to individuals exposed to a single spider. Similarly, Lang & Craske, (2000) found that variable exposure to different heights (e.g., 8th floor, 2nd floor, 11th floor and so on) within different contexts (e.g., indoor stairwell vs outdoor stairwell) led to better outcomes at 1-month follow-up for acrophobic university students, compared to a traditional approach. Notably, neither study directly measured participants' emotional responses to the varied stimuli/situation. This idea was explored by Kircanski, Mortazavi, et al. (2012) using a preclinical sample of university students that scored highly on contamination fears. The study found that greater variability in self-rated anxiety (i.e., greater increases and decreases of distress) measured using subjective units of distress, during exposure, predicted lower self-rated anxiety at 2-week follow-up. Although the precise mechanisms driving this effect remain unclear, the authors suggest that emotional states may serve as a retrieval cue (as varying levels of fear are likely to be elicited in different situations), therefore variability serves to enhance the retrievability of learning when varying levels of fear are elicited in anxiety provoking situations beyond the exposure session (e.g., an individual being treated for a phobia of dogs experiencing different dogs associated with different perceived levels of threat beyond exposure sessions) (Bjork & Bjork, 1992, 2013). The authors also suggest that greater emotional variability may serve to enhance the generalisation of learning as the individual is able to tolerate facing the feared situation/stimulus in a variety of emotional states and various levels of intensity. Again, this idea contrasts with habituation model of exposures which seeks to facilitate fear reduction during exposure where possible.

Affect labelling

The results of experimental research with adults indicates that affect labelling (e.g., saying "I feel scared") during exposure is associated with improved outcomes. Although the precise mechanisms of affect labelling are not clear, the results of neuroimaging research suggest that self-reflective cognitive processing, such as affect labelling, may reduce responses to negative stimuli by engaging neurological pathways believed to be involved in inhibitory regulation (Lieberman et al., 2007). For example, Lieberman et al., (2007) found that amygdala activity was reduced, and right ventrolateral prefrontal cortex regions (RVLPFC) were activated, in adults who performed affect labelling (e.g., by choosing a negative word such as "scared" or "angry") whilst viewing evocative images (e.g., scared and angry faces), whereas there was no RVLPFC activation observed in adults who used nonaffective labelling.

Three studies have since demonstrated that affect labelling appears to enhance the effectiveness of exposure on physiological measures of fear at follow up (Kircanski, Lieberman, & Craske, 2012; Niles, Craske, Lieberman, & Hur, 2015; Tabibnia, Lieberman, & Craske, 2008b).

Tabibnia et al., (2008) exposed spider-fearful adults to twenty-four different images of spiders paired with negative labels (e.g., "cancer", "war" and "bullet"), no labels (i.e., a blank screen) or neutral labels (e.g., "little", "pet" and "living") and found that repeated presentation (72 trials over 1 session) of spider images with negative labels led to greater attenuation of skin conductance responding at 1-week follow up compared to the other conditions.

A subsequent study by Kircanski, Lieberman, et al., (2012) examined the effects of graded exposure to a live spider paired with affect labelling (e.g., saying "I feel anxious the disgusting tarantula will jump on me"), cognitive reappraisals (e.g., saying "Looking at the little spider is not dangerous for me"), distraction (e.g., saying "There is a television in front of my couch in the den"), and exposure alone on fear responding in spider-fearful adults. In each group, participants were instructed to create and speak a sentence that included i) a negative word to describe the spider and a negative word to describe their emotional response to the spider (affect label), ii) a neutral word to describe the spider and a neutral word or two to describe a way of thinking about the spider in order to feel less negatively about it (reappraisal condition) or iii) an object of furniture found in their home and a room or location in which the furnishing is found (distraction). Participants in the exposure alone condition received no verbal instructions. Participants underwent 20 exposure trials for 38 seconds each, split across two days. At one-week follow-up, participants who experienced exposure with affect labelling had

lower skin conductance responses compared to the other groups, and got significantly closer to a live spider, compared to those who were distracted during exposure.

More recently, Niles et al., (2015) demonstrated that affect labelling may also enhance exposure outcomes for adults fearful of public speaking. Participants were allocated into one of two groups; affect labelling or control. The inclusion of emotion labelling followed by feared outcome was consistent with Kircanski, Lieberman, et al., (2012). Prior to each exposure trial, participants in the affect labelling condition were prompted by a computer to choose words to label their feared outcome from four options presented on a screen. At the top of the screen, the phrase "I feel_____ was presented, followed by three possible negative emotion words (e.g., anger, sadness, or anxiety label words such as "afraid", "nervous", "anxious" and "jittery") or "other". The phrase "The audience will_____" was then presented followed by three possible feared outcomes related to the audience's response (e.g., "laugh at me", "be disinterested", "notice I'm nervous" and "think I'm stupid") or "other". Participants in the control condition complete a shape matching task presented on a computer screen. The study demonstrated that participants in the affect labelling condition, particularly those who used more labels during exposure, experienced greater reductions on measures of skin conductance and heart rate at 1-week follow-up, compared to those in the control condition.

1.7 Extinction Learning in Children and Adolescents

There has been a growing interest in the mechanisms underpinning fear conditioning and extinction across development. This has led to important developments concerning the potential applicability of exposure strategies designed to target extinction learning mechanisms in the treatment of childhood anxiety disorders.

Extinction learning in young animals

There is evidence from neuroimaging research with rodents that extinction processes vary across development (Shechner, Hong, Britton, Pine, & Fox, 2014). Following aversive conditioning trials, juvenile rats appear more able to forget aversive associations, but by adolescence, there appears to be an increased resistance to extinction (Baker et al., 2014; Ganella & Kim, 2014; Pattwell et al., 2012). These developmental differences may be accounted for by the maturation of key brain structures that are central in the extinction learning process in adults, such as they amygdala, prefrontal cortex, and hippocampus, as developmental research with rodents suggest key differences in the neurological structures

underlying extinction (Kim & Richardson, 2010). For example, during extinction, temporary inactivation of the vMPFC impairs learning in 24-day old rats, but not in 17-day old rats (Kim, Hamlin, & Richardson, 2009) and unlike juvenile rats, infant rats do not require the use of the prelimbic subregion of the mPFC (Li, Kim, & Richardson, 2012). Moreover, a review of neurological conditioning and extinction research concluded that, similar to adult rats, extinction in 24-day old rats involves the amygdala and the vmPFC, whereas extinction in 17-day old rats appears to involve the amygdala, but not the vmPFC (Kim & Richardson, 2010). Together, the findings appear to suggest that a more traditional "un-learning" approach (e.g., EPT) could be appropriate during the pre-adolescent period, whereas during adolescence, fear expression and extinction are temporarily impaired (Baker, Den, Graham, & Richardson, 2014; Ganella & Kim, 2014) which may be better understood, and treated, using an inhibitory learning approach.

Extinction learning in children and young people

There is emerging evidence from aversive conditioning and extinction studies suggesting that young people who are anxious demonstrate deficits in extinction learning (McGuire et al., 2016). Therefore, strategies which target inhibitory learning may optimise extinction during exposure, and improve treatment outcomes, for child and adolescent anxiety disorders (McGuire et al., 2016). Guidelines have recently been published describing how exposure strategies targeting inhibitory learning can be applied during the treatment of childhood anxiety disorders (McGuire & Storch, 2018). However, age effects between children and adolescents in extinction learning (McGuire et al., 2016; Waters, Theresiana, Neumann, & Craske, 2017) and developmental differences in the neurological mechanisms underpinning extinction (McCallum, Kim, & Richardson, 2010) suggest that findings from adult research may not directly translate to children and/or adolescents.

Until recently, there has been little examination of extinction learning across development in humans. However, consistent with animal research, there is now growing evidence from aversive conditioning and extinction research that relative to younger children and adults, extinction learning is particularly diminished during adolescence. Pattwell et al (2012) used an aversive conditioning paradigm to investigate fear-extinction across development and found impaired extinction learning, measured using skin conductance responses, during adolescence, compared to younger children and adults. Similarly, in a more recent study, Waters, Theresiana, Neumann, & Craske (2017) found that relative to children and adults, adolescents

exhibited impairments during extinction, measured using self-reported anxiety, where they were less likely to retain new, non-fearful, inhibitory information at re-rest. The maturation of brain structures and neurotransmitter systems are likely to be responsible for these developmental distinctions as the human brain undergoes rapid developmental changes (Sowell, Thompson, Holmes, Jernigan, & Toga, 1999). Indeed, similar to rodents, different biological pathways appear to underpin threat conditioning and extinction in children, adolescents and adults (Britton et al., 2013; Lau et al., 2011; Shechner et al., 2014). More specifically, during adolescence, dynamic changes in neuroplasticity and neural circuitry in the prefrontal area of the brain are apparent, and may account for diminished extinction (Pattwell et al., 2012, 2016). For example, when faced with aversive cues (e.g., fearful faces), adolescents demonstrate hyperactivity in the amygdala and hippocampus, and hypoactivity in the pre-frontal cortex (Casey, Giedd, & Thomas, 2000; Somerville, Jones, & Casey, 2010).

1.8 Exposure-Based Treatment for Children and Adolescents

Traditional CBT approaches: Anxiety management plus exposure

Most empirically tested CBT treatments for childhood anxiety disorders apply a traditional, habituation "anxiety management plus exposure" approach (e.g. Kendall, Choudhury, Hudson, & Webb, 2002; Kendall & Hedtke, 2006). Specifically, both Kendall & Hedtke's (2006) "Coping Cat" for children (aged 7-13 years), and Kendall et al's (2002) "The C.A.T Programme" for adolescents (aged 14-17 years) include 8 sessions of anxiety management (i.e., relaxation training and cognitive strategies such as positive coping statements (e.g., saying "It will be OK") and cognitive restructuring (e.g., instead of "I always make mistakes" thinking ""If I make a mistake, I'll get it right eventually" and instead of "If I pass out it will be unbearable and people will laugh" thinking "If I faint I will come around in a few moments and people will be concerned if I'm OK"); Vande Voort, Svecova, Jacobson, & Whiteside, 2010)), followed by 8 sessions of exposure. During the exposure phase, children and adolescents are both encouraged to draw on cognitive skills (e.g., positive coping statements and cognitive restructuring) to facilitate cognitive change (Kendall et al., 1997) and tolerate exposure demands (Manassis, Russell, & Newton, 2010). Notably, Kendall et al's "The C.A.T Programme" was developed from "Coping Cat" for younger children (Kendall & Hedtke, 2006). These approaches have dominated the evidence-base concerning psychotherapy for child and adolescent anxiety disorders (Reynolds, Wilson, Austin, & Hooper, 2012), however, run counter to the above mentioned inhibitory learning account of exposure (Craske et al.,

2018, 2014a; Tabibnia, Lieberman, & Craske, 2008a) and evidence that children and adolescents may need a different approach during exposure (Waters et al., 2017).

Treatment without anxiety management

As previously highlighted, a key clinical implication from inhibitory learning theory is to design exposures which maximally violate expectations and *avoid* strategies (e.g., positive reframing and cognitive restructuring) that reduce expectancies prior to exposure (Craske et al., 2018, 2012, 2014b, 2014a). While research with adults has demonstrated that exposure-based therapies are highly effective with or without adjunctive cognitive strategies across a range of anxiety disorders (Norton & Price, 2007), there are concerns that children and young people require pre-exposure cognitive strategies to tolerate exposure exercises (Manassis et al., 2010). Indeed, a key purpose of the cognitive component of CBT is to support the young person to prepare, persist and process behavioural exposure (Salkovskis, 1996) by facilitating engagement and reducing the likelihood of resistance (Butler & et al, 1984). However, a recent dismantling study not only demonstrated the feasibility of delivering exposure without pre-exposure anxiety management, but also the potential to *enhance* its effectiveness and improve outcomes (Whiteside et al., 2015). Specifically, the study randomly allocated children and adolescents (aged 7-14 years) with mixed anxiety disorders to receive either i) traditional CBT (i.e., CBT plus 6 sessions of pre-exposure anxiety management) or ii) parent-coached exposure therapy without pre-exposure anxiety management. Equivalent fidelity ratings, dropouts and satisfaction ratings between the studies indicated that exposure without pre-exposure anxiety management is safe and tolerable, and that anxiety management strategies may not be a necessary component of CBT treatment for childhood anxiety disorders (Whiteside et al., 2015). Further, greater improvements with early, parent-coached exposure were observed at post-treatment, with superior effects maintained at 3-month follow-up, and may suggest that anxiety management strategies prevent optimal exposure outcomes from being achieved. Furthermore, in a recent meta-analysis of 75 studies that included children and adolescents (n=5412, mean age = 11.27 years) with an anxiety disorder treated with CBT or a comparison condition found that compared to treatments that omitted relaxation, treatment that included relaxation strategies were associated with significantly smaller pre to post-treatment effect sizes and suggests that treatment which emphasises in session exposure without the use of relaxation strategies have the potential to improve treatment outcomes. Consequently, the authors called for further dismantling studies to guide the development of CBT beyond the

dominant anxiety management followed by exposure approach (Whiteside et al., 2019). However, negative views about the potential harmfulness of exposure are prevalent (Deacon et al., 2013; Meyer, Farrell, Kemp, Blakey, & Deacon, 2014; Richard & Gloster, 2007) and may contribute towards the underutilisation of research concerning exposure exercises in children and young people.

Evidence from case studies

While there have been no further dismantling studies since the publication of Whiteside et al., (2019), to our knowledge, there is preliminary evidence from case reports that exposure therapy with children and adolescents can not only be safely delivered without the use of anxiety management strategies, but also using approaches more in line with an inhibitory learning theory. For example, Franklin, Tolin, March, & Foa (2001) illustrated the application of intensive CBT of a 12-year-old boy with severe OCD that involved psychoeducation, ongoing coaching in implementing ritual prevention between sessions and did not include methods that were designed to attenuate anxiety during exposure (e.g., anxiety management techniques). Following treatment, OCD symptoms (measured using the Children's Yale-Brown Obsessive-Compulsive Scale; CY-BOCS) reduced from Pre-treatment (28) to Post-treatment (3) to 3-Month Follow-Up (0). In a second, more recent, case study, Farrell, Sluis, & Waters (2016) demonstrated the application of concentrated, prolonged exposure treatment for a 12-year old girl with severe OCD. The treatment involved psychoeducation, followed by three 3-hour long concentrated sessions of exposure therapy. Prior to completing exposure tasks, anxiety predictions were obtained to encourage new information that would challenge dysfunctional beliefs, expectancies for danger and the patient's perceived ability to cope, and relaxation was not included. The patient was often encouraged to "overlearn" during exposure (exceeding limits); a method that is in line with violating expectancies (Craske et al., 2018, 2014a). For example, obsessional thoughts were triggered by coming into contact with her dad's work clothes, therefore one exposure exercise involved the patient's dad sleeping in her bed in his dirty work clothes. OCD symptoms significantly declined after treatment, and she no longer met diagnostic criteria for OCD (posttreatment CY-BOCS score was 4).

There is also evidence from pilot studies that family approaches omitting anxiety management and focussing on factors such as parent behaviour, can be successfully incorporated into exposure therapy for childhood anxiety disorders. This is important because depending on the age, appropriateness and preference of the child, parents may be actively

present during treatment and/or support between session exercises (e.g., between session experiments, exposures) (e.g. Kendall, Choudhury, Hudson, & Webb, 2002; Kendall & Hedtke, 2006) yet parental anxiety, overprotection (Breinholst, Esbjørn, Reinholdt-Dunne, & Stallard, 2012) and accommodation (e.g., ways in which family members assist or modify their own behaviour in response to the child's anxious symptoms) can play a role in the development and maintenance of childhood anxiety disorders (Storch et al., 2007). Using a modified version of family-based exposure (Freeman & Garcia, 2008) to treat OCD in a 7-year old boy, Herren, Freeman, & Garcia (2016) focussed on reducing family accommodation (e.g., assisting with rituals and providing reassurance), understanding the functional relationship between obsessions and compulsions and creating opportunities to facilitate habituation during exposure exercises. Anxiety management or reducing techniques (e.g., relaxation or changing anxious thoughts) were not taught as part of the treatment. The findings from the study indicated that significant improvements in OCD symptoms and function, in addition to within and between session habituation. Further, Ale, Arnold, Whiteside, & Storch (2014) illustrated a family-based behavioural approach to treat compulsive hoarding in a 9-year old girl. The treatment focussed on psychoeducation, exposure to discarding items, exposure to acquiring cues and parent behavioural management techniques (e.g., differential attention to decrease undesirable behaviours such as screaming and saying mean things and increase desirable behaviours such as discarding items or talking about feelings in a nice way). Again, anxiety management strategies were not included within the treatment and resulted in clinically significant improvement on a measure of OCD severity.

Cognitive strategies as an adjunct to exposure

While evidence has consistently indicated that relaxation is not significantly associated with improved outcomes in CBT for childhood anxiety disorders (Peris et al., 2015; Whiteside et al., 2019), the added value of cognitive strategies is somewhat mixed. For example, Silverman et al., (1999) randomly allocated 81 children (aged 6-16 years, mean = 9.86) with a specific phobia to either a control condition (education support) or one of two exposure-based conditions that began with 3 sessions of cognitive self-control (SC; child cognitive strategies to facilitate child exposure or approach behaviour toward feared objects or situations including cognitive restructuring, self-evaluation, and self-reward) or 3 sessions of contingency management (CM; parent behavioural strategies to facilitate child exposure or approach behaviour towards feared objects or situations including positive reinforcement, shaping,

extinction, and contingency contracting) followed by 6 sessions focussed on exposure. At post-treatment, 88% of children in the SC condition recovered compared to 55% and 56% in the CM and control conditions, respectively. Notably, no exposure alone condition was included therefore firm conclusions about the effectiveness of adding cognitive strategies to exposure cannot be made. Conversely, in an unpublished dissertation, Yadegar et al (2017) found that cognitive extensiveness (i.e., the therapist's use of cognitive strategies) during exposure for child and adolescent anxiety disorders was not associated with improved outcomes on clinician rated severity at post-treatment. The study used an observational coding measure to examine the relative strength of exposure and cognitive interventions in facilitating post-treatment outcomes in CBT for anxious children and adolescents (aged 8-17 years). Cognitive extensiveness was rated by independent raters viewing weekly exposure sessions. While cognitive extensiveness was not significantly associated with outcomes at post-treatment, the study found that age significantly moderated the relationship between cognitive extensiveness and post-treatment outcomes whereby greater cognitive extensiveness was associated with greater improvements for younger children, and decreased cognitive extensiveness was associated with greater improvements for older children. Taken together, the findings may suggest that cognitive strategies are a useful adjunct to exposure for children, but not adolescents, however further research is required before firm conclusions can be made.

1.9 Summary

Anxiety disorders in children and adolescents are common and associated with a range of adverse outcomes that persist into adulthood. Although CBT treatment is effective, many children and young people do not benefit. Exposure appears to be the key ingredient of CBT for the treatment of childhood anxiety. Traditional models of exposure focus on fear reduction, however, recent research has challenged this approach and in adults there appears to be no relationship between within and between session habituation and treatment outcomes. There is a wealth of experimental research with adults that has been used to guide and inform clinical science research and practice. Translational research with animals and adult humans has shed light on the processes which underpin extinction, and the major focus of exposure therapy has shifted away from within and between session fear reduction, towards the retrievability of new, non-threatening inhibitory associations. Notably, adults with anxiety disorders appear to show deficits in key mechanisms believed to underlie exposure, and failure to benefit may be due to deficits in cognitive mechanisms such as inhibitory learning. Strategies that target inhibitory learning mechanisms have been developed to improve the efficacy of exposure-based

treatments in adults and given the identified deficits in extinction learning among children and adolescents with anxiety disorders, may also be applicable for young people. However, aversive conditioning research with animals and humans suggest that extinction processes vary across development. This is of importance and may suggest that children and adolescents need to be treated differently. However, exposure-based treatment typically follows a pre-exposure anxiety reduction approach, which runs counter to current theories of exposure (i.e., inhibitory learning theory). While views about the potential harmfulness of exposure are prevalent, there is growing evidence that exposure without pre-exposure anxiety management may be more effective than exposure with pre-exposure anxiety management for the treatment of child and adolescent anxiety disorders. Furthermore, several case studies/series have illustrated that exposure can be delivered effectively without the inclusion of pre-exposure anxiety management strategies and using strategies more in line with inhibitory learning principles. However, the current state of evidence concerning exposure optimisation in the treatment of childhood anxiety disorders, and questions about how best to design exposures during interventions, remain unclear.

This thesis aims to address gaps within the literature concerning exposure for the treatment of childhood anxiety disorders in order to develop a better understanding of potential optimisation strategies for the treatment of child anxiety symptoms/disorders. This thesis aims to gain a greater understanding of the current state of empirical evidence concerning the optimisation of exposure therapy for child and adolescent anxiety disorders through a systematic review of the literature. It then aims to explore the effects of adding different verbalisation strategies to exposure on fear responding for adolescents with public speaking anxiety. The following section provides an overview of the of the research questions addressed by each of the chapters.

1.10 Outline of Chapters

Chapter 2, Paper 1: Optimising Exposure for Children and Adolescents with Anxiety: A Systematic Review

As outlined above, failure to benefit from exposure may be due to deficits in cognitive mechanisms such as inhibitory learning (Craske et al., 2012, 2014b). Research with adults has identified a number of strategies to optimise learning during exposure (Pittig, van den Berg, & Vervliet, 2015) however, the effects of the majority of these strategies have not been considered from a developmental perspective and the current evidence base concerning the optimisation

of exposure for childhood anxiety disorders is unclear. Chapter 2 (Paper 1) reports on a systematic review of twenty-nine studies that consider the association between potential optimisation strategies and treatment procedures and outcomes for the treatment of child and adolescent anxiety symptoms/disorders. Specifically, the review reports on factors associated with differential outcomes from exposure in children and young people with anxiety symptoms/disorders, and where possible examines how associations differ across this age range, by examining i) specific exposure optimisation strategies (e.g. pharmacotherapy and parental involvement) and ii) specific characteristics of the process of exposure (e.g. cognitive, behavioural, and therapy level characteristics).

This paper was led by Hannah Plaisted. The research and main conceptualisation ideas were developed by Hannah Plaisted, Polly Waite and Cathy Creswell. Hannah Plaisted conducted the systematic search of literature, abstract and full-text article screening, data extraction and analysis of the results. Hannah Plaisted and Kate Gordon performed quality ratings for the included articles. Hannah Plaisted took the lead in writing the manuscript with support and editing from Polly Waite and Cathy Creswell. All authors contributed towards the final version of the manuscript.

Chapter 3, Paper 2: Optimising Exposure for Adolescents with Public Speaking Anxiety: Affect Labelling or Positive Coping Statements?

One of the key findings from the systematic review presented in Chapter 2, was that there has been minimal evaluation of exposure optimisation in preclinical experimental studies or controlled clinical trials and as such, the majority of key optimisation strategies identified within the adult literature (e.g., violation of expectancies (Baker et al., 2010), and affect labelling (Kircanski, Lieberman, & Craske, 2012; Niles, Craske, Lieberman, & Hur, 2015)) have yet to be explored with children and young people. In addition, only 3 (10%) of studies included an adolescent-only sample (Leyfer, Carpenter, & Pincus, 2019; Mataix-Cols et al., 2014; Olivares-Olivares, Ortiz-González, & Olivares, 2019) and no studies examined differences between narrow age groups. This is conspicuous given that several anxiety disorders emerge during adolescence (Beesdo et al., 2009) and there is some evidence to suggest that treatment outcomes are poorer for adolescents compared to children (Ginsburg et al., 2011). A recommendation was that, in line with adult research, it may be more efficient for research to examine targeted, theoretically-driven strategies in methodologically robust,

preclinical studies, and use the findings from these studies to guide and prioritise the development of clinical research.

Anxiety about public speaking typically manifests during adolescence (Stein, Torgrud, & Walker, 2000; Wittchen & Fehm, 2003), presents a risk for and is one of the most frequently reported fears among young people with social anxiety disorder (Hofmann et al., 1999; Hans Ulrich Wittchen, Stein, & Kessler, 1999). As such, Paper 2 used an experimental method with a community sample of adolescents (aged 13 – 14 years) with public speaking anxiety, to examine the effectiveness of adding i) affect labelling with feared outcomes, ii) positive coping statements or iii) neutral statements to exposure. The study uses a similar approach to previous research with adults fearful of spiders (Kircanski, Lieberman, et al., 2012) and public speaking (Niles et al., 2015). Based on findings from the adult literature (Kircanski, Lieberman, et al., 2012; Niles et al., 2015), Paper 2 examines the hypotheses that adolescents instructed to use affect labelling would show significantly greater reduction of fear than adolescents instructed to use positive coping statements and neutral statements, at 1-week follow up. Given the limited evidence to guide directional hypotheses, we also explored whether there were significant differences in post-exposure anxiety between exposure with neutral statements and exposure with positive coping statements.

This paper was led by Hannah Plaisted. The research and main conceptualisation ideas were developed by Hannah Plaisted, Polly Waite and Cathy Creswell. Hannah Plaisted developed the study design, and conducted the recruitment, data collection and analysis of results. Hannah Plaisted took the lead in writing the manuscript with support and editing from Polly Waite and Cathy Creswell. All authors contributed towards the final version of the manuscript.

Chapter 4, Study 3: The Generalisation of Extinction

The systematic review presented in Chapter 2 revealed that there has been scarce evaluation of the effectiveness of exposure optimisation strategies on the generalisation of extinction learning in children and adolescents. In fact, only two studies (Byrne et al., 2015; Menzies & Clarke, 1993) (6.9%) included an assessment of exposure generalisation. A key issue with exposure is that the risk of relapse may be increased if a different stimulus is encountered (Rowe & Craske, 1998) or if the previously feared stimulus is encountered in a different context to that in which treatment took place (Culver, Stoyanova, & Craske, 2011; Mineka,

Mystkowski, Hladek, & Rodriguez, 1999; Mystkowski, Craske, & Echiverri, 2002; Rodriguez, Craske, Mineka, & Hladek, 1999). Therefore, for treatment to be deemed successful, it is critical that fear extinction learning during exposure generalises beyond the therapeutic context. This may be especially important for young people with a principal diagnosis of social anxiety, who compared to other anxiety disorders, have less favourable treatment outcomes (Compton et al., 2014). There is evidence from research with adults that effective treatment of public speaking fear also leads to the remission of other symptoms of social anxiety (Hofmann, 2004; Hofmann, Schulz, Meuret, Moscovitch, & Suvak, 2006) and pre-recorded audiences may serve as exposure stimuli in the treatment of social anxiety disorder in adolescents.

This study addresses these issues and extends findings from Chapter 3 (Paper 2) by investigating whether adding affect labelling or positive coping statements to exposure enhanced the generalisation of extinction learning for adolescents with public speaking anxiety. Using the same adolescent sample from Paper 2, the study explored whether extinction learning acquired during the 1-minute speech tasks generalised when participants were asked to deliver a 2-minute speech to a different, smaller audience recorded in a different location one week later. We also examined whether completing the speech tasks led to a reduction in broader social anxiety symptoms. Based on findings from research with adults (Hofmann et al., 2006) it was hypothesised that symptoms of social anxiety would decrease.

This study was led by Hannah Plaisted. The research and main conceptualisation ideas were developed by Hannah Plaisted, Polly Waite and Cathy Creswell. Hannah Plaisted developed the study design, and conducted the recruitment, data collection and analysis of results. Hannah Plaisted took the lead in writing the chapter with support and editing from Polly Waite and Cathy Creswell. All authors contributed towards the final version.

The following chapters will present the papers and further findings from the empirical study, followed by a discussion chapter which reflects on the overall thesis findings, limitations, implications, and the future direction of research.

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Chapter 2

Paper 1: Optimising Exposure for Children and Adolescents with Anxiety, OCD and PTSD: A Systematic Review

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Optimising Exposure for Children and Adolescents with Anxiety, OCD and PTSD: A Systematic Review

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Abstract

Cognitive-behavioural therapy is an effective treatment for anxiety disorders in children and young people, however, many do not benefit. Behavioural exposure appears to be the critical ingredient in the treatment of anxiety disorders. Research with adults has identified innovative strategies to optimise exposure-based treatments, yet it is not clear how to optimise the effects of exposure for children and young people. This review was a preliminary exploration of the association between potential optimisation strategies and treatment procedures and outcomes for the treatment of child anxiety symptoms/disorders. We searched PsychInfo and Medline databases using a systematic search strategy and identified 29 articles. We found preliminary evidence that some specific strategies may enhance the effects of exposure, such as dropping safety behaviours, parents and therapists discouraging avoidance, and the use of homework. However, not one significant finding was replicated by another study for the same time point using the same methodology. To a large degree, this lack of replication reflects a limited number of studies combined with a lack of consistency across studies around conceptualisations, methodological approaches, and outcome measures making it difficult to make meaningful comparisons between studies and draw firm conclusions. Examination is needed of a wide range of theoretically-driven potential optimisation strategies using methodologically robust, preclinical studies with children and young people. Furthermore, the methods used in future research must enable comparisons across studies and explore developmental differences in the effects of particular optimisation strategies.

Keywords

Child, adolescent, youth, anxiety, exposure, cognitive behaviour therapy

Introduction

Anxiety and related disorders[1] are among the most common and impairing mental health disorders in children and adolescents, with worldwide prevalence rates estimated at 6.5% (Polanczyk, Salum, Sugaya, Caye, & Rohde, 2015). This is of particular concern as, if left untreated, childhood anxiety disorders can run a chronic course (Bittner et al., 2007; Broeren, Muris, Diamantopoulou, & Baker, 2013), are associated with educational underachievement (Owens, Stevenson, Hadwin, & Norgate, 2012), poor peer relationships (Asendorpf, Denissen, & van Aken, 2008) and poor social (Settipani & Kendall, 2013) and occupational (Swan & Kendall, 2016) functioning.

Cognitive behavioural therapy (CBT) is typically the first-line treatment for child and adolescent anxiety disorders (e.g. National Institute for Health and Care Excellence, 2014; World Health Organization, 2015). Although CBT is an effective treatment, approximately 41% of young people do not benefit (James, James, Cowdrey, Soler, & Choke, 2015). Furthermore, a naturalistic follow-up study of anxious youth treated with CBT found that 48% of initial treatment responders relapsed following treatment (≤ 6 years) (Ginsburg et al., 2014). Together these studies emphasise that although CBT for childhood anxiety disorders is beneficial, there is a clear need for improvement. The critical ingredient in CBT for the treatment of anxiety disorders in children and young people appears to be behavioural exposure (Kendall et al., 2005; Peris et al., 2015; Peterman, Read, Wei, & Kendall, 2014), a controlled therapeutic technique that involves the person facing an anxiety-provoking stimulus or situation (Marks, 1973). The theoretical foundations and proposed mechanisms of change that guide behavioural exposure have important implications for how the exposure session is planned, conducted and appraised (Abramowitz, 2013).

Behavioural exposure was first derived from principles of associative learning through fear conditioning (learning to predict an aversive event by pairing a neutral stimulus with an aversive stimulus) and extinction (the gradual decrease in response to a conditioned fear when the stimulus is presented in the absence of the reinforcement) whereby within and between

[1] The Diagnostic and Statistical Manual Fifth Edition (DSM-5) (American Psychiatric Association, 2013) reclassified obsessive-compulsive disorder (OCD) and posttraumatic stress disorder (PTSD) from "anxiety disorders" to other categories. However, anxiety disorders, OCD and PTSD are all characterised by clinically significant fear, anxiety and distress in response to stimuli and/or situational cues (McGuire et al., 2016). As such, these disorders have been referred to as 'anxiety disorders' from here on.

session fear reduction and habituation reflects successful learning (e.g. Emotion Processing Theory; Foa & McNally, 1996)). However, recent studies with adults have failed to find a significant relationship between within-exposure habituation and level of fear on behavioural avoidance tests at follow-up weeks to months later (Kircanski, Mortazavi, et al., 2012). Furthermore, research with animals has suggested that, rather than facilitate successful exposure, rapid habituation may actually impede long-term learning (Woods & Bouton, 2008). As such, more contemporary accounts of exposure suggest that associations learned during threat conditioning (i.e., when the fear is acquired) are not weakened or forgotten but compete with new non-threatening associations. For example, Inhibitory Learning Theory (Craske et al., 2008) proposes that the failure to benefit from exposure is due to deficits in cognitive mechanisms, including inhibitory learning (i.e., learning which inhibits previous learning) (Craske et al., 2008), and the focus of inhibitory learning-guided exposure should be to develop new (non-threatening) associations that overshadow the excitatory (threatening) association. It is therefore proposed that the 'success' of exposure is reflected by effective consolidation, retrievability and generalisability of new inhibitory learning assessed during follow-up, rather than the degree of fear reduction that occurs between and within exposure sessions (Craske, Treanor, Conway, Zbozinek, & Vervliet, 2014).

Inhibitory Learning Theory has highlighted several strategies that enhance extinction learning and may also increase the effectiveness of exposure within treatment. Examples include violating expectancies about harm, occasional reinforced extinction, reducing safety seeking behaviours (Salkovskis, Hackmann, Wells, Gelder, & Clark, 2007; Sloan & Telch, 2002), stimulus variability (Culver, Stoyanova, & Craske, 2012; Kircanski et al., 2012) and affect labelling (Kircanski, Lieberman, & Craske, 2012; Niles, Craske, Lieberman, & Hur, 2015). Furthermore, exposure may be optimised by pharmacological strategies to enhance memory consolidation. For example, D-Cycloserine (DCS) has been shown to have a small augmentation effect on exposure-based psychotherapy for adults with anxiety, obsessive-compulsive and post-traumatic stress disorders (Mataix-Cols et al., 2017).

Inhibitory Learning Theory and its application to optimise exposure has predominantly been based on research with adults and its application to younger people remains unclear. Indeed, most empirically tested CBT treatment protocols for childhood anxiety disorders apply traditional habituation-based models of exposure (e.g. Kendall, Choudhury, Hudson, & Webb, 2002; Kendall & Hedtke, 2006). However, there are indications from animal research that

different biological pathways may underpin fear extinction in children, adolescents and adults (Shechner, Hong, Britton, Pine, & Fox, 2014) and notably, among rats, there appears to be a unique developmental period whereby fear expression and extinction are temporarily impaired during adolescence (Ganella & Kim, 2014). Consistent with the animal work, recent findings from a threat-conditioning study with humans found that relative to children and adults, adolescents exhibited impairments during extinction where they were less likely to retain new, non-fearful, inhibitory information (Waters, Theresiana, Neumann, & Craske, 2017). The maturation of brain structures and neurotransmitter systems are likely to be responsible for these developmental distinctions in extinction as the human brain undergoes rapid developmental changes (Sowell, Thompson, Holmes, Jernigan, & Toga, 1999). In addition to potential biological mechanisms underlying developmental differences in the process of fear extinction, there may be other factors that have an impact on the efficacy of exposure in children and young people. For example, parent or carer responses may influence the extent to which children are able to undertake the active parts of treatment by interacting with fearful situations or stimuli, through the degree to which they model and reinforce 'brave' approach-related behaviours and facilitate exposure in multiple contexts between sessions (e.g. at home, in school, in the community). As such it is plausible that the effectiveness of strategies to promote exposure may differ through development and that specific consideration of how to optimise exposure among children and adolescents is required.

Summary and Aim of Review

This systematic review will explore factors associated with differential outcomes from exposure in children and young people with anxiety symptoms/disorders, and where possible examine how associations differ across this age range, by examining:

(i) Specific exposure optimisation strategies (e.g. pharmacotherapy and parental involvement)

(ii) Specific characteristics of the process of exposure (e.g. cognitive, behavioural, and therapy level characteristics)

Method

Protocol and Registration

The review was conducted using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis of Individual Participant Data (Moher et al., 2009). The study protocol was

registered with PROSPERO (CRD42018109875) and it is accessible from www.crd.york.ac.uk/PROSPERO/display_record.php?RecordID=109874

Search Strategy

A systematic review of the literature was conducted during November 2019 using two databases *Psych-INFO and Medline (Pub-Med).* The start time was selected based on the earliest material published in the databases. The search used key exposure-based treatment terms: *exposure* in conjunction with *therapy, treatment, intervention* and *behavio**, anxiety-related terms: *anxi*, worry, fear*, obsess*, compul*, OCD, panic, GAD, phobi*, mute, mutism, agora*, PTSD, post-traumatic* and *(stress adj2 disorder)*[2], and terms to identify studies which involved children and adolescents: *child, children, childhood, adolescen*, youth* and *teen**. The search results were collated in Endnote where duplicates between databases were removed.

Inclusion Criteria

Studies were included in the review if they met the following criteria via a hierarchical coding system:

1. Written in English
2. Peer-reviewed empirical study (case studies not included)
3. Involved human participants aged between 3 and 21 years, with a mean age of ≥ 5 and ≤ 18 years
4. Focused on typically developing children / adolescents
5. Included at least one condition with a core exposure-based intervention/treatment component (≥ 50% sessions contained exposure) that targets pre-existing fear / anxiety
6. Used at least one anxiety or fear related outcome measure
7. Reported the statistical association between an exposure strategy or characteristic and treatment outcomes:

i) Compared exposure with and without a particular strategy ("exposure plus" condition). To ensure that observed effects were carried by features of the exposure component of an intervention/treatment (rather than other elements delivered as part of a wider treatment package, for example, psychoeducation), a strategy was defined as an "exposure strategy" if the intervention/treatment was ≥ 80% exposure

[2] The '2' is a proximity search which specifies that the search terms (i.e., stress and disorder) are a maximum of two words apart from one another, regardless of the order in which they appear.

OR if the strategy was administered during the exposure component of treatment (e.g., directly before, during or directly after an exposure session). For example, a study would be included if a strategy (e.g., pharmacotherapy) was introduced during the exposure component of a treatment that was 50% exposure (e.g., Leyfer, Carpenter, & Pincus, 2019) but excluded if the strategy was introduced during other, non-exposure components of treatment (e.g., Compton et al., 2010).

ii) Reported an association between features of exposure practice (i.e. specific characteristics of exposure which have not been experimentally manipulated for example; use of safety seeking behaviour during exposure) and treatment outcome[s]. Exposure practice can also include between-session exposure related activities (e.g. parental training to support between-session exposure)

Study Selection

Following a search of electronic databases, the selection process was piloted using a sample of papers. Abstracts were screened for inclusion by HP and second rated by one of three undergraduate psychology research assistants with a high level of reliability (k = 0.82). Full-text articles were screened for inclusion by HP and second rated by a postgraduate psychology research assistant with a substantial level of reliability (k = 0.73). Reference lists of the primary studies identified were reviewed to identify further potential studies of interest, and abstracts were retrieved, and full texts screened for inclusion, if appropriate. All queries regarding study eligibility were discussed and resolved between HP, CC and PW. The study selection process and the number of studies remaining at each stage is shown in Figure 1.

Data Extraction

For each study, the following information was extracted: study location, sample characteristics including child age and anxiety diagnostic status, intervention characteristics including treatment protocol and exposure technique, primary outcome measure(s) and where relevant, the inclusion and duration of follow-up assessment. The data was extracted by HP. Where there was missing data or additional data needed, authors of the studies were contacted.

For studies that examined the efficacy and effectiveness of exposure optimisation strategies, the following information was also extracted: (i) percentage of intervention containing exposure, and (ii) exposure PLUS (i.e., strategy) and exposure ONLY information (i.e., control). For studies that examined the relationship between exposure process variables

and treatment outcomes, we also extracted exposure process variable information (e.g., safety seeking behaviour).

Outcome Measure of Fear/Anxiety

We developed a hierarchy of preferred outcome measures:

1. Clinician ratings (CSR) – i.e., independent evaluators used a structured diagnostic interview such as the Anxiety Disorders Interview Schedule for Children – Child and Parent Versions (ADIS-C/P) (Silverman & Albano, 1996) and assigned a CSR using a 0-8 scale based on child/parent interviews
2. Self-report measures of symptom severity/fear – i.e., child / parent questionnaires
3. Approach/avoidance of the feared situation / stimulus – i.e., Behaviour Assessment Test (BAT)
4. Self-rating of anxiety during exposure –i.e., Subjective Units of Distress Scales (SUDS)

For each study, if multiple outcomes were reported the disorder/fear specific outcome measure with the highest rank was selected for inclusion. If a study included multiple measures from one category, the most frequently used measure across all studies in the review was selected. If a study included a self-report measure *and* a BAT, both measures were reported. Where child and parent measures were provided separately, both informants' reports were included.

Data Synthesis

Due to the heterogeneity of studies included within the review (e.g., participants, anxiety disorder/symptoms, primary outcome measures, study design, exposure-strategy and/or process variable) the findings were evaluated through a narrative approach. Where possible, effect sizes were extracted or calculated for each individual study. For within-subject studies, effect sizes were reported as Pearson's product-moment correlation coefficient (*r*). Where studies reported only standardised multiple regression coefficients, rather than correlation coefficients, we used Peterson & Brown's (2005) imputation approach to convert B coefficients to corresponding coefficients (*r*). For experimental studies involving group comparisons, effect sizes were reported as Cohen's *d*. Where studies did not report Cohen's *d*, this was calculated using the available data (Cohen, 1988) for each available time point. Where no effect size is reported it is because sufficient data was unavailable.

Study Quality Ratings

All included studies were evaluated for methodological quality using an adapted version of Moncrieff, Churchill, Drummond, and McGuire (2001)'s study quality assessment instrument. As this review included experimental and within-subject studies, adaptations were made to the instrument to account for the differences in designs. For within-subject studies, the following standards were omitted from the assessment: *Item 5) Method of Allocation; Item 6) Concealment of Randomisation; Item 8) Blinding of Subjects* and *Item 17) Information on Comparability and Adjustment for Differences in Analysis*. One item was adapted to reflect the single condition nature of these types of studies: *Item 15) Record of Number and Reason for Withdrawal (omitted 'by group').* For experimental studies, all items from the original instrument were included. Items 8 (blinding of subjects) and 13 (blinding of assessor) were combined. All included studies were rated by the first author (HP) and second rated by the third author (KG). Inter-rater reliability for study quality ratings was excellent (k = .98). All discrepancies and queries regarding study ratings were discussed and resolved between the authors.

Results

Description of Included Studies

Twenty-nine studies were identified, published between 1993 and 2019, details of which can be found in Tables 1 and 2. Seventeen (59%) of the studies used an experimental, between-subject design and 12 (41%) used a within-subject design.

Sixteen studies (55%) included participants with a broad age range (e.g. 7-17 years), 6 (21%) included children and early adolescents (e.g. 6-14 years), 4 (14%) only included young children (e.g. 3-8 years) and 3 (10%) only included adolescents (e.g., aged 12-17 years).

Twenty-five (86%) studies included clinical samples that met diagnostic criteria for anxiety disorders, and all of these studies delivered treatment using a manualised protocol (e.g., Angelosante, Pincus, Whitton, Cheron, & Pian, 2009; Kendall & Hedtke, 2006; March & Mulle, 1998; Öst, 1989, 1997). Four (14%) of the studies did not conduct diagnostic assessments; two used an exposure-based intervention (e.g. gradual in-vivo exposure) and two used a manualised trauma-focussed treatment protocol (i.e. Cohen, Mannarino, & Deblinger, 2006). Twenty-two (76%) studies used an intervention/treatment protocol that included

exposure in more than 50% of the sessions. However, only three (10%) studies reported the association between the amount of time spent on exposure/the number of exposures and treatment outcomes. Twenty-one (72%) studies used an intervention/treatment protocol that involved parents, 5 (17%) only included children/adolescents and 3 (10%) did not report parent involvement.

Twenty-eight (97%) of the studies included a post-exposure assessment, and 16 (55%) included one or more follow-up assessments ranging from 4 days to 1-year post-exposure.

Quality Ratings

As shown in Tables 1 and 2, quality ratings ranged widely from 33% to 83%. Particular areas of weakness in study quality related to a lack of information on and inclusion of withdrawals, fidelity, sample size, compliance and power calculation. There was also commonly a lack of information about side effects, although these were more commonly reported in studies of pharmacological approaches. Notably, only 7 studies included a follow up > 3 months post-treatment completion.

Exposure Characteristics and Optimisation Strategies

Before Exposure

Fourteen studies examined associations between pre-exposure variables (administration of pharmacotherapy, modelling, attention training, social skills training and exposure preparation) and exposure outcomes.

Pharmacotherapy

D-Cycloserine

Six studies examined the effect of DCS administration *one hour prior* to commencing exposure (Byrne et al., 2015; Farrell et al., 2013; Leyfer et al., 2019; Scheeringa & Weems, 2014; Storch et al., 2010, 2016), and two studies examined the effect of DCS administration *at the beginning* of each exposure session (Farrell et al., 2018; Rapee et al., 2016) All eight studies used a double blind, placebo-controlled design.

One study found a significant facilitative effect of DCS administered *1-hour before* exposure on treatment outcomes (Byrne et al., 2015). In the treatment of specific phobias, Byrne et al., (2015) found that children and young adolescents (aged 6-14 years) who received DCS administration prior to prolonged exposure did not perform significantly better than those who received a placebo control during a behaviour approach test (BAT) at 1-week follow up, with a small effect size. However, when the stimulus was presented in a novel context (i.e., a different stimulus outdoors with no parent present) children who received DCS performed significantly better than those in the control group during the BAT, with a medium effect size. However, in a study which included children and adolescents (aged 8-18 years) with 'difficult to treat' OCD, Farrell et al., (2013) did not find a significant facilitative effect of DCS on OCD severity immediately post-treatment (did not meet a threshold for a small effect) nor at 1- and 3-month follow-up (medium and small effect size respectively). A large (though non-significant) facilitative effect of DCS was observed at 1-month follow-up, based on a parent report measure. In a third study, Storch et al., (2010) found that children and adolescents (aged 8-17 years) who received DCS before each of 7 sessions of exposure did not have significantly greater improvements in OCD severity immediately post-treatment compared to those in a placebo condition, although the pattern of results suggested an advantage for DCS with a medium effect size. No significant differences were observed in the rate of improvement over time and no follow-up assessment was conducted. In a further study, Storch et al., (2016), found no significant difference in OCD severity for children and adolescents (aged 7-17 years) between those who received DCS and placebo control at post-treatment. Again, no follow-up assessment was conducted.

One study focussed on the treatment of panic disorder in adolescents (aged 12-17 years) (Leyfer et al., 2019) and found no evidence for a significant facilitative effect of DCS on disorder severity at post-treatment, nor at 3-month follow-up, compared to placebo control, with neither meeting the threshold for even a small effect.

One study focused on the treatment of PTSD in children and adolescents (aged 7-18 years) (Scheeringa & Weems, 2014) and found no evidence of a significant facilitative effect of DCS taken one hour prior to narrative exposure, on PTSD symptoms at post-treatment or 3-month follow-up. However, the pattern of results indicated that children with high PTSD symptom scores who received the placebo, had lower symptoms both post-treatment and at 3-month follow-up compared to those who received DCS, with a medium effect size.

Two studies involving children and young adolescents (7-14 years), with mixed anxiety disorders (Rapee et al., 2016) and specific phobias (Farrell et al., 2018), examined the effect of DCS administered *at the beginning* of exposure. Findings from both studies suggested that DCS administration at the beginning of exposure does not significantly enhance outcomes post-treatment. Specifically, in the treatment of broad anxiety disorders, Rapee et al., (2016) found that those who received a placebo had (non-significantly) lower anxiety symptoms (based on child report) at post-treatment than those who received DCS, with a medium effect. However, the opposite pattern was found with a parent report measure, in which those who received DCS had (non-significantly) lower anxiety symptoms at post-treatment, with a small effect. In the treatment of specific phobias (Farrell et al., 2018), there were no significant benefits of DCS compared to placebo control in anxiety severity across any timepoints. However, when age was examined as a moderator, significant differences were found between treatment conditions whereby improvements at post-treatment among the placebo group appeared to be accounted for by positive effects among adolescents, whereas improvements at the 1-month follow-up among the DCS group appeared to be accounted for by positive effects among pre-adolescent children.

Sertraline

Two studies examined the post-treatment effect of sertraline augmented exposure-based CBT for children and adolescents aged 7-17 years with OCD (Storch et al., 2013; The Pediatric OCD Treatment Study (POTS), 2004). While POTS (2004) found a significant, facilitative effect of sertraline augmented treatment compared to CBT alone, with a small effect size, the findings were not replicated by Storch et al. (2013) who did not find a significant difference in OCD severity between those who received sertraline (regular or slow dosing) and placebo control. The pattern of results indicated that children and adolescents who received the placebo, had lower OCD severity at post-treatment compared to those who received slow sertraline dosing, with a small effect, but marginally greater OCD severity compared to those who received regular sertraline dosing, although neither effect was significant.

Attention Training to Positive Stimuli

One study compared the effects of a pre-treatment session in which children and adolescents (aged 6-17 years) received attention training to positive stimuli (i.e., modifying attention biases away from threatening, toward neutral, facial stimuli) or an attention training

control, prior to a single session of exposure on outcomes for a specific phobia (Waters et al., 2014). There were no significant between group differences at post-treatment nor 3-month follow-up (with only the post-treatment results meeting the threshold for a small effect), however a greater post-treatment bias towards positive stimuli significantly predicted lower phobia severity at 3-month follow-up for children who received the pre-treatment attention training, with a small effect size.

Observational Learning

Two studies examined whether observational learning enhances exposure for children fearful of swimming (Menzies & Clarke, 1993; Weiss, McCullagh, Smith, & Berland, 1998). Weiss et al., (1998) allocated children (aged 5-7 years) to either in-vivo exposure plus peer-mastery modelling (PMM), peer coping modelling (PCM), or exposure alone (IVE). Children in the peer modelling groups either watched a video of a peer engage in highly competent (PMM) or less competent (PCM) swimming related behaviour. Both mastery and coping modelling significantly enhanced exposure immediately post-exposure, both with a medium effect, but this was no longer significant by the 4-day follow up, and effect sizes at this time point were small. A second study with 3 to 8 year old children found evidence that modelling may enhance in-vivo exposure long term (Menzies & Clarke, 1993). Children received either vicarious exposure (i.e., observed an adult swimming instructor model display competent, fearless behaviour whilst in a swimming pool) (IVVE) or a non-related task (i.e., observed a variety of card games) (IVE) prior to 15 minutes of gradual in-vivo exposure. There were no significant between group differences in fearful behaviour post-intervention or the extent to which treatment gains generalised to a novel swimming pool scenario, however, maintenance of fear reduction (i.e., approach-related behaviour) was significantly poorer from post- to 12-week follow-up in the IVE condition compared to the IVVE condition.

Social Skills Training

One study compared the effects of a pre-exposure social skills training by allocating adolescents (aged 14-17 years) with social anxiety disorder to receive either exposure-based CBT plus social skills training (e.g., starting/maintaining conversations, assertiveness, paying and accepting compliments, making and keeping friends and training in public speaking), or exposure-based CBT alone (Olivares-Olivares, Ortiz-González, & Olivares, 2019). Compared to the CBT alone group, the CBT plus social skills training group had significantly greater

improvements in the number of social situations feared and/or avoided at post-treatment, 6- and 12-month follow-up, all with large effect sizes.

Exposure Preparation

In the treatment of children and young adolescents (aged 7-13 years) with mixed anxiety disorders, Tiwari el al (2013) found that the amount of pre-exposure preparation (i.e., a broad, overall quality measure including activities such as an explanation of the rationale for exposure, selecting the exposure task, role-playing/practicing with the therapist and discussion and/or selection of a reward) was not significantly related to anxiety severity immediately post-treatment, with a small effect.

Within Exposure

Eleven studies examined associations between within-exposure variables (features of exposure tasks, child factors, distress, parent and therapist involvement) and outcomes.

Features of Exposure Tasks

Four studies looked at associations between the characteristics of exposure tasks and treatment outcomes (Benito et al., 2018; Hedtke, Kendall, & Tiwari, 2009; Kircanski & Peris, 2015; Peris et al., 2017).

Quantity of Exposure

Three studies examined the association between the amount of time spent on exposure and the number of exposures and treatment outcome for OCD (Benito et al., 2018; Kircanski & Peris, 2015) and anxiety disorders (Hedtke et al., 2009). Notably, the studies differed in how the number of exposures were quantified. For example, Benito et al., (2018) measured the cumulative sum of all instances of fear change per participant whereas Hedtke et al., (2009) measured the total number of exposure tasks per session. Nonetheless, the amount of time spent on exposure was not significantly associated with better outcomes in any study (Benito et al., 2018; Hedtke et al., 2009; Kircanski & Peris, 2015). Specifically, neither Benito et al (2018) nor Kircanski & Peris (2015) found that number of exposures was significantly associated with better OCD outcomes (for children aged 7-17 and 8-17 years respectively) at post-treatment or 3-month follow-up (in Kircanski and Peris, 2015). Furthermore, Hedtke et al., (2009) found that a greater number of exposure tasks per session was significantly associated with *less*

change in anxiety severity from pre to post-treatment in the treatment of children and young adolescents (aged 7-13 years) with mixed anxiety disorders.

The amount of exposure has also been quantified based on the proportion of treatment that was spent on exposure in two studies (Peris et al, 2017; Kircanski & Peris, 2015). Peris et al (2017) found that for children and adolescents (aged 7-17 years) with mixed anxiety disorders, a greater percentage of sessions with exposure (therapist rated), and a greater "cumulative dose" of in vivo exposure, were both significantly associated with improved anxiety severity post-treatment. There was also evidence that a greater proportion of sessions containing exposures that the young person categorised as 'difficult' was significantly associated with improved anxiety severity post-treatment (Peris et al., 2017). Kircanski & Peris (2015) focused specifically on the proportion of combined exposures per session (i.e., single exposure tasks that target more than one symptom or stimulus simultaneously) and found no evidence that the proportion of combined exposures was significantly associated with outcomes for children and adolescents (aged 7-18 years) with OCD post-treatment or at a 3-month follow-up.

Exposure Task Type

One study with 7-13 year-old children with mixed anxiety disorders (Hedtke et al., 2009), investigated the way in which the exposure was delivered (i.e. imaginal vs in-vivo) and degree to which the exposure task matched the principal diagnosis, and found no evidence that either were significantly associated with better outcomes post-treatment.

Location

There was no evidence that the location of exposure (i.e., imaginal or in-vivo exposure occurring within or outside the therapy room) was significantly associated with treatment outcomes, based on one study with children and young adolescents with mixed anxiety disorders (Hedtke et al, 2009).

Child Factors

Three studies investigated the association between child behaviour during exposure and outcomes (Benito, Conelea, Garcia, & Freeman, 2012; Hedtke et al., 2009; Peris et al., 2017).

Safety Seeking and Avoidance

Two studies used video-taped exposure sessions to examine the relationship between child behaviours during exposure and outcomes. Hedtke et al., (2009) found that safety seeking behaviour (e.g., checking for exits or bathrooms, carrying safety aids, hand sanitizer or repeatedly seeking verbal reassurance from others) during exposure was significantly associated with *less* change in anxiety severity from pre to post-treatment, with a medium effect size. No follow-up assessments were conducted. In a second study, Benito et al., (2012) found that child avoidance statements (i.e., child statement indicating avoidance or distraction from exposure stimulus such as, "Is this going to hurt me?" and "Can I use the bathroom?") and avoidance behaviours (e.g., avoiding contact with the exposure stimulus or using compulsive behaviour) were not significantly associated with OCD severity at post-treatment or 3-month follow-up.

Cognitive Strategy

One study investigated children's use of cognitive strategies to try to lower anxiety (e.g., "I know I won't actually hurt anyone because I've never done it before") during exposure and found no significant association with OCD severity post-treatment or at 3-month follow-up (Benito et al., 2012).

Compliance, Mastery and Coping

Peris et al., (2017) found that therapist ratings (7-point scale) of child compliance (i.e., how well the child completed the requirements of therapy as specified by the therapist) and mastery (i.e., how well the child mastered the information/skill presented during the session) within exposure sessions were significantly associated with greater anxiety severity improvements at post-treatment for children and adolescents (7-17 years) with mixed anxiety disorders.

There was no evidence that child coping behaviour (i.e., behaviour that is used before or during exposure that is intended to help manage, not escape or avoid, anxiety or fear) during exposure was significantly associated with changes in anxiety severity from pre to post-treatment and the effect was small (Hedtke et al., 2009).

Processing

Two studies with young people (7-17 years) with PTSD looked at associations between child processing during the narrative phase of treatment (i.e., exposure) and treatment outcomes (Hayes et al., 2017; Ready et al., 2015). Ready et al. (2015) found evidence that greater overgeneralisation (i.e., global, exaggerated beliefs of self, others, or the world related to a traumatic event) during exposure was significantly associated with poorer PTSD symptom outcomes six months post-treatment, with a small effect size, but not immediately post-treatment or at 9-month or 12-month follow-up (with only post-treatment and 9-month follow-up meeting threshold for a small effect). There was no evidence that more accommodation (defined as the extent to which the individual shows a balanced view of the self, others, or the world) during exposure was significantly associated with short- or long-term outcomes (all but the 9-month follow-up met the threshold for a small effect size). Re-analysis of data from the same trial found no evidence that unproductive processing (i.e., rumination and avoidance), productive processing (i.e., decentering) or levels of negative emotion expressed during exposure significantly predicted PTSD symptom outcomes, with only negative emotion meeting threshold for a small effect (Hayes et al, 2017).

Distress

Five studies investigated the relationship between child distress during exposure and treatment outcomes (Benito et al., 2018; Hedtke et al., 2009; Kircanski & Peris, 2015; Peterman, Carper, & Kendall, 2016; Waters, Potter, Jamesion, Bradley, & Mogg, 2015).

Initial Distress

Kircanski & Peris (2015), found that initial distress (i.e., the SUDS level for the first exposure response prevention (ERP) task during the first ERP session) was not significantly associated with OCD severity immediately post-treatment in children and adolescents (aged 8-17 years).

Fear Activation

Three studies examined the association between fear activation (i.e., the highest anxiety rating) during exposure and treatment outcomes (Benito et al., 2018; Hedtke et al., 2009; Peterman et al., 2016). None of the studies found significant associations between fear activation and OCD or mixed anxiety symptom severity post-treatment (Benito et al., 2018;

Hedtke et al., 2009; Peterman et al., 2016) and, in the one study where an effect size was available, this did reach a small effect at post-treatment and at 1 year follow-up (Peterman et al., 2016). However, secondary analysis of the data in Peterman et al. (2016) did find that greater initial fear activation was significantly associated with lower anxiety severity at 1-year follow-up for children with a diagnosis of separation anxiety and/or social anxiety disorder, but not for those with generalised anxiety disorder.

Fear Reduction

Four studies looked at the relationship between within-exposure fear reduction and treatment outcomes (Benito et al., 2018; Kircanski & Peris, 2015; Peterman et al., 2016; Waters et al., 2015). There is mixed evidence from two studies with young people with OCD that greater within-exposure fear reduction across treatment is associated with more positive outcomes. Benito et al., (2018) found that more 'habituation' (which they operationalised as fear reduction at a time when no explicit strategies were applied to cope with/address fear) across a number of exposure sessions (mean = 4) was associated with significantly greater reductions in OCD severity at post-treatment. There were no significant associations between peak-minus-end fear, (i.e., the end fear subtracted from the highest fear during the exposure), and the number of exposures ending with no fear across treatment and treatment outcomes. Kircanski & Peris (2015) found no significant association between the amount that distress decreased over the first three exposure tasks and OCD severity at post-treatment, nor at 3-month follow-up.

In the treatment of children and young adolescents (aged 7-12 years) with mixed anxiety disorders, Waters et al (2015) found that more within-session habituation across exposure sessions was associated with significantly greater improvements in anxiety severity at post-treatment, with a medium effect size. However, in the treatment of children and adolescents (aged 7-14 years), Peterman et al., (2016) found a small, non-significant relationship between within-session habituation and anxiety severity at post-treatment, and 1-year follow-up.

50% Rule

In the treatment of children and young adolescents with mixed anxiety disorders, Peterman et al., (2016) found that greater use of the 50% rule (i.e., SUDS ratings reduction of

at least 50% before ending the exposure task) was not significantly related to anxiety severity at post-treatment or at 1-year follow-up, and this did not meet threshold for a small effect.

Variability of Distress

Three studies investigated emotional variability during exposure (Benito et al., 2018; Kircanski & Peris, 2015; Waters et al., 2015). Notably, each study differed in terms of how emotional variability was measured; Benito et al (2018) measured the cumulative sum of all observer rated fear increases and decreases throughout exposure, Kircanski and Peris (2015) calculated the average difference between the maximum and the minimum SUDS level for each ERP session, and Waters (2015) used the standard deviation of the four critical exposure SUDS ratings during each exposure activity, averaged across 5 exposure activities. There is evidence from two studies that greater variability of distress during exposure is associated with better outcomes (Kircanski & Peris, 2015; Waters et al., 2015). At post-treatment, Waters et al (2015) found a significant association between greater emotional variability and improved mixed anxiety severity immediately post-treatment, with a large effect size, although this association was not found by Benito et al (2018) or Kircanski and Peris (2015). However, at 3-month follow-up, Kircanski & Peris (2015) did find that greater emotional variability in distress was significantly associated with reductions in OCD severity, with a medium effect size.

Differences between Expected and Actual Distress

In the treatment of children and adolescents with OCD, Kircanski & Peris (2015) found that the discrepancy between expected and actual distress, conceptualised as the average difference between anticipated distress and actual distress levels for each ERP session, was not significantly associated with improved OCD severity at immediate post-treatment, nor 3-month follow-up.

Final Distress

Kircanski & Peris (2015) found that final distress (i.e., the distress level for the final exposure task during the last exposure session) was not significantly associated with improved OCD severity a post-treatment, or at a 3-month follow-up.

Therapist Involvement

One study investigated the association between therapist behaviour during exposure and OCD severity (Benito et al., 2012). The study found that post-treatment, none of the

following therapist behaviours were significantly associated with outcomes: addressing accommodation, encouraging the use of cognitive strategies, unrelated talk, exposure comments, accommodation behaviour, externalising talk and discouraging avoidance. However, at the 3-month follow-up, discouraging avoidance (i.e., discouraging the child from decreased mental or actual avoidance of exposure stimulus, by statements such as "Keep looking at the sink") was significantly associated with a greater reduction in OCD symptoms, with a very large effect size. No other significant associations were found.

Parent Involvement

Four studies looked at the association between parent involvement during exposure and outcomes (Benito et al., 2012; Hedtke et al., 2009; Ollendick et al., 2015; Öst, Svensson, Hellström, & Lindwall, 2001).

In the treatment of childhood phobias, two studies compared child-focussed one session exposure to parent augmented exposure (Ollendick et al., 2015; Öst et al., 2001). In the study by Öst et al., (2001) parents were present during the session to function as a supportive figure and to be directly involved (e.g., modelling) where appropriate, whereas parents in Ollendick et al., (2015) were provided with psychoeducation and taught strategies to reinforce courageous approach behaviours. Both of the studies found that children and adolescents aged 7-17 (Öst et al., 2001) and 6-15 years (Ollendick et al., 2015) who received parent augmented exposure did not significantly differ on reported fears and anxiety severity respectively, at any timepoint from those who received child-focussed treatment alone (with small effects in favour of child only exposure at post-treatment for both studies, and at 6-month follow-up in Ollendick et al., 2015). Notably, in the study by Öst et al (2001), the child-alone condition had significantly more clinically improved children and adolescents on a behavioural approach test (steps towards the feared animal, object or situation) at post-treatment compared to the parent augmented exposure group, however, no significant differences were found at 1-year follow-up. There is no evidence that parent presence during exposure (i.e., whether at least one parent or guardian was present during the planning or implementation of the exposure task) is associated with anxiety severity in the treatment of children and adolescents with mixed anxiety disorders (Hedtke et al., 2009). As for parent behaviours, Benito et al., (2012) found that none of 8 measured behaviours were associated with better outcomes in the short term but at 3-month follow-up, parent discouraging of avoidance was significantly associated with a greater reduction in OCD symptoms, with a very large effect size.

Following Exposure

Five studies looked at the association between post-exposure characteristics (child processing, pharmacotherapy and fear reduction) and outcomes.

Child Processing

Tiwari et al (2013) found that the child's post-exposure processing (i.e., discussion of their experience and distress ratings) was significantly associated with greater improvements in anxiety severity from pre to post-treatment, with a small effect size.

Pharmacotherapy

In a double blind, placebo-controlled study of adolescents (age 12-18 years) with OCD, Mataix-Cols et al., (2014) found that DCS administration *immediately after* exposure (sessions 3-12) did not significantly facilitate short or long-term outcomes, and none of the associations met the threshold for a small effect size.

Fear Reduction

Three studies examined whether greater between-session reduction of fear was associated with better treatment outcomes (Kircanski & Peris, 2015; Kircanski et al., 2014; Peterman et al., 2016). Results were inconsistent but notably studies differed in how between-session fear reduction was calculated. For example, Kircanski et al., (2014) used the average child distress ratings for all obsessive-compulsive symptoms per session, whereas Peterman et al., (2016) used the maximum child distress rating per session, to calculate differences between sessions. Kircanski et al (2014) found a significant association between greater between-session reductions in both child and parent reported distress, and improved OCD severity outcomes at post-treatment. However, this finding was not replicated by Kircanski & Peris (2015) or Peterman et al (2016) at post-treatment, 3-month or 1-year follow-up respectively. It is also important to note that, unlike Kircanski et al (2015), Kircanski and Peris (2015) did not find a significant decrease in distress between sessions (e.g., as a result of exposures increasing in difficulty over the course of treatment) which may, in part, account for null findings.

Between Session

One study looked at the association amongst between-exposure characteristics and outcomes.

Homework

In a reanalysis of data from a previous study (Storch et al, 2010), Park et al., (2014) found a significant association between more homework compliance and greater reductions in OCD severity outcomes at post-treatment, with a large effect size.

Discussion

This review synthesised findings from 29 studies, examining factors associated with outcomes from exposure-based interventions in children and young people with anxiety symptoms/disorders. We found some preliminary evidence for specific optimisation strategies, such as dropping safety behaviours, parents and therapists discouraging avoidance, and the use of homework. However, not one significant finding was replicated by another study for the same time point using the same methodology. To a large degree, this lack of replication reflects a lack of consistency across studies around conceptualisations, methodological approaches, and outcome measures, making it difficult to make meaningful comparisons between studies and limiting the scope for drawing meaningful, reliable conclusions.

Much of the literature used a habituation-based model to examine exposure characteristics and, in line with animal (Woods & Bouton, 2008) and adult human (Craske et al., 2008; Culver, Stoyanova, & Craske, 2012; Kircanski et al., 2012) research, the studies generally failed to support a role of habituation-based fear reduction in the successful treatment of child and adolescent anxiety disorders. For example, there was no evidence of a significant association between treatment outcome and initial fear activation (Benito et al., 2018; Hedtke et al., 2009; Peterman et al., 2016) or 'the 50% rule' (Peterman et al., 2016), and evidence was mixed for both within session fear reduction (Benito et al., 2018; Kircanski & Peris, 2015; Peterman et al., 2016; Waters et al., 2015) and emotional variability during exposure (Benito et al., 2018; Kircanski & Peris, 2015; Waters et al., 2015).

On the other hand, we found some evidence for the use of exposure strategies derived from inhibitory learning theory (e.g., Craske et al., 2008; Vervliet, Craske, & Hermans, 2013). Consistent with experimental research with adults (Salkovskis et al., 2007; Sloan & Telch, 2002), reducing the young person's use of safety behaviours and parents/therapists' discouragement of avoidance during exposure (Benito et al., 2012; Hedtke et al., 2009) were significantly associated with enhanced outcomes. However, support for the use of

pharmacological strategies to enhance memory consolidation was mixed (e.g., Byrne et al., 2015; Farrell et al., 2013; Scheeringa & Weems, 2014; Storch et al., 2010, 2016). Some studies found that characteristics that appeared to be consistent with inhibitory learning strategies were associated with improved exposure outcomes, such as violation of expectancies (Tiwari, Kendall, Hoff, Harrison, & Fizur, 2013); however, the studies were not set up using this theoretical approach or terminology and therefore it is not clear whether the findings can truly be accounted for by inhibitory learning strategies.

Strengths and Limitations

This is the first systematic exploration of the current state of empirical literature on optimising exposure for childhood anxiety disorders. Strengths include the broad inclusion criteria (e.g., all anxiety disorders/pre-existing fears, any anxiety outcome measure) and the use of a hierarchy of pre-specified outcome measures to determine selected outcomes. Where possible, effect sizes and quality ratings were considered in the interpretation of findings, particularly where findings were mixed.

Nevertheless, the review only included up to two outcome measures for each study therefore significant effects identified using different measures may have been overlooked. There was wide variation in the quality of studies included, with lower quality studies failing to report on patient withdrawals from the study, compliance with the treatment, and therapist fidelity to treatment. In these instances, it is not possible to determine whether exposure strategies altered the amount of attrition from treatment or whether a lack of therapist fidelity or patient compliance may have washed out any potential effects. Crucially, the majority of studies did not report or adequately describe a power calculation and many studies lacked a sufficiently large sample size to detect potentially clinically meaningful effects. Another key limitation is the small number of available studies and, within those, the extensive variation in the conceptualisation of key factors. That is, although several studies looked at similar constructs (e.g., within-session reduction of fear, quantity of exposure), there was variation in how these constructs were measured. This resulted in mixed findings and limited comparability between studies. The majority of studies did not include a follow-up assessment, and of those that did; only seven (24%) included a follow-up beyond 3-months. Therefore, at this stage, inferences can only be based on short-term outcomes. Only one study examined age as a moderator (Farrell et al., 2018). Given that animal research (Ganella & Kim, 2014; Kim & Richardson, 2010) and threat-conditioning studies with humans (Waters et al., 2017) suggest

that adolescence is a developmental period marked by impaired extinction learning relative to younger children and adults, further work is required to determine whether children and adolescents respond differently to strategies that target extinction mechanisms. The majority of key optimisation strategies identified within the adult literature (e.g., occasional reinforced extinction (Salkovskis et al., 2007), stimulus variability (Culver, Stoyanova, & Craske, 2012; Kircanski et al., 2012) and affect labelling (Kircanski, Lieberman, & Craske, 2012; Niles, Craske, Lieberman, & Hur, 2015)) have yet to be explored with children and young people, highlighting further gaps in the evidence base. Finally, there were a limited number of studies and many provided insufficient data to calculate an effect size or explore potential moderators of immediate treatment outcomes or the association between exposure strategies and outcomes, such as the amount of time spent on exposure within treatment, how exposure was conducted (e.g., in vivo or imaginal),a focus on different disorders, or the amount or nature of parent involvement within treatment.

Clinical Implications

Given the lack of replication of findings, any implications for how exposure may be carried out to achieve the best clinical effects must be extremely tentative at this stage and further research is required to be able to make any strong recommendations. However, the preliminary findings suggest that, during exposure, clinicians may find it beneficial to (i) ensure that the young person is engaged and able to master the information and skills, (ii) focus on the reduction of safety behaviours, (iii) ensure that both they and the parent/carer discourage the young person's avoidance (iv) encourage the young person to do 'difficult' exposures within and between session exposures, (v) look for variable levels of fear within exposure sessions such as greater emotional ups and downs, (vi) not try to do too many exposure exercises within the session (perhaps aiming for quality rather than quantity), and (vii) encourage the young person to discuss and process the experience following exposure.

Future Research Directions

An important first step in future research will be to develop and agree validated measures of potential exposure optimisation variables that can be used within methodologically robust experimental and naturalistic studies. Future research should also address potential moderating factors; for example, examining the effect of strategies among specific age groups especially in light of the existing animal research (Ganella & Kim, 2014; Shechner et al., 2014)

and different disorders (e.g., Peterman et al., 2016). Finally, the studies in this review predominantly included clinical samples. In line with adult research, it may be more efficient for future research to examine targeted, theoretically-driven strategies in methodologically robust, preclinical studies, and use the findings from these studies to guide and prioritise the development of clinical research.

Conclusion

Given that exposure appears to be the key ingredient in the treatment of anxiety disorders in children and young people (Ale, McCarthy, Rothschild, & Whiteside, 2015; Kendall et al., 2005; Whiteside et al., 2015, 2019), it is critical that we understand how best to deliver it to improve treatment outcomes. This review identified a lack of consistent support for any potential optimisation strategies, wide ranging methodological inconsistencies among studies, and highlighted that most of the potential optimisation strategies identified within the adult literature have not been explored. Going forwards, future research should use consistent conceptualisations, methodological approaches, and outcome measures to enable meaningful comparisons between studies, examine other factors that have been found to facilitate exposure with adults, explore developmental differences (for example, between children and adolescents), and look to expand the research field by robust examination of theoretically-driven potential optimisation strategies.

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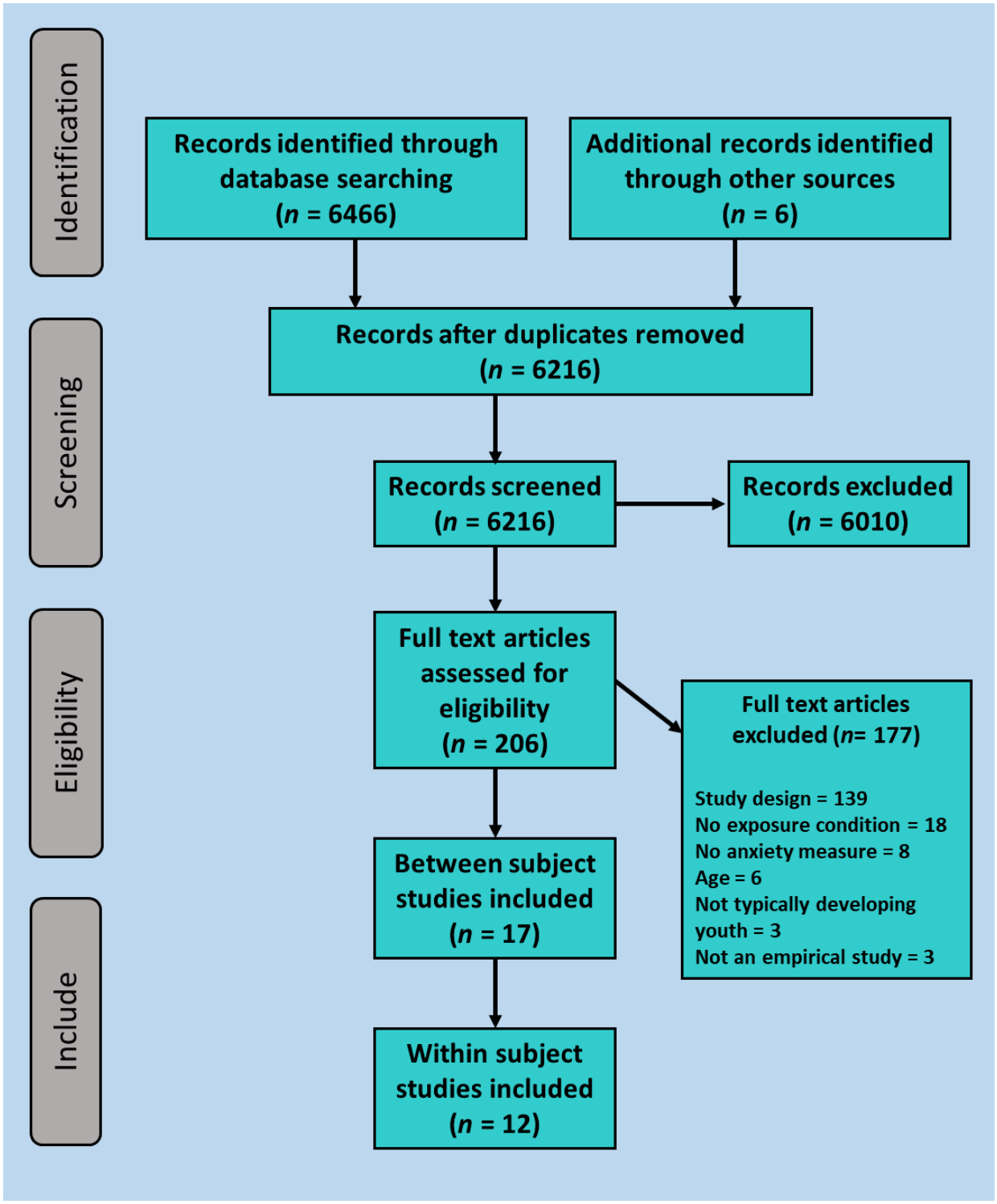

Figure 1. Study selection

Table 1. Study characteristics; Between-subject studies

Additional Component, Study Authors	**Exposure Plus (n)**	**Exposure Only (n)**	**Age (mean)**	**Anxiety Type**	**Exposure Technique (Format)**	**Treatment Approach**	**% Sessions Containing Exposure[1]**	**Measure**	**Follow-up**	**Location**	**Study Quality (%)**
Pharmacotherapy											
D-Cycloserine											
Rapee et al. (2016)	EXP + DCS (n=27)	EXP + PBO (n=24)	7-14 (9.22)	Mixed	In vivo (Individual)	Graduated, in vivo exposure to hierarchy	100	Fear-relevant SCAS-C & SCAS-P	No	AU	54
Farrell et al. (2013)	EXP-RP + DCS (n=9)	EXP-RP + PBO (n=8)	8-18 (13.11)	OCD	In vivo (Individual)	March & Mulle (1998)	56	CY-BOCS-C-Total CY-BOCS-P-SR	1 & 3 months	AU	67
Mataix-Cols et al. (2014)	ERP + DCS (n=13)	ERP + PBO (n=14)	12-18 (14.96)	OCD	In vivo (Individual)	CBT for OCD	70	CY-BOCS-C/P-Total	3, 6 & 12 months	UK	80
Storch et al. (2010)	EXP-RP + DCS (n=15)	EXP-RP + PBO (n=15)	8-17 (12.2)	OCD	In vivo (Individual)	March & Mulle (1998)	60	CY-BOCS-Total• ADIS-IV-P-CSR	No	USA	54

Additional Component, Study Authors	**Exposure Plus (n)**	**Exposure Only (n)**	**Age (mean)**	**Anxiety Type**	**Exposure Technique (Format)**	**Treatment Approach**	**% Sessions Containing Exposure[1]**	**Measure**	**Follow-up**	**Location**	**Study Quality (%)**
Storch et al (2016)	ERP + DCS (n=70)	ERP + PBO (n=72)	7-17 (12.8)	OCD	In vivo (Individual)	March & Mulle (1998)	70	CY-BOCS-C/P-Total	No	US	76
Leyfer et al (2019)	CBT + DCS (n=14)	CBT + PBO (n=10)	12-17 (14.5)	Panic	Interoceptive / in vivo (Individual)	Angelosante, Pincus, Whitton et al (2009)	50	ADIS-IV-C/P-PDA-CSR	3 months	USA	64
Scheeringa et al. (2014)	CBT + DCS (n=29)	CBT + PBO (n=28)	7-18 (12.5)	PTSD	Trauma focussed (Individual)	CBT protocol	58	CPSS-C/P	3 months	USA	83
Byrne et al. (2015)	EXP+DCS (n=18)	EXP + PBO (n=17)	6-14 (8.08)	Specific Phobia	In vivo (Individual)	Öst, (1989)	100	BAT (steps)	1 week	AU	60
Farrell et al. (2018)	OST + DCS (n=17)	OST + PBO (n=18)	7-14 (10.43)	Specific Phobia	In vivo (Individual)	Öst (1989) (modified)	100	ADIS-IV-C/P-CSR	1 & 3 months	AU	74
Sertraline											
The POTs Study (POTS, 2004)	EXP-RP + SSRI (n=28)	EXP-RP Alone (n=28)	7-17 (-)[2]	OCD	In vivo (Individual)	March & Mulle (1998)	79	CY-BOCS-Total•	No	USA	78
Storch et al (2013)	EXP-RP + SSRI RegSert (n=14) EXP-RP SSRI SlowSert	EXP-RP PBO (n=16)	7-17 (11.89)	OCD	In vivo (Individual)	March & Mulle (1998)	79	CY-BOCS-Total•	No	USA	74

Additional Component, Study Authors	**Exposure Plus (n)**	**Exposure Only (n)**	**Age (mean)**	**Anxiety Type**	**Exposure Technique (Format)**	**Treatment Approach**	**% Sessions Containing Exposure[1]**	**Measure**	**Follow-up**	**Location**	**Study Quality (%)**
	(n=17)										
Observational Learning											
Menzies et al. (1993)[3]	EXP + Vicarious Learning / Live Modelling (n=12)	EXP Alone (n=12)	3-8 (5.5)	Water Phobia	In vivo (Group)	Swimming lessons	100	Behaviour Rating Scale	12 weeks	AU	35
Weiss et al. (1998)	EXP + Peer mastery (n=5) EXP + Peer coping (n=5)	EXP Alone (n=7)	5-7 (6.2)	Water Phobia	In vivo (Group)	Swimming lessons	100	Fear of swimming[4]	4 days	USA	33
Parental Involvement											
Ollendick et al (2015)	Parent Augmented OST (n=46)	OST Alone (n=51)	6-15 (8.85)	Specific phobias (various)	In vivo (Individual)	Öst (1989)	100	ADIS-IV-C/P-CSR	1 & 6 months	USA	80
Ost et al. (2001)	EXP + Parental Involvement (n=30)	EXP Alone (n=30)	7-17 (11.7)	Specific phobias (various)	In vivo (Individual)	Öst (1989)	100	FSSC-R-C BAT (steps)	1 Year	SE	55

Additional Component, Study Authors	**Exposure Plus (n)**	**Exposure Only (n)**	**Age (mean)**	**Anxiety Type**	**Exposure Technique (Format)**	**Treatment Approach**	**% Sessions Containing Exposure[1]**	**Measure**	**Follow-up**	**Location**	**Study Quality (%)**
Attention Training to Positive Stimuli											
Waters et al. (2014)	OST + AT (n=19)	OST + ATC (n=18)	6-17 (-)[5]	Specific Phobia	In vivo (Individual)	Öst (1997)	100	ADIS-IV-C/P-Phobia-CSR	3 months	AU	71
Social Skills Training											
Olivares-Olivares et al (2019)	IAFS	IAFS-R	14-17 (15.4)	Social Anxiety	In vivo, simulated & imaginal (Group)	Olivares (2005)	80	NSSFA-C	6 months	ES	62

Note. AT = Attention Training to positive stimuli, ACT = Attention Training Control, CBT = Cognitive Behavioural Therapy, DCS = D-Cycloserine, EXP = Exposure treatment/intervention, EXP-RP = Exposure Response-Prevention, IAFS = intervention in adolescents with social phobia, IAFS-R = IAFS without social skills training, OST = One Session Treatment for Specific Phobia, PBO = Placebo, RegSertSSRI = sertraline at standard dosing, SlowSertSSRI = sertraline titrated slowly, TF-EXP = Trauma Focussed Exposure; Anxiety Type: OCD = Obsessive Compulsive Disorder, PTSD = Post Traumatic Stress Disorder; Measure: ADIS = Anxiety Disorders Interview Schedule, BAT = Behavioural Approach Test, CPSS = Child PTSD Symptom Scale, CY-BOCS = Children's Yale-Brown Obsessive-Compulsive Scale, FSSC-R = The Fear Survey Schedule for Children-Revised, NSSFA = The number of social situations feared and/or avoided quantified based on social phobia section of the ADIS-IV, -PDA = Panic Disorder with Agoraphobia, SCAS = Spence Children's Anxiety Scale, -C = child/young person report, -CSR = Clinician Severity Rating, -P = parent report, SR = self-report, c/p = child/young person and/or parent report together; ▪ = reporter not specified; Location: AU = Australia, ES = Spain, SE = Sweden, USA = United States of America; 1 = Excluding pre-treatment, post-treatment and follow-up assessment sessions, 2 = Total sample mean age not reported, , 3 = Children either received invivo plus vicarious exposure, vicarious exposure alone, invivo exposure alone or assessment only control. For the purpose of the review, only findings from the invivo plus vicarious exposure and the invivo exposure alone conditions are reported, 4 = two instructors jointly rated each child on their fear of swimming using a scale in which scores ranged from 1 (not afraid at all) to 11 (afraid a lot), 5 = mean age not reported

Table 2. Study Characteristics; Within-Subject Studies

Study Authors	Sample Size (n)	Age (mean)	Anxiety Type	Exposure Technique (Format)	Treatment Protocol	% Sessions Containing Exposure[1]	Measure	Follow-up	Location	Study Quality (%)
Hedtke et al. (2009)	87	7-13 (10.32)	Generalised, Social and/or Separation	In vivo & imaginal (Individual)	Kendall (2002)	50	ADIS-C/P-CSR	No	USA	65
Peterman, Carper & Kendall (2016)	72	7-14 (10.5)	Generalised, Separation and/or Social	In vivo & imaginal (Individual)	Kendall (2002)	50	ADIS C/P CSR	1 year	USA	53
Peris et al. (2017)	279[2]	7-17 (10.8)	Mixed	In vivo & imaginal (Individual)	Kendall (2002)	58	PARS-C/P	No	USA	58
Tiwari et al (2013)	61	7-13 (10.5)	Mixed	In vivo & imaginal (Individual)	Kendall (2002)	50	ADIS C/P CSR	No	USA	55
Waters et al (2015)	26	7-12 (10)	Mixed	In vivo (Group)	Waters, Ford, Wharton, & Cobham, (2009)	50	ADIS C/P CSR	No	AU	55
Benito et al (2018)	111	7-17 (10.17)	OCD	In vivo (Individual)	Freeman & Garcia, (2009); March & Mulle (1998)	67-79	CY-BOCS-Total▪	No	USA	53
Benito et al. (2012)	18	4-8 (6.74)	OCD	In vivo (Individual)	Freeman & Garcia (2009)	67	CY-BOCS-Total▪	3 months	USA	53
Kircanski & Peris (2015)	35	8-17 (12.86)	OCD	In vivo (Individual)	Piacentini, Langley, & Roblek (2007)	83	CY-BOCS-Total▪	3 months	USA	43
Kircanski, Wu & Piacentini (2014)	40	8-17 (11.9)	OCD	In vivo (Individual)	Piacentini et al (2007)	83	CY-BOCS-Total▪	No	USA	53

Study Authors	Sample Size (n)	Age (mean)	Anxiety Type	Exposure Technique (Format)	Treatment Protocol	% Sessions Containing Exposure[1]	Measure	Follow-up	Location	Study Quality (%)
Park et al (2014)	30	8-17 (12.2)	OCD	In vivo (Individual)	March & Mulle (1998)	60	CY-BOCS-Total▪	No	USA	58
Hayes et al (2017)	81	7-17.9 (12.56)	PTSD[3] symptoms	Trauma Narrative (Individual)	Cohen, Mannarino & Deblinger (2006)	33	UPID-IV-C	No	USA	70
Ready et al. (2015)	81	7-17 (12.56)	PTSD symptoms[3]	Trauma Narrative (Individual)	Cohen, Mannarino & Deblinger, (2006)	33	UPID-IV-C	9 months 12 months	USA	61

Note. Anxiety Type: GAD = generalised anxiety disorder, OCD = obsessive compulsive disorder, PTSD = post-traumatic stress disorder, SAD = separation anxiety disorder, SP = social phobia; Measure: ADIS = Anxiety Disorders Interview Schedule, CY-BOCS = Children's Yale-Brown Obsessive-Compulsive Scale, PARS = Paediatric Anxiety Rating Scale, UPID = The UCLA PTSD Reaction Index for DSM; -C = child/young person report, -CSR = Clinician Severity Rating, -P = parent report, SR = self-report, c/p = child/young person and parent report together; Location: AU = Australia, USA = United States of America, ▪ = reporter not specified, 1 = excluding pre-treatment, post-treatment and follow-up assessment sessions, 2 = *N* varied according to construct of interest: % of session with exposure n=273, % of session with difficult exposure n=254, cumulative dose of exposure n=241, child compliance n=254, child mastery n=254, 3 = PTSD symptoms = not diagnosis. Included participants scored ≥ 17 on the UPID-A or endorsed 3/9 PTSD symptoms based on an independently verified (e.g., through child welfare) trauma

Table 3. Differences between conditions and associations between characteristics of exposure and anxiety outcomes, by assessment timepoint

Construct	Study	Anxiety Type	Studies *(n)*	Effect Size by Assessment Timepoint		Cohen's *d* or r
Before Exposure						
DCS 1 hour *before* exposure	Farrell et al (2013)	OCD (difficult to treat)	1	PT = 0.00 1m = -0.50 3m = -0.40	NE Medium Small	*d*
				Pa: PT = -0.15 *Pa:* 1m = -0.69□ *Pa:* 3m = 0.22	NE Large Small	*d*
	Storch et al (2010)	OCD	2	PT = -0.67	Medium	*d*
	Storch et al (2016)			PT = ◊	-	-
	Leyfer et al (2019)	Panic	1	PT = 0.18□ 3m = 0.04□	NE NE	*d*
	Scheeringa & Weems (2014)	PTSD	1	PT = 0.71□ 3m = 0.62□	Medium Medium	*d*
	Byrne et al (2015) *Same context*	Specific Phobia	1	1w = 0.19	Small	r
	Novel context			1w = -0.37*	Medium	r
DCS at the *commencement* of exposure	Farrell et al (2018)	Specific Phobia	1	PT = ◊ 1m = ◊ 3m = ◊	- - -	- - -
	Rapee et al (2016)	Mixed	1	PT = 0.56□	Medium	*d*
				Pa: PT = -0.23□	Small	
Sertraline	Storch et al (2013) *RegSert*	OCD	2	PT = -0.02□	NE	*d*

Construct	Study	Anxiety Type	Studies *(n)*	Effect Size by Assessment Timepoint		Cohen's *d* or r
	SlowSert			PT = 0.23□	Small	*d*
	The POTS Study (2004)			PT = -0.31□**	Small	*d*
Attention Training to Positive Stimuli (ATP)	Waters et al (2014)	Specific phobia	1	PT = 0.25□ 3m = 0.12□	Small NE	*d*
Observational Learning	Menzies & Clarke (1993) *Same context*	Fear of Water	2	PT = ◊ 12w = ◊*	-	-
	Novel Context			1w = ◊	-	
	Weiss et al (1998)					
	Peer Mastery			PT = -0.60□* 4d = -0.42□	Medium Small	*d*
	Peer Coping			PT = -0.50□* 4d = -0.11□	Medium NE	*d*
Social Skills Training	Olivares-Olivares et al (2019)	Social	1	PT = 1.06Δ*** 6m = 1.00Δ*** 12m = 0.95Δ***	Large Large Large	*d*
Preparation	Tiwari et al (2013)	Mixed	1	PT = 0.15Δ♦	Small	r
<u>Within exposure</u>						
Quantity of Exposure	Hedtke et al (2009)	Mixed	1	PT = ◊*	-	-
	Benito et al (2018)	OCD	2	PT = ◊	-	-
	Kircanski & Peris (2015)			PT = ◊	-	-

Construct	Study	Anxiety Type	Studies *(n)*	Effect Size by Assessment Timepoint		Cohen's *d* or r
				3m = ◊	-	
Time spent on Exposure	Hedtke et al (2009) *Average length of exposure tasks per session*	Mixed	1	PT = ◊	-	-
	Benito et al (2018) *Duration of exposures*	OCD	2	PT = ◊	-	-
	Kircanski & Peris (2015) *Minutes spent on ERP tasks per session*	OCD		PT = ◊ 3m = ◊	- -	-
Cumulative Dose of Exposure	Peris et al (2017)	Mixed	1	PT = ◊***	-	-
Percentage of Session with Exposure	Peris et al (2017)	Mixed	1	PT = ◊***	-	-
Percentage of Session with Difficult Exposure	Peris et al (2017)	Mixed	1	PT = ◊***	-	-
Proportion of Session with Combined Exposure	Kircanski & Peris (2015)	OCD	1	PT = ◊ 3m = ◊	- -	-
Frequency of Exposure Task Type	Hedtke et al (2009)	Mixed	1	PT = ◊	-	-
Location of Exposure Task	Hedtke et al (2009)	Mixed	1	PT = ◊	-	-
Safety Seeking	Hedtke et al (2009)	Mixed	1	PT = -0.37Δ♦*	Medium	r
Cognitive Strategy	Benito et al (2012)	OCD	1	PT = ◊	-	-
Avoidance Statement			1	PT = ◊	-	-

Construct	Study	Anxiety Type	Studies *(n)*	Effect Size by Assessment Timepoint		Cohen's *d* or r
Avoidant Behaviour			1	PT = ◊	-	-
Compliance	Peris et al (2017)	Mixed	1	PT = ◊***	-	-
Mastery	Peris et al (2017)	Mixed	1	PT = ◊***	-	-
Coping	Hedtke et al (2009)	Mixed	1	PT = 0.11Δ♦	Small	r
Processing	Hayes et al (2017)	PTSD	2			
	Negative Emotion			PT = 0.21♦	Small	r
	Avoidance			PT = 0.00♦	NE	r
	Ruminative Processing			PT = 0.06♦	NE	r
	Decentering			PT = -0.02♦	NE	r
	Ready et al (2015)					
	Overgeneralisation (beliefs)			PT = 0.15	Small	r
				6m = 0.24*	Small	
				9m = -0.12	Small	
				1y = 0.08	NE	
	Accommodation			PT = -0.12	Small	r
				6m = -0.16	Small	
				9m = 0.09	NE	
				1y = 0.19	Small	
Initial Distress	Kircanski & Peris (2015)	OCD	1	PT = ◊	-	-
				3m = ◊	-	
Fear Activation	Hedtke et al (2009)	Mixed	2	PT = ◊	-	-
	Peterman et al (2016)			PT = -0.11	Small	r
				1y = -0.16	Small	

Construct	Study	Anxiety Type	Studies *(n)*	Effect Size by Assessment Timepoint		Cohen's *d* or r
	Benito et al (2018)	OCD	1	PT = ◊	-	-
Fear Reduction	Peterman et al (2016)	Mixed	2			
	Between session			PT = 0.00 1y = -0.05	NE NE	r
	Within session			PT = -0.20 1y = -0.17	Small Small	r
	Waters et al (2015)			PT = 0.42Δ*	Medium	r
	Benito et al (2018)	OCD	2	PT = ◊*	-	-
	Kircanski & Peris (2015)			PT = ◊ 3m = ◊	- -	-
50% Rule	Peterman et al (2016)	Mixed	1	PT = -0.08 1y = -0.05	NE NE	r
Variability of Distress	Waters et al (2015)	Mixed	1	PT = 0.50Δ**	Large	r
	Benito et al (2018)	OCD	2	PT = ◊	-	-
	Kircanski & Peris (2015)			PT = ◊ 3m = -0.40Δ♦*	- Medium	- r
Expected Minus Actual Distress	Kircanski & Peris (2015)	OCD	1	PT = ◊ 3m = ◊	- -	-
Final Distress	Kircanski & Peris (2015)	OCD	1	PT = ◊ 3m = ◊	- -	-
Parent Involvement	Hedtke et al (2009)	Mixed	1	PT = ◊	-	-

Construct	Study	Anxiety Type	Studies *(n)*	Effect Size by Assessment Timepoint		Cohen's *d* or r
	Benito et al (2012)	OCD	1			
	Discourage avoidance			PT = ◊ 3m = 0.84Δ**	- Very Large	- r
	Externalizing statements			PT = ◊ 3m = ◊	- -	-
	Ollendick et al (2015)	Specific Phobia	2	PT = 0.24 1m = 0.17 6m = 0.20	Small NE Small	*d*
	Ost et al (2001)			PT = 0.25□ 1y = 0.17□ *BAT* PT = ◊ *BAT* 1y = ◊	Small NE - -	*d* -
Therapist Involvement	Benito et al (2012)	OCD	1	PT = ◊ 3m = 0.73Δ**	- Very Large	r
	Discourage avoidance					
	Unrelated Talk			PT = ◊ 3m = ◊	- -	-
	Exposure comments (to increase anxiety)			PT = ◊ 3m = ◊	- -	-
After Exposure						
Child Processing	Tiwari et al (2013)	Mixed	1	PT = 0.18Δ♦*	Small	r
DCS after exposure	Mataix Cols et al (2014)	OCD	1	PT = 0.07 3m = 0.10 6m = 0.19 1y = 0.15	NE NE NE NE	*d*
Between Sessions						

Construct	Study	Anxiety Type	Studies *(n)*	Effect Size by Assessment Timepoint		Cohen's *d* or r
Fear Reduction	Peterman et al (2016)	Mixed	1	PT = 0.00	NE	r
				1y = -0.05	NE	
	Kircanski & Peris (2015)	OCD	2	PT = ◊	-	-
				3m = ◊	-	
	Kircanski, Wu & Piacentini (2014)			PT = ◊**	-	-
				*Pa*PT = ◊***	-	-
Homework Compliance	Park et al (2014)	OCD	1	PT = -0.65	Large	r

Note. *Pa* = parent report; PT = post-treatment; Follow-up: d = day, w = week, m = month, y = year; For between-subject studies (*d*): negative effect indicates lower anxiety level for "EXP plus" condition; positive effect indicates lower anxiety level for "EXP only/placebo" control condition; Δ = measure reported as change between assessment timepoints so that a higher score indicates a greater reduction in anxiety; ♦ = r imputed from β coefficients using Peterson and Brown's (2005) imputation approach; □ = effect size calculated using available data; ◊ = insufficient data available to calculate effect size; *p < .05, ** p < .01, *** p < .001; NE = did not meet the threshold for a small effect, $_{BAT}$ = Behavioural Approach Test.

Chapter 3

Paper 2: Optimising Exposure for Adolescents with Public Speaking Anxiety: Affect Labelling or Positive Coping Statements?

This paper will be submitted for publication to *Behaviour and Research Therapy*.

Optimising Exposure for Adolescents with Public Speaking Anxiety: Affect Labelling or Positive Coping Statements?

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Abstract

Cognitive Behavioural Therapy (CBT) is the first line treatment for anxiety disorders in youth however many adolescents do not benefit. Behavioural exposure is believed to be the critical ingredient of CBT and research with adults has shown that labelling affect, but not positive coping statements, enhances exposure outcomes. However, many CBT protocols for young people involve using positive coping statements alongside exposure. We compared the effects of exposure with positive coping statements, affect labelling, and neutral statements on fear responses in adolescents (age 13-14 years) with public speaking anxiety as they delivered a series of speeches in front of a pre-recorded classroom audience. Self-rated anxiety, heart rate, and observer ratings of expressed anxiety were assessed pre-test, immediate post-test and at 1-week follow-up. Neither affect labelling nor positive coping statements enhanced exposure on any measure from pre-test to 1-week follow-up. While there was an initial advantage of exposure with positive coping statements for post-speech self-reported anxiety, this effect was not maintained, and there was a significant increase in anxiety from immediate post-test to 1-week follow-up in this condition, compared to the other conditions. The short-term benefits from generating positive coping statements may explain why this is often employed in the treatment of anxiety problems in young people, but also indicate that it may not confer any advantage in the longer term. These intriguing findings highlight the urgent need for further attention to improve understanding of how to optimise exposure in young people and maximise treatment outcomes.

Key Words

Adolescents, Affect Labelling, Exposure, Positive Coping Statements, Public Speaking Anxiety

1. Introduction

Anxiety about public speaking typically manifests during adolescence (Stein, Torgrud, & Walker, 2000; Wittchen & Fehm, 2003) and presents a risk for and is one of the most frequently reported fears among young people with social anxiety disorder (Hofmann et al., 1999; Wittchen et al., 1999). Public speaking anxiety is highly prevalent in community populations (15-30%; Pull, 2012) and can cause clinically significant distress and marked interference with functioning in educational, social and employment domains (Stein, Walker, & Forde, 1996).

Although there has been little systematic evaluation of treatments for performance anxiety in adolescents, CBT is typically recommended as the first-line treatment for adolescents with social anxiety disorder, (e.g. National Institute for Health and Care Excellence, 2014; World Health Organization, 2015). A growing body of evidence suggests that the critical ingredient of CBT is behavioural exposure (Ale, McCarthy, Rothschild, & Whiteside, 2015; Peris et al., 2015; Whiteside et al., 2020). However, although exposure-based treatments are effective in treating anxiety disorders compared to wait-list controls (James, Reardon, Soler, James, & Creswell, 2020), many adolescents do not benefit. For example, Ginsburg et al., (2011) found that 59% of children and young people with social phobia did not recover following 14 sessions of CBT, with outcomes generally appearing to be particularly poor for adolescents compared to children (64% of adolescents vs. 48% of children with mixed anxiety disorders did not recover). While research with adults has highlighted the need for careful attention to the conditions that optimise (or minimise) the effectiveness of exposure for performance anxiety (Niles, Craske, Lieberman, & Hur, 2015), to date, there has been little examination of this among younger populations.

Evidence-based treatments for anxiety disorders, including performance fears and/or social anxiety disorder, in adolescents typically start with up to six to eight sessions of anxiety management, including cognitive reappraisal, with the primary aim of reducing anxiety and facilitating subsequent engagement in exposure (Kendall, Choudhury, Hudson, & Webb, 2002). While anxiety management strategies may facilitate *engagement* in exposure (Hofmann, Heering, Sawyer, & Asnaani, 2009; Van Den Hout, Kindt, Weiland, & Peters, 2002; Van den Hout, Van Pol, & Peters, 2001)), Inhibitory Learning Theory (ILT) suggests that they may potentially impede optimal outcomes being achieved (Craske, 2015). ILT proposes that original, fearful beliefs are not forgotten, but that they compete with new, non-fearful learning that occurs during exposure (Craske, 2015; Craske et al., 2008; Craske, Treanor, Conway,

Zbozinek, & Vervliet, 2014) and, as such, the development and retrievability of new learning (e.g., that the feared situation or stimulus is not dangerous) rather than habituation of fear responses, is key to successful exposure (Bouton, 2000; Craske, Liao, Brown, & Vervliet, 2012).

Opportunities for learning may be enhanced when there is a greater mismatch between what is expected and what actually occurs (Rescorla & Wagner, 1972). This is supported by experimental studies with adults that have shown that exposure is enhanced when expectations are violated (Baker et al., 2010); in other words greater learning takes place when a person has a positive (or non-negative) experience of a feared stimulus after expecting a highly negative outcome, than when they have entered the situation thinking, for example, "everything will be fine". There is evidence from studies with adults that explicitly verbalising negative affective states and feared outcomes ('affect labelling') during exposure to spiders reduced physiological arousal one week later, compared to the use of cognitive reappraisal (where there is typically encouragement to anticipate positive outcomes) or exposure alone, with a large effect (Kircanski, Lieberman, & Craske, 2012). Similarly, for adults who were fearful of public speaking, verbalising negative expectations and affect labelling prior to delivering a presentation was associated with a significantly greater reduction in physiological arousal during recovery from public speaking one week later compared to exposure alone, with effect sizes ranging from small to large (Niles, Craske, Lieberman, & Hur, 2015).

When it comes to younger people, studies have cast doubt on both the importance of pre-exposure anxiety management strategies in facilitating engagement in exposure (Whiteside et al., 2015) and the use of cognitive strategies, such as cognitive reappraisal through generating positive coping strategies (e.g., saying "It's unlikely people will laugh at me, they haven't laughed at me when I have given a speech before") to lower anxiety during exposure. However it remains uncertain whether the strategies that have been shown to optimise inhibitory learning in adults also apply to adolescents where fear learning differs in critical ways. Specifically, animal research has shown that both the expression and extinction of fear are temporarily impaired in adolescent rats compared to both younger and older rats (Ganella & Kim, 2014) and there is evidence from neurological (Johnson & Casey, 2015) and fear-conditioning (Waters, Theresiana, Neumann, & Craske, 2017) research with humans for diminished extinction learning in adolescents compared to children and adults. Examination of the effectiveness of inhibitory learning based strategies specifically within adolescents is a

necessary step towards enhancing treatment for common fears and anxieties, such as public speaking fears, in this age range.

The aim of this study therefore was to explore the effects of affect labelling (labelling feared outcomes and affect states before exposure) and generating positive coping statements on exposure for public speaking anxiety in adolescents. Based on findings from the adult literature (Kircanski et al., 2012; Niles et al., 2015), we hypothesised that adolescents instructed to use affect labelling would show significantly greater reduction of fear than adolescents instructed to use positive coping statements and neutral statements, at 1-week follow up, but not immediately post-test. Given the limited evidence to guide directional hypotheses, we also explored whether there were significant differences in post-exposure anxiety between exposure with neutral statements and exposure with positive coping statements.

2. Method

2.1 Design

The study used a 3 (group) x 3 (time) mixed design with adolescents who were fearful of public speaking. Groups were exposure combined with (i) affect labelling (AL), (ii) positive coping statements (PCS) or (iii) a neutral sentence (Control). Assessment times were pre-exposure (Time 1), post-exposure (Time 2) and 1-week follow-up (Time 3).

2.2 Participants

Ninety-one adolescents (age 13-14 years) with anxiety about public speaking were recruited to the study between June 2016 and November 2017. See Table 1 for sample demographics and Figure 1 for a consort diagram of participant flow through recruitment and study procedures.

2.3 Recruitment

Four schools participated in the study and six classes from Year 9 were screened for eligibility (see Figure 1 Participant flow chart) during school assemblies. Adolescents who scored above a pre-determined threshold on a screening question, were fluent in English and did not have a diagnosed learning disability were invited to take part.

2.4 Materials

2.4.1 Screening

Consistent with previous studies with adults (e.g., Culver, Stoyanova, & Craske, 2012; Tsao & Craske, 2000), adolescents were asked to give a written response to two screening questions related to anxiety and avoidance of giving a speech. Questions were "How anxious would you feel giving a speech in front of people your age?" and "How likely are you to try and avoid giving a speech in front of people your age?". Each question was rated on a 0 to 8 scale where 0 indicated "no anxiety"/"no avoidance" and 8 indicated "extreme anxiety" / "extreme avoidance". However, following feedback from adolescents that their *actual* avoidance was low due to their perceived consequences of avoidance (e.g., getting in trouble with teachers, being embarrassed in front of peers and poor grades) we decided to drop this item from the screening. Therefore adolescents who rated themselves as a 5 or higher for anxiety were considered for participation. All adolescents who attended the assemblies completed the screening questions, and then school staff confirmed eligibility criteria (see Recruitment) to ensure that those who were invited were suitable to participate.

2.4.2 Symptoms of Anxiety and Depression

The Revised Child Anxiety and Depression Scale (RCADS; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000), is a 47-item measure of anxiety and depression symptoms which assesses symptoms of Separation Anxiety Disorder, Social Anxiety Disorder, Generalised Anxiety Disorder, Panic Disorder, Obsessive Compulsive Disorder and Major Depressive Disorder. Responders rate how often each item applies on a scale of 0 ("never") to 3 ("always"). For this study, we used the total (anxiety and depression) scale, the anxiety subscale and the social anxiety subscale scores (Cronbach's alpha = .95 .94 and .83, respectively) to describe the sample. This scale has shown good psychometric properties in young people aged 7-18 years, within both non referred (Chorpita et al., 2000) and clinical populations (Chorpita, Moffitt, & Gray, 2005).

2.4.3 Exposure Stimulus

Prepared speeches were performed in front of a variety of pre-recorded classroom audience footage of similar aged peers recruited from a drama school and filmed within a school setting. These pre-recorded classroom audiences provided a controlled and practical exposure stimulus that could be administered within a school environment. The footage followed a similar procedure to the Leiden-Prepared Speech Task (PST; Westenberg et al., 2009), a task that

elicits a moderate social-evaluative threat. Recording of the classroom audience footage (e.g., developing directions for actors) and the development of procedural instructions was developed in consultation with the Leiden research group.

The audience footage was filmed across two contexts:

i) a classroom including rows of tables, chairs and actors wearing standard school uniform (e.g., white shirt, trousers/skirt, school bag)
ii) an assembly hall including rows of chairs and actors wearing casual, non-uniform (e.g., jeans, jumper/t-shirt)

To decrease the likelihood of premature habituation and to maximise sensitivity of the dependent variables, we developed two different contexts for the assessment and exposure sessions. Five scenes were filmed for each context. Each scene included 14-16 actors, aged between 12-15 years, and a male teacher. Each scene began with an empty room. The audience entered the room, talking amongst themselves, after approximately 30 seconds. Once the audience were seated the teacher instructed "You can start now". Recording took place over four separate sessions. To ensure that the recordings reflected what might typically happen in a school environment, we showed a pilot recording to University students and used their feedback in subsequent recordings. The final recordings were discussed and edited in consultation with a local secondary school-based patient and public involvement group. To limit potential order effects, the order that recordings were shown in were counterbalanced across experimental conditions (see Figure 1 in Supplemental Material for a diagram of the audience counterbalancing procedure).

2.4.4 Speech Topics

A range of topics were compiled to ensure that all participants would feel able to select enough topics of interest to speak about in the study. Examples of topics were school uniform, school subjects, mobile phones, and hobbies. Topics were transferred onto cards and a different set, containing different topics, was used for each session. We intentionally avoided emotive topics that may have influenced participants' level of arousal.

2.4.5 Outcome Measures (Assessment of Speech Anxiety)

Speech anxiety across all three groups was measured at pre-test (Session 1; speech 1), immediate post-test (Session 2; speech 8), and 1-week follow-up (Session 3; speech 9) (see Figure 2 in Supplemental Material for a diagram of anxiety assessment procedures).

2.4.5.1 Subjective Units of Distress (SUDS)

Participants provided a rating of their anxiety immediately prior to and following speeches that were delivered during the assessment phases, using a 0-10-point Likert scale, with 0 indicating "not anxious" and 10 indicating "extremely anxious".

2.4.5.2 Heart Rate

Physiological arousal was measured on the basis of heart rate recorded using a Polar Precision A360 Activity Tracker worn on the wrist of the participant's non-dominant hand. An activity tracker worn on the wrist offered an accurate (Rider et al., 2019), suitable, non-invasive apparatus to use with adolescents in a one-on-one situation within a school environment. The data transferred to the computer through the software Polar Flow Sync by means of an interface device with infrared emission signals. The data (beats per minute, per second) was transported from Polar Flow Sync to the Microsoft Excel software (Microsoft Office). Discrete one-minute timestamps were recorded throughout the experimental procedure to guide heart rate data extraction. The mean beat per minute (BPM) was calculated for each 1-minute timepoint (i.e., immediately before and after each assessment speech).

2.4.5.3 Observer Ratings of Speech Anxiety

A three-item instrument was developed for the purpose of the study to measure observer ratings of speech anxiety. The instrument followed a similar procedure to the child anxiety observational coding scale used by Murray et al (2012) and adapted for this age range by Waite & Creswell (2015). For this study, further adaptations were made following feedback from four young people (e.g., the inclusion of an "essential" and "additional" criteria and expansion to a seven-point rating scale to reduce ceiling effects) (see Table 1 in Supplemental Material).

The instrument assessed three anxiety domains:

i) General behaviour (e.g., appears eager to get away from the camera, reassurance seeking, conceals face, nervous laugh/coughing, pacing/rocking/swaying, gulping or deep/shallow breathing) assessed before and during each assessment speech

ii) Body movements (e.g., anxious facial expressions, mouthing/chewing, facial twitches/grimaces, eyes, frowned/raised eyebrows, flared nostrils, poor eye contact, posture, hand actions, crossed arms, shaking) assessed before and during each assessment speech

iii) Speech (e.g., hesitation/difficulty starting, uncomfortable tone/pace, stumbling/stuttering over words, long pauses, repeatedly saying 'um' or 'like') assessed during each assessment speech

The coding scale for each item ranged from 1 (no obvious signs of anxiety) to 7 (anxiety is pervasive and strong). Each 20 second epoch was rated separately prior to and during the speech, and then a mean score was calculated for each domain at each timepoint. Video recordings of each assessment phase were coded by two undergraduate psychology students, blind to study conditions. Each coder completed a training phase and coders were required to be reliable at a kappa intraclass correlation of 0.7 or above after coding the same 30 videos. Coders then received ongoing supervision and attended weekly group meetings to review the coding and reduce coder drift. Inter-rater agreement showed good levels of agreement between raters for all codes: general behaviour (before speech): 0.73; body movements (before speech): 0.70; general behaviour (during speech): 0.70; body movements (during speech): 0.81; and speech related performance anxiety: 0.92. Where videos were double coded (i.e. for training/reliability purposes) the coding from the coder who rated the highest number of videos overall was included. The three domains (general behaviour, bodily manifestations and speech anxiety) did not correlate highly with each other (r=0.001-0.36) and so were analysed separately.

2.4.6 Procedure

The study was reviewed by the School of Psychology and Clinical Language Sciences Ethics Committee at the University of Reading and permission for it to proceed was granted. Participants' caregivers were given written information about the study and provided written consent prior to the first session.

The procedure included three sessions within the school, away from the participants' scheduled lessons. In Session 1, participants were provided with initial study information before they gave written assent to take part and provided demographic information including age, gender, ethnicity and parent occupation (in order to ascertain socio-economic status). Participants then completed the RCADS (and other questionnaires not related to this study) in hard copy. Next, the heart rate tracker was secured to the participant's wrist on their non-dominant hand. A 1-minute baseline measure of heart rate was recorded while participants watched a (calm) nature video. Participants then completed the first assessment of speech anxiety, followed by four exposure trials. In Session 2, participants completed three exposure

trials followed by the second assessment of speech anxiety. At the start of session 3, participants completed a set of questionnaires (not related to this study), followed by the third assessment of speech anxiety. Where possible, Session 2 occurred the next school day after Session 1, and Session 3 occurred 7 days after Session 1, however, due to the naturalistic context in which the study was conducted this was not always possible. Session 2 took place 1-4 days (M = 1.36) after Session 1, and Session 3 took place 6-10 days (M = 7.33) after Session 1.

2.4.7 Speech Task

Participants selected a speech topic at random from a variety of cards, face down on a desk. A range of speech topics were available and differed between sessions. Speech topics were randomly selected, however, the option to select another topic was provided if the participant did not feel they could talk about their chosen topic for 1 minute. Participants were instructed to make each speech last for 1 minute and were encouraged to share their thoughts, beliefs and opinions on the given topic. Participants were given 5 minutes to plan each speech. Consistent with previous studies (Westenberg et al., 2009), in order to create a condition of social-evaluative threat, participants were informed that their speeches would be recoded and evaluated by peers of the same age and a teacher from a different school in a different area. However, this was not the case and participants were told this in a debrief at the end of the study. Participants were given a sheet with prompts to help prepare the speech. After the five-minute preparation, participants were instructed to walk over and stand on a mat placed in front of a white screen. A pre-recorded classroom audience was projected on to the screen showing an empty classroom. The researcher moved to the back of the classroom and sat behind a screen to avoid distracting the participant during the speech task. Participants were instructed to begin their speech after the pre-recorded audience had entered the room, sat down, and they heard the teacher say "You can start". If participants stopped talking before the allocated 1-minute, the researcher gave a prompt "Would you like to continue, or have you finished?" after 20 seconds of silence. After the speech, participants returned to the desk. Participants were instructed to "wait" for 3-minutes (recovery period). No other instructions were given during the recovery period. The same procedure was repeated during Session 2 and Session 3 although the choice of speech topics differed each time (see Figure 2 in Supplemental Material).

2.4.8 Exposure trials

At the start of Session 1, participants were randomly assigned, using a sealed envelope, to one of the three groups (AL, PCS or control). Although the optimal dose of exposure trials required in preclinical studies remains unclear, there is evidence from fear conditioning and extinction studies for successful extinction effects have been observed after 6-8 trials of conditioned stimuli in adolescents (Fairchild, Van Goozen, Stollery, & Goodyer, 2008; McGuire et al., 2016; McLaughlin et al., 2016). Therefore, a total of 7 exposure (plus verbalisation strategy) trials were conducted between Session 1 and Session 2. The same procedure was used for all 7 exposure (1-minute speech) trials (see Figure 3 in Supplemental Material for a diagram of the exposure procedure across experimental conditions). After each speech, participants were instructed to sit down for a 90-second inter-trial interval. Speech topics were selected using the same procedure used during the speech anxiety assessment.

2.4.9 Verbalisation strategies

2.4.9.1 Affect Labelling (AL)

The AL procedure was based on Kircanski et al. (2012) and Niles et al. (2015). Prior to each speech, participants in the AL condition were instructed to label their emotions and feared outcome using words from a selection presented on individual cards. Participants were given a paper slip with the phrase "I feel____. I think the other people will____". Examples of emotion words were "anxious", "embarrassed" and "stupid". Examples of feared outcome phrases were "think that I look ridiculous", "think that I'm not good enough" and "laugh at my speech". The response options were developed with a group of adolescents in the study age range to make sure they were age appropriate. Participants wrote down their emotions and feared outcomes on the slip of paper provided, confirmed this with the researcher, walked over to the red mat and read the slip out loud (immediately before the pre-recorded classroom audience was projected onto the white screen).

2.4.9.2 Positive Coping Statements (PCS)

The PCS condition followed a similar procedure. Prior to each speech, participants were instructed to create a positive sentence using positive words and outcomes to help them to feel less worried. Participants were given a paper slip with the phrase "It will be____ because____". Examples of positive words were "rewarding", "useful" and "enjoyable". Examples of positive outcomes were "other people might learn something new", "my speech is planned" and "people

might like my speech". Again, the response options were developed with a group of adolescents in the study age range. Participants wrote down their positive sentence on the slip of paper provided, confirmed this with the researcher, walked over to the red mat and read the slip out loud (immediately before the pre-recorded classroom audience was projected onto the white screen).

2.4.9.3 Neutral Statements (Control)

Prior to each speech, participants in the control condition were asked to come up with and say a neutral sentence and were given a paper slip with the phrase "The time is____ my speech will be about____". Participants wrote down the time and the topic of their speech on the slip of paper provided, confirmed this with the researcher, walked over to the red mat and read the slip out loud (immediately before the pre-recorded classroom audience was projected onto the white screen).

2.4.10 Debrief

At the end of the study, participants received a full study debrief from the researcher and were informed that the speech footage would only be viewed by members of the research team for the purpose of analysis. Participants were asked not to share details of the study with peers until the study was complete to ensure that the necessary deception was preserved. Participants who completed the study were enrolled into a prize draw to win one of three £50 vouchers.

2.4.11 Power Analysis

The sample size was informed by a previous study of exposure with affect labelling for adults with public speaking anxiety (Niles et al., 2015). For heart rate during recovery, Niles et al.(2015) reported a significant group x time interaction from post-test to 1-week follow-up with an effect size of $d = 0.33$ and this was considered to be clinically meaningful. For the current study, the results of a G*Power calculation suggested that to achieve power of 0.8, for a repeated measures, within-between analysis of variance (ANOVA) effect size of 0.3, the sample required would be 79. To achieve equal group sizes, we aimed to recruit 81 participants.

2.4.12 Data Analysis

SPSS 24.0 for Windows (UK) was used for statistical analysis. Multiple imputation was used to replace missing values (Enders, 2017). Experimental groups were compared on baseline characteristics and clinical characteristics (age, gender, ethnicity, SES) and pre-test outcome measures (SUDS, heart rate observer ratings of anxiety) using one-way ANOVA/

Pearson's chi-squared ($\chi 2$) test as appropriate. To assess experimental outcomes, data were analysed using a 3 (group; AL, PCS and control) by 3 (time: pre-test, immediate post-test and 1-week follow-up) within-between (mixed) ANOVA with assessment time-points as a repeated-measure variable (heart rate: 1-minute anticipation and recovery from speech; SUDS: immediately prior to and after the speech; observer ratings of expressed anxiety: 1-minute anticipation and during the speech). A two-tailed test with a p value of < 0.05 was considered statistically significant. Partial eta squared ($\eta_p 2$) was calculated to examine the magnitude of the significant time by condition interactions (small effect = 0.01; medium effect = 0.06; and large effect = 0.14) (Cohen, 1988) and Cohen's *d* was used to examine the magnitude of experimental effects between groups. Post-hoc contrast analysis was used to explore statistically significant group x time interactions. All data in this study are presented as the mean ± standard deviation.

3. Results

3.1 Baseline Group Differences

Demographic information is presented in Table 1. Participants in the three conditions did not differ significantly at baseline on any of the demographic, clinical or outcome variables.

Hypothesis Testing

3.2 SUDS

Before speech

For pre-speech SUDS ratings, there was a significant change between times ($F(2,156) = 35.6$, $p < .001$, $\eta_p^2 = .31$), with a large effect, reflecting a significant decrease from pre-test to immediate post-test (M = 1.64, 95% CI [1.03 - 2.26], $p < .001$) and from pre-test to 1-week follow-up (M = 1.72, 95% CI [1.14 – 2.29], $p < .001$), but not from immediate post-test to 1-week follow-up (M = .07, 95% CI [-.42 - .56], $p = 1.0$), indicating that SUDs reduced from pre to post and then remained relatively stable to the 1 week follow-up. There was a small, non-significant group x time interaction ($F(2, 78) = 1.3$, $p = .35$, $\eta_p^2 = .03$) when all assessment timepoints were included.

After speech

A similar pattern was found for post speech SUDS ratings, there was a significant change between times ($F(2, 156) = 46.27$, $p < .001$, $\eta_p^2 = .37$) with a large effect, reflecting a significant

decrease from pre-test to immediate post-test (M = 2.10, 95% CI [1.47 – 2.73], $p < .001$) and from pre-test to 1-week follow-up (M = 2.04, 95% CI [1.43 – 2.65], $p < .001$), but not from immediate post-test to 1-week follow-up (M = -.06, 95% CI [-.64 - .52], $p = 1.0$).

For post speech SUDS there was a significant group x time interaction ($F(2, 155) = 2.89$, $p = .03$, $\eta_p^2 = .07$) with a medium effect. Post hoc analysis of between group comparisons found no significant differences in SUDS immediately post-test ($F(2, 78) = .24$, $p = .79$) or at 1-week follow-up ($F(2, 78) = 1.92$, $p = .15$). However, simple contrast analysis with a Bonferroni adjustment showed that participants in the PCS group reported a significantly greater reduction in SUDS from pre-test to immediate post-test compared to both the AL ($t(52) = -2.70$, $p = 0.1$, $\eta_p^2 = .09$) and Control ($t(52)$, $= -2.29$, $p = 0.2$, $\eta_p^2 = .06$) groups, both with medium effects, but the reverse pattern was observed later, that is, there was a significant increase in SUDS in the PCS group from immediate post-test to 1-week follow-up compared to the other groups; PCS vs AL ($t(52) = 2.88$, $p = .01$, $\eta_p^2 = .10$); PCS vs Control ($t(52) = 1.98$, $p = .05$, $\eta_p^2 = .05$), with large and medium effects respectively (see Figure 2). However, the PCS group did not differ significantly from the AL ($t(52) = -.06$, $p = .95$, $\eta_p^2 = .00$) or the Control ($t(52) = -.48$, $p = .63$, $\eta_p^2 = .00$) groups from pre-test to 1-week follow-up. The AL and Control groups did not differ significantly from one another from pre-test to immediate post-test ($t(52) = -.41$, $p = .68$, $\eta_p^2 = 00$), immediate post-test to 1-week follow-up ($t(52) = .89$, $p = .37$, $\eta_p^2 = .01$) or pre-test to 1-week follow-up ($t(52) = .42$, $p = .67$, $\eta_p^2 = 00$) (see Table 2).

3.3 Heart Rate

There were no significant main effects or interactions based on measures of heart rate before or after the speech (all *ps* > .05) (see Table 2 and Table 4).

3.4 Observer Ratings of Expressed Anxiety

Before speech

For general behaviour before the speech, there was a small non-significant change over time ($F(2,156) = 3.12$, $p = .05$, $\eta_p^2 = .04$) and group x time interaction ($F(4,156) = .26$, $p = .90$, $\eta_p^2 = .01$) when all assessment timepoints were included.

For body movement before the speech, there was no significant change between times ($F(2,156) = .23$, $p = .79$, $\eta_p^2 = .00$) and no significant group x time interaction ($F(4,156) = .26$, $p = .90$, $\eta_p^2 = .00$) when all assessment timepoints were included.

During speech

For general behaviour before the speech, there was no significant change between times ($F(2,156) = .10$, $p = 0.91$, $\eta_p^2 = .00$) and a small, non-significant group x time interaction ($F(4,156) = .69$, $p = .60$, $\eta_p^2 = .02$). The same was true for body movement before the speech, i.e., there was no significant change over time ($F(2,156) = .04$, $p = .96$, $\eta_p^2 = .00$) and a small, non-significant group x time interaction ($F(4,156) = 1.23$, $p = .29$, $\eta_p^2 = .03$) when all assessment timepoints were included.

For speech related performance anxiety during the speech task, there was a significant change between times ($F(2, 156) = 5.54$, $p = .005$, $\eta_p^2 = .07$), with a medium effect. Speech related performance anxiety reduced from pre-test (M = 2.98, SD = .96), to immediate post-test (M = 2.64, SD = .91), and to 1-week follow-up (M = 2.63, SD = .99). Contrast analysis with a Bonferroni adjustment revealed that speech related performance anxiety significantly decreased from pre-test to immediate post-test (M = .33, 95% CI [.02 - .64], $p = .03$) and from pre-test to 1-week follow-up (M = .34, 95% CI [.50 – .64], $p = .02$), but not from immediate post-test to 1-week follow-up (M = .01, 95% CI [-.24 - .26], $p = 1.0$). There was a small, non-significant group x time interaction ($F(4,156) = .21$, $p = .93$, $\eta_p^2 = .01$) when all assessment timepoints were included.

4. Discussion

This study explored the effect of adding different verbalisation strategies (affect labelling and positive coping statements, compared to neutral statements) to exposure for public speaking anxiety in adolescents. In contrast to our hypotheses, affect labelling did not enhance the effectiveness of exposure in that there were no significant differences between the groups from pre-test to 1-week follow-up on measures of self-rated anxiety, heart rate, or observer ratings of expressed anxiety. For post-speech self-reported SUDS ratings, there was an initial advantage of exposure with positive coping statements, however this effect was not maintained, and at the 1-week follow-up, the reverse pattern was seen, with a significant increase in SUDS in this condition from post-test to 1-week follow-up compared to exposure with affect labelling or neutral statements.

While the lack of significant findings relating to affect labelling and self-reported SUDS ratings was consistent with studies on adults (Kircanski et al., 2012; Niles et al., 2015), our lack of significant findings for heart rate was inconsistent with the significant (but small)

effects seen in adults (Niles et al., 2015). However, although groups did not differ significantly at each time point or across the anxiety measures from the pre-test to follow-up assessment, we did observe different patterns across the different conditions such as stability of fear among those in the neutral statements condition but continued reductions in fear for adolescents in the affect labelling condition. Notably, for those in the positive coping statements condition, there was an initial (and significant) reduction in fear, followed by a partial return of fear, over the duration of the study, which may indicate that immediate advantages of positive coping statements diminish over time. Further studies with longer-term follow-up assessments are now warranted to replicate and extend these intriguing findings.

The finding that the use of positive coping statements appeared to bring short term benefits may explain its common application within treatments for anxiety disorders in young people. However, the finding that it ultimately did not facilitate exposure adds to evidence suggesting that anxiety management strategies may not ultimately improve outcomes in young people with anxiety disorders (Whiteside et al., 2015). It is also consistent with Kircanski et al.'s (2012) finding in adults with spider fears that reframing negative stimuli before exposure did not generate significant benefits in the longer term. Anxiety management strategies have long been thought to be important for engagement and tolerability, making exposure exercises more acceptable and increasing "buy-in", especially for younger populations (Butler & et al, 1984; Kendall et al., 2005; Manassis, Russell, & Newton, 2010). However, notably there were equivalent (low) dropout ratings between the groups in the present study. Similarly, Whiteside et al.'s (2015) study involving young people with anxiety disorders found high (85%) and identical retention rates between treatment conditions with and without anxiety management, suggesting that positive reframing may not be a necessary precursor to engagement with exposure. Given the need to increase access to psychological therapies for young people with anxiety disorders (Green, McGinnity, Meltzer, Ford, & Goodman, 2009; Lawrence et al., 2015; Merikangas et al., 2011), understanding what components of treatment are not necessary is an important step towards making interventions more efficient.

This study was designed using a theoretical approach driven by inhibitory learning principles and is the first study to address the effectiveness of exposure with affect labelling and positive coping statements in adolescents. It examines exposure in a fear that is commonly reported in adolescents, using an experimental paradigm conducted in highly controlled

conditions in a naturalistic setting and involving a speech task that successfully generated a moderate level of anxiety in participants.

Several limitations which may have reduced experimental effects and generalisability of findings are noted. While improvements in fear responding were found across all conditions, the study did not include a no-exposure condition, therefore we cannot confidently conclude that changes were driven by exposure. Furthermore, we deliberately set out to prevent participants in the control condition from internally verbalising their affect or using positive coping statements through the use of neutral statements. However, this may have interfered with the exposure by acting as a distraction. Future studies may benefit from an exposure-alone condition. Due to the practical constraints of conducting the sessions in the school environment and having to fit within the school timetable, our study included less exposure trials than the adult studies (seven versus twenty trials in the adult studies; i.e., Kircanski et al., 2012; Niles et al., 2015) which may account for inconsistent outcomes. We anticipated that seven exposure trials would be sufficient given previous evidence to suggest that successful extinction effects can occur after 6-8 trials of conditioned stimuli in adolescents (Fairchild et al., 2008; McGuire et al., 2016; McLaughlin et al., 2016). It is possible, however, that adolescents require a greater number of exposure trials to elicit experimental effects than used in the current study. In addition, unlike Niles et al., (2015), the study did not include a questionnaire measure of public speaking anxiety (e.g., Personal Report of Public Speaking Anxiety; McCroskey, 1970). Although we used different contexts/scenes to decrease the likelihood of premature habituation, we were not able to replicate what would typically occur in clinical treatment, where exposures tend to increase in difficulty over time (e.g., Benjamin et al., 2010). By having a pre-recorded (rather than the live audiences used by Niles et al., (2015) in their research with adults), we were able to standardise the experimental conditions, however adolescents were not afforded the opportunity to learn that the feared outcome (e.g., audience laughing at speech) did not occur, which may further account for the inconsistent outcomes. The current study measured physiological arousal using an activity tracker worn on the wrist as this was non-invasive and suitable to use with adolescents in a one-to-one situation within a school environment. However, a physiological measure recommended for fear conditioning and extinction research with children and young people (e.g., skin conductance response) may have been more sensitive to experimental effects (Ryan, Zimmer-Gembeck, Neumann, & Waters, 2019). Finally, participants were identified based on having high levels of performance anxiety,

however they were not a clinical sample and scored substantially below the clinical cut off for symptoms of overall anxiety and social anxiety.

To conclude, the current study explored the effect of adding affect labelling, positive coping statements and neutral statements to exposure for public speaking anxiety in adolescents. Although initial reductions in speech anxiety were seen among those adolescents who generated positive coping statements, these reductions appeared to diminish over the course of the following week, by which time there were no significant differences between the groups on measures of self-rated anxiety, heart rate, and observer ratings of expressed anxiety. This study demonstrated the possibility of conducting innovative experimental research with young people. Further research should now build on this to explore the applicability of a wider range of optimisation strategies identified with adults (e.g., Craske, Hermans, & Vervliet, 2018; Craske et al., 2008, 2014), taking into account different developmental periods, types of anxiety symptoms/disorders and severity.

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6. Figures

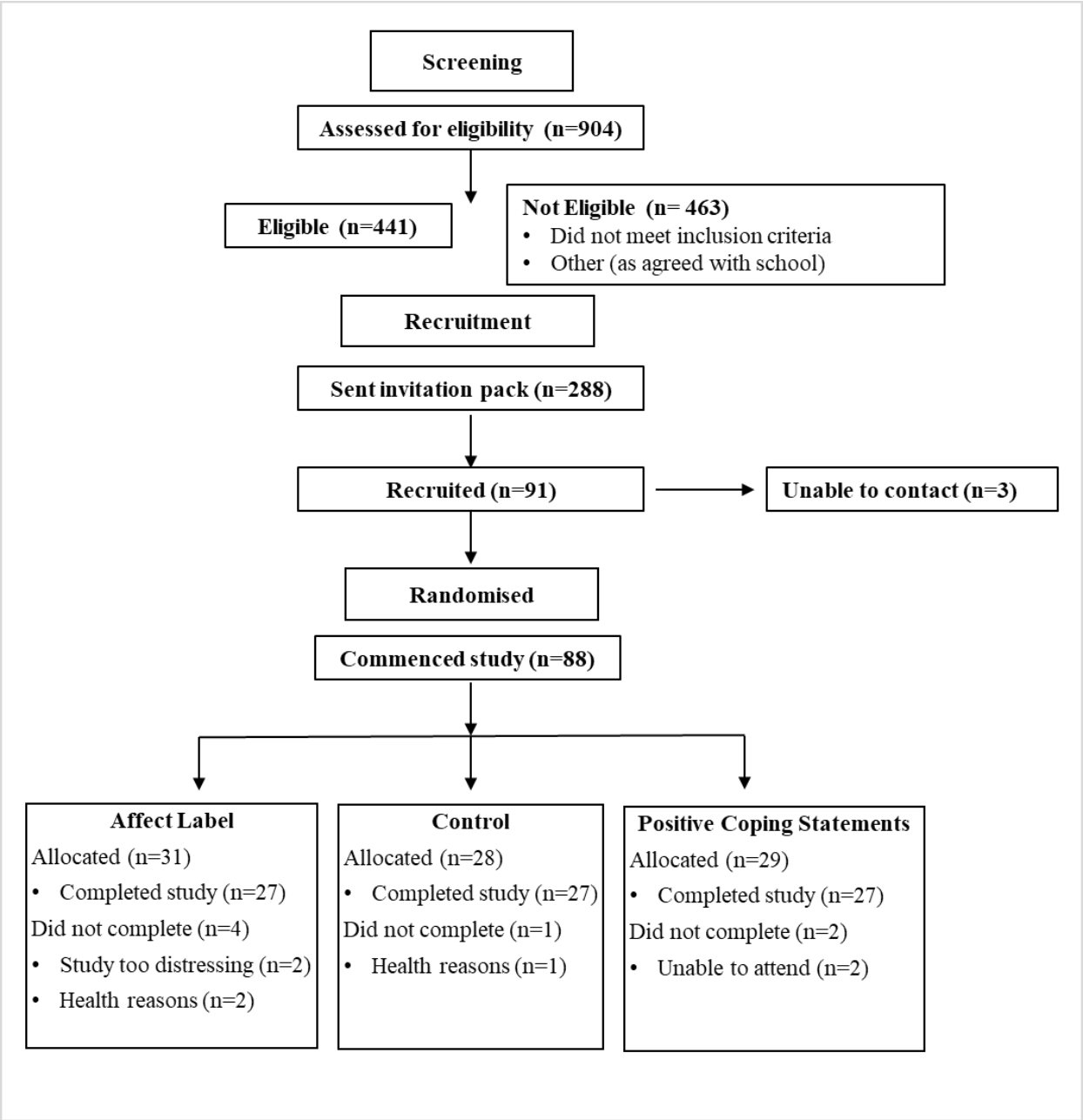

Figure 1. Participant flow chart

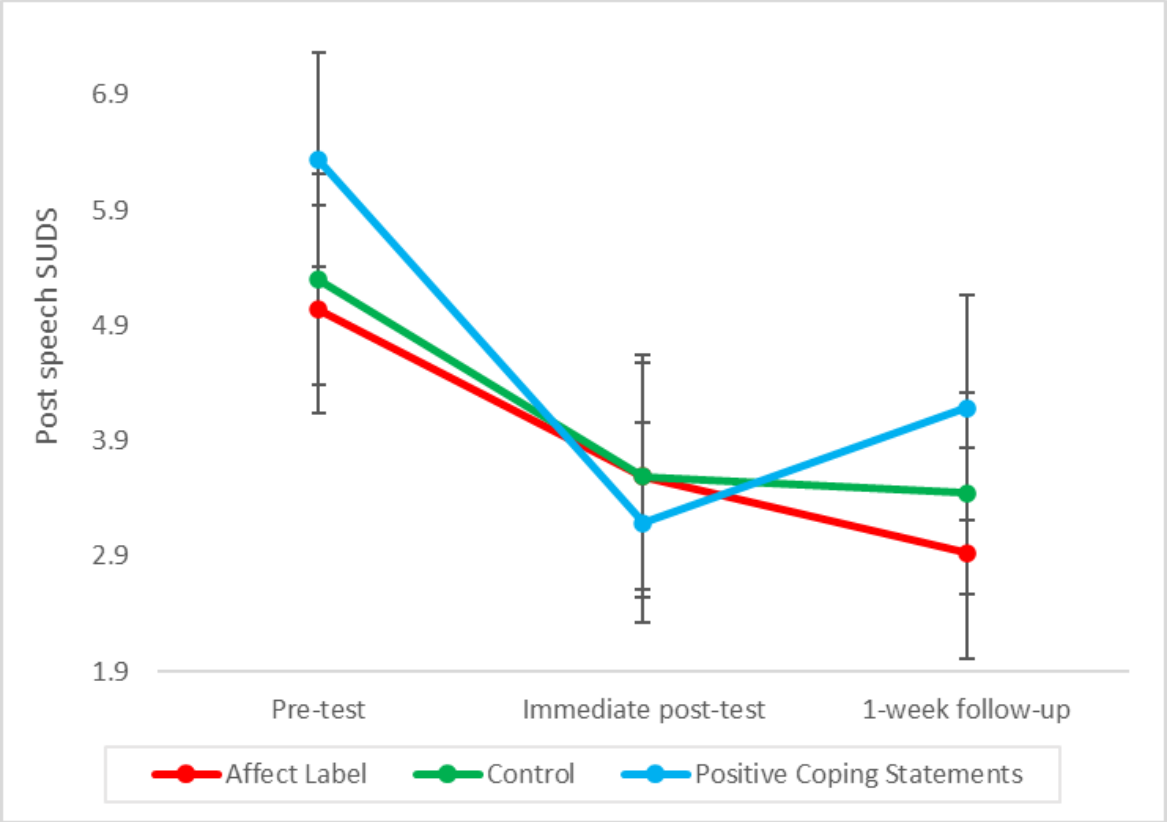

Figure 2. Effect of experimental condition on SUDS after the speech task

7. Tables

Table 1. Sample demographics, scores on screening measure and baseline and anxiety symptoms

	Overall Sample (n=81)	**Affect Label** (n=27)	**Control** (n=27)	**Positive Coping Statements** (n=27)	**Between Conditions**	
	M(SD)	*M(SD)*	*M(SD)*	*M(SD)*	χ^2	***P***
Gender (%)						
Male	25.7	22.2	25.9	25.9	.13	.94[a]
Female	75.3	77.8	74.1	74.1		
SES (% professional)	49	68	54.2	43.5	2.95	.23[a]
Ethnicity (%)						
White British[b]	63	-	-	-	-	-
					F	***P***
Age	14.09 (.55)	14.0 (.44)	14.2 (.73)	14.1 (.47)	.72	.49[c]
Performance Anxiety (0-8)	6.61 (1.05)	6.30 (0.91)	6.85 (0.99)	6.67 (1.18)	2.03	.14[c]
RCADS total	50.19 (21.25)	52.67 (27.30)	50.52 (19.26)	47.37 (16.05)	.42	.66 [c]
RCADS anxiety	41.36 (17.12)	44.18 (21.81)	41.04 (15.73)	38.85 (12.81)	.66	.52[c]
RCADS social anxiety	15.78 (5.20)	15.96 (5.96)	15.93 (5.09)	15.44 (4.64)	.08	.92[c]

Note. SES = socioeconomic scale; RCADS = The Revised Children's Anxiety and Depression Scale; [a] χ2 test; [b] Schools provided ethnicity data in an anonymised format, therefore it was not possible to compare ethnicity between groups; [c] Analysis of variance.

Table 2. Mean raw scores by group and across assessment timepoints for dependent variables

	Affect Label (n=27)			**Control (n-=27)**			**Positive Coping Statements (n=27)**		
	Pre-Test (Session 1)	Immediate Post-Test (Session 2)	1-week Follow-Up (Session 3)	Pre-Test (Session 1)	Immediate Post-Test (Session 2)	1-week Follow-Up (Session 3)	Pre-Test (Session 1)	Immediate Post-Test (Session 2)	1-week Follow-Up (Session 3)
	Mean (SD)								
Heart Rate									
Baseline	81.8 (11.9)	-	-	77.1 (9.9)	-	-	76.1 (8.7)	-	-
Before speech	97.1 (10.7)	93.9 (12.7)	96.9 (11.0)	94.2 (11.2)	92.6 (9.2)	95.2 (9.5)	94.4 (11.3)	92.9 (9.4)	95.3 (12.2)
After speech	93.3 (14.4)	90.9 (11.2)	90.2 (9.4)	88.9 (11.3)	87.2 (9.2)	92.2 (8.8)	87.8 (10.0)	84.8 (10.2)	88.9 (9.7)
SUDS									
Before speech	5.52 (1.09)	4.04 (2.10)	3.48 (1.74)	5.41 (2.02)	4.07 (2.11)	4.19 (1.71)	6.19 (1.78)	4.07 (1.90)	4.30 (1.70)
After speech	5.04 (2.33)	3.59 (2.69)	2.93 (2.35)	5.30 (2.35)	3.59 (2.55)	3.44 (2.26)	6.33 (2.39)	3.19 (2.23)	4.19 (2.51)
Observer Ratings									
Before speech									
General behaviour	2.65 (0.57) [a]	2.65 (0.60)	2.38 (0.73) [a]	2.51 (0.77)	2.68 (0.72)	2.47 (0.71)	2.40 (0.66) [a]	2.52 (0.77)	2.25 (0.83) [a]
Body movement	4.12 (1.02) [a]	4.02 (1.16)	4.16 (0.84) [a]	4.05 (1.02)	3.96 (0.72)	3.93 (0.85)	3.84 (0.73) [a]	3.85 (0.85)	3.99 (0.87) [a]
During speech									
General behaviour	2.39 (0.88) [a]	2.77 (0.69)	2.64 (0.78) [a]	2.36 (0.96)	2.24 (1.07)	2.30 (0.72)	2.35 (0.64) [a]	2.35 (0.72)	2.27 (0.97) [a]
Body movement	3.62 (0.96) [a]	3.78 (0.96)	3.84 (0.81) [a]	3.95 (0.65)	3.92 (0.75)	3.63 (0.78)	3.66 (0.65) [a]	3.46 (1.01)	3.66 (1.06) [a]

Speech Related Performance Anxiety	2.94 (0.98) [a]	2.72 (1.12)	2.62 (1.18) [a]	2.96 (1.13)	2.65 (0.83)	2.62 (0.95)	3.03 (0.79) [a]	2.56 (0.78)	2.65 (0.83) [a]

Note. [a] Multiple imputation used to replace missing data

Table 3. Cohen's d between conditions at immediate post-test and 1-week follow-up

	Affect Label vs Control		**Affect Label vs Positive Coping Statements**		**Control vs Positive Coping Statements**	
	Immediate Post-Test (Session 2)	1-week Follow-Up (Session 3)	Immediate Post-Test (Session 2)	1-week Follow-Up (Session 3)	Immediate Post-Test (Session 2)	1-week Follow-Up (Session 3)
	d					
Heart Rate						
Before speech	0.12	0.17	0.09	0.14	0.03	0.01
After speech	0.36	0.22	0.57	0.14	0.25	0.36
SUDS						
Before speech	0.01	0.41	0.01	0.48	0	0.06
After speech	0	0.22	0.16	0.52	0.17	0.31
Observer Ratings						
Before speech						
General behaviour	0.05	0.13	0.19	0.17	0.21	0.28
Body movement	0.06	0.27	0.17	0.20	0.14	0.07
During speech						

General behaviour	0.59	0.45	0.60	0.42	0.12	0.04
Body movement	0.16	0.26	0.32	0.19	0.51	0.03
Speech Related Performance Anxiety	0.07	0	0.17	0.03	0.11	0.03

Table 4. Main Effects (time) and Interactions (time by group)

Comparison	Main Effect (Session)			Interaction (Session x Group)		
	Value		Effect Size	Value		Effect Size
	F	P	η_p^2	F	P	η_p^2
Heart Rate						
Before speech	2.43	.91	.03	.10	.98	.00
After speech [a]	.97	.49	.01	1.55	.12	.04
SUDS						
Before speech	35.6	< .001	.31	1.3	.35	.03
After speech	46.27	< .001	.37	2.89	.03	.07
Observer Ratings						
Before speech						
General Behaviour	3.12	.05	.04	.26	.90	.01
Body Movement	.23	.79	.00	.26	.90	.00
During speech						
General Behaviour	.10	.91	.00	.69	.60	.02
Body Movement	.04	.96	.00	1.23	.29	.03
Speech Related Performance Anxiety	5.54	.005	.07	.21	.93	.01

Note. [a] Mauchly's test indicated that the assumption of sphericity had been violated ($\chi 2$ (2) 13.4, p = .001); degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity (ε = .86).

8. Supplementary Material

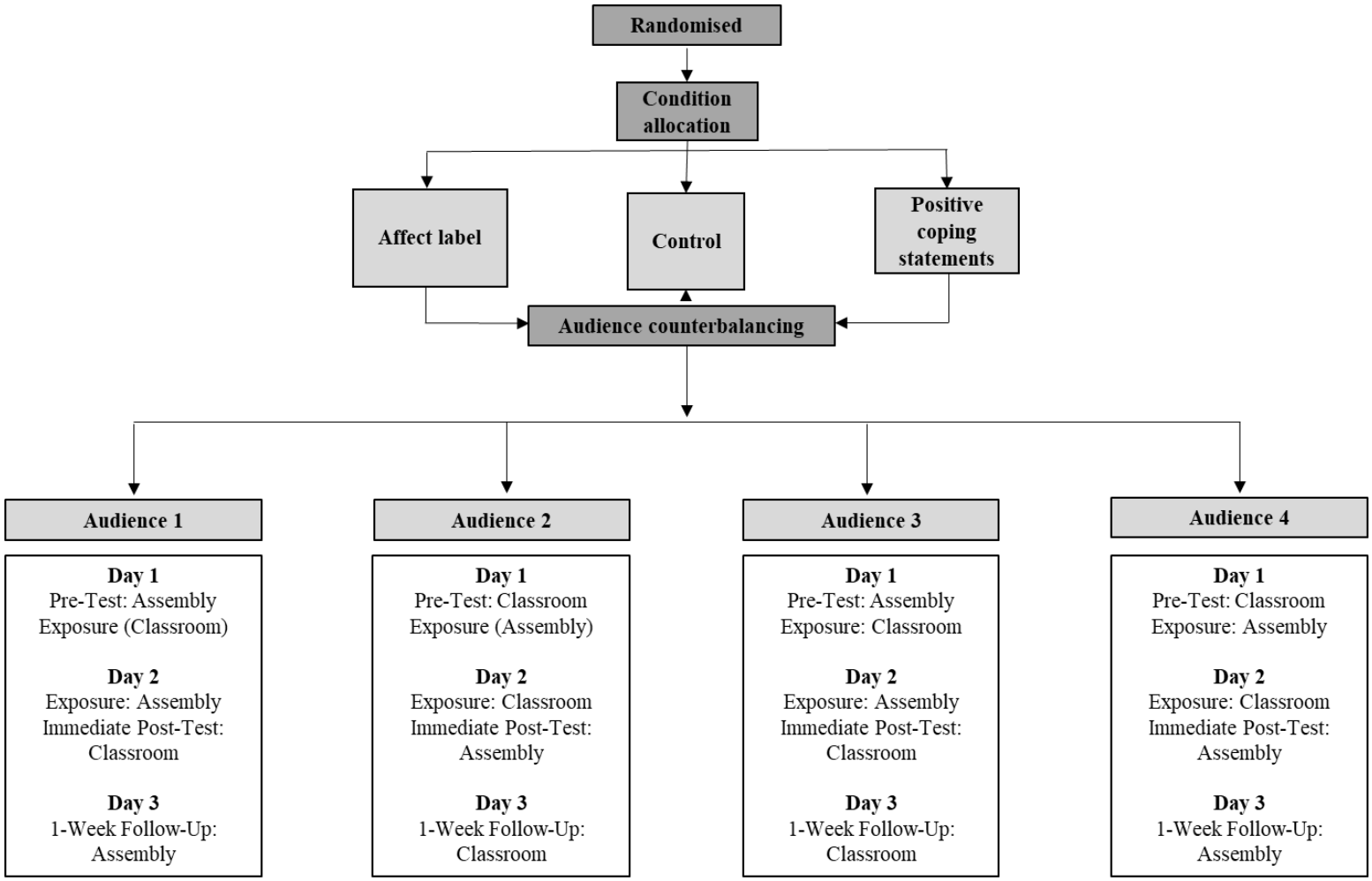

Figure 1. Audience counterbalancing

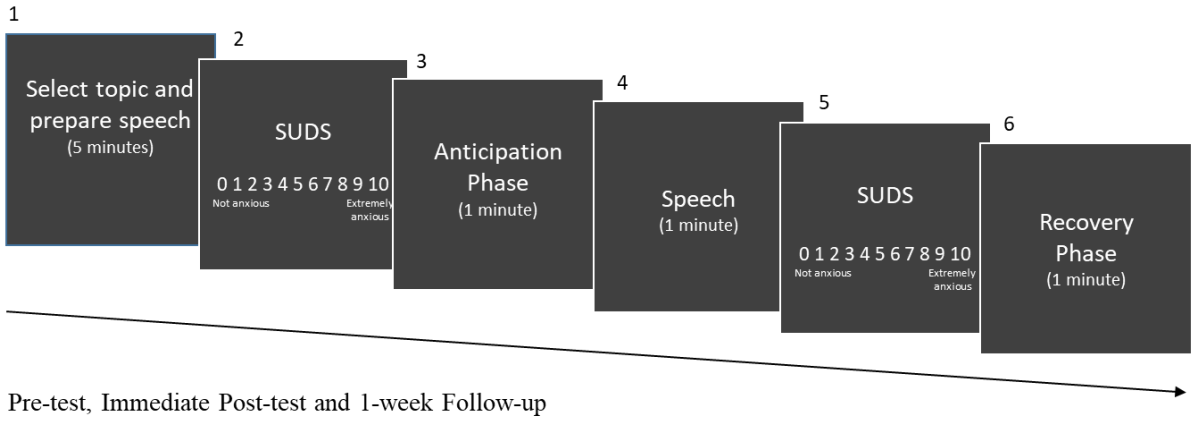

Figure 2. Speech anxiety assessment

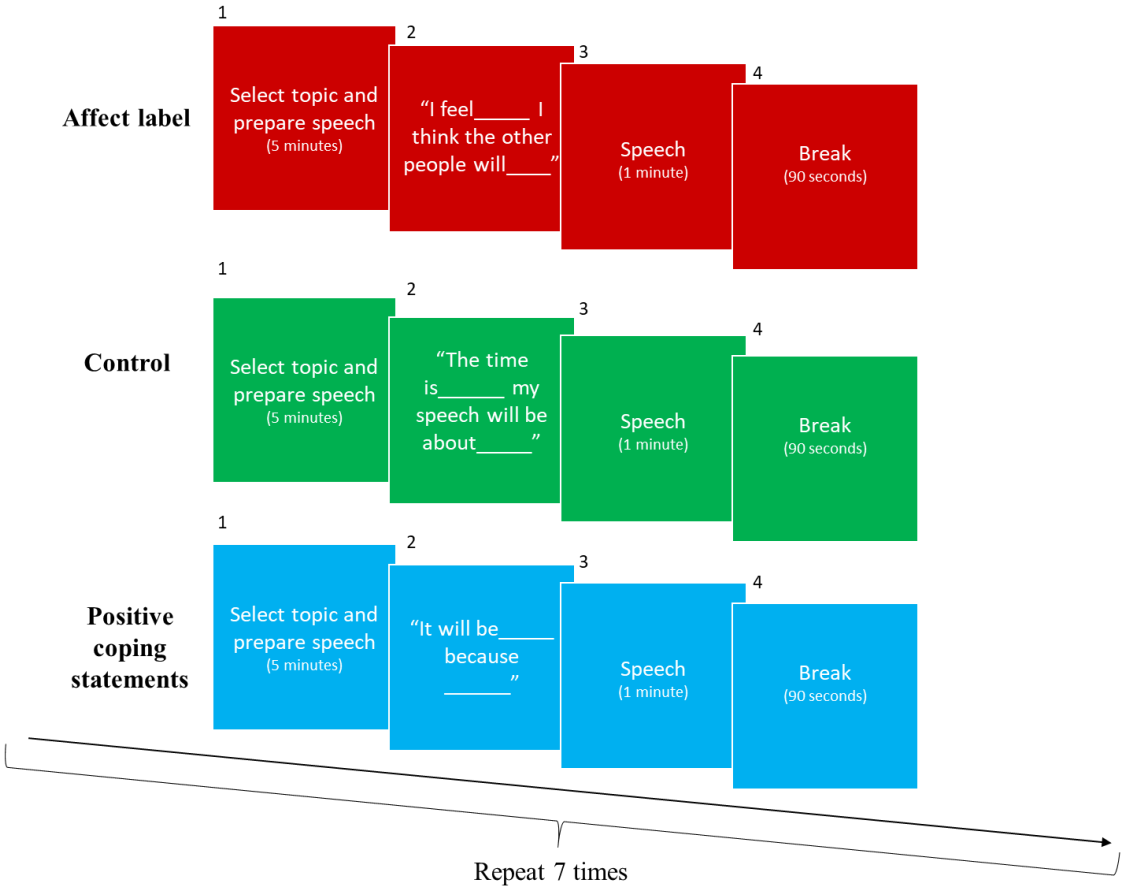

Figure 3. Exposure task by experimental condition

Table 1. Observer Ratings of Speech Anxiety; Child Anxiety Scale

Child anxiety scale (1-7) – Code every 20 seconds			
	ESSENTIAL		**ADDITIONAL**
1	The adolescent shows no obvious signs of anxiety. Overall, they seem relaxed and confident.		The talk will be delivered well. The adolescent shows one or more clear sign[s] that they are feeling confident and relaxed.
2	The adolescent seems anxious in a small way – one or more mild signs of anxiety.		Although the talk will be delivered well, the adolescent may only show mild signs that they are feeling confident.
3	The adolescent seems somewhat anxious - 1 clear sign of anxiety/shyness.		Overall the talk will be delivered adequately and the adolescent may show some minor signs that they are feeling confident. There may also be some brief/mild indication[s] of anxiety.
4	The adolescent seems moderately anxious - 2 clear signs of anxiety/shyness.		Although the talk will be delivered adequately, the adolescent will seem somewhat reluctant to do it. They may appear uncomfortable for more than just a brief episode.
5	The adolescent seems anxious for more than half of the time and shows 3 clear signs of anxiety/shyness.		Although some of the talk will be delivered adequately, the adolescent will seem clearly reluctant to do it. They are likely to appear uncomfortable for at least half of the time.
6	The adolescent seems anxious for most of the time. They will show more than 3 different, clear signs of anxiety/shyness.		Most of the talk will not be delivered adequately. The adolescent will clearly be reluctant to do the talk and likely to appear uncomfortable for most of the time.
7	The adolescent's anxiety is pervasive and strong for most of or the entire talk. The adolescent does not appear confident or relaxed at any point.		The adolescent will show clear signs of distress. The adolescent may be quiet for most of the talk, which may be ≤ 10 seconds in duration.

Chapter 4

The Generalisation of Exposure

Abstract

For exposure to be successful, extinction learning must extend beyond the therapeutic context. However, relapse, or return or fear, following exposure is common. Verbalisation strategies, such as affect labelling and generating positive coping statements, may facilitate exposure by increasing the generalisation of extinction learning, however, this has not been explored in young people. We extend the findings from Paper 2 by comparing the effects of exposure with affect labelling, positive coping statements to exposure with neutral statements on the *generalisation* of extinction learning for the adolescents with public speaking anxiety who took part in the study outlined in the previous chapter. As well as assessing fear during a 1-minute speech delivered in the original context participants were asked to prepare and deliver a 2-minute speech delivered in a novel context at 1-week follow-up. Performance fear was measured on the basis of self-rated anxiety, heart rate, and observer ratings of expressed anxiety. We also examined whether broader social anxiety symptoms, cognitions, safety behaviours and attitudes changed over time, measured at pre-test, 1-week follow-up, and a later 3-month follow-up time point. None of the groups significantly differed on any measure of fear from the original context to the novel context at 1-week follow-up, suggesting potential generalisation of extinction learning across conditions. Furthermore, while social anxiety symptoms, cognitions and behaviours decreased significantly from pre-test to 1-month and 3-month follow-up, there were no significant group differences on any measure of social anxiety at any timepoint. A broad implication of this study is that for adolescents with elevated public speaking anxiety, the effects of exposure appear to generalise without the use of verbalisation strategies, and recorded audiences may provide a valuable exposure stimulus. Further experimental studies using improved methodology and clinical samples are warranted to explore the clinical implications of these findings.

1. Introduction

As highlighted in Chapter 3 (Paper 2), public speaking anxiety is highly prevalent (Pull, 2012), can cause clinically significant distress and marked interference with functioning (Stein, Walker, & Forde, 1996) and is one of the most frequently reported fears for young people with social anxiety disorder (Hofmann et al., 1999; Hans Ulrich Wittchen, Stein, & Kessler, 1999).

As previously highlighted, CBT is recommended as the first-line treatment for adolescents with social anxiety disorder and performance fears (e.g. National Institute for Health and Care Excellence, 2014; World Health Organization, 2015) and the critical ingredient is believed to be behavioural exposure (Peterman, Read, Wei, & Kendall, 2014). However, fear reduction following exposure can be short-lived, may follow a return of fear (Rachman, 1979, 1989). Inhibitory Learning Theory proposes that the "success" of exposure is reflected by effective consolidation, retrievability and *generalisability* of new inhibitory learning assessed during follow-up (Craske, Treanor, Conway, Zbozinek, & Vervliet, 2014). That is, for exposure treatment to be deemed "effective", it is crucial that extinction learning which occurs during exposure sessions extends beyond the therapeutic context.

Research with adults suggests that the risk of relapse may increase if a different exposure stimulus is encountered (Rowe & Craske, 1998), or if the previously feared stimulus is encountered in a different context (context renewal of fear) to that in which treatment took place (Culver, Stoyanova, & Craske, 2011; Mineka, Mystkowski, Hladek, & Rodriguez, 1999; Mystkowski, Craske, & Echiverri, 2002; Rodriguez, Craske, Mineka, & Hladek, 1999). In a study by Rowe & Craske (1998), spider-fearful adults who completed four exposure trials experienced a return of fear when a novel spider (i.e., a spider that varied on dimensions such as shape, colour, hairiness, quickness and/or size compared to the spider used during exposure trials) was presented at 3-week follow-up. Four studies (again with spider-fearful adults) found a significantly greater return of fear when the stimulus was encountered in a different context (e.g., presentation of the same spider in a different room with an experimenter who differed from the therapist) (Mineka et al., 1999; Mystkowski, 2006; Mystkowski et al., 2002; Rodriguez et al., 1999), and one study with adults fearful of public speaking (Culver et al., 2011) found a significantly greater return of fear at 2-week follow-up when participants completed a follow-up test in a different context (i.e., a different room with different layout and furniture).

The generalisation of extinction learning may be enhanced using exposure optimisation strategies. For example, there is some, albeit limited, evidence from pharmacological research with rodents that d-Cycloserine (DCS) may facilitate extinction learning across different stimuli (Ledgerwood, Richardson, & Cranney, 2005) and scopolamine may reduce context renewal of fear following extinction (Zelikowsky, Pham, & Fanselow, 2012). There is also evidence from one study with adults (Tabibnia, Lieberman, & Craske, 2008) that affect labelling prior to exposure enhances the generalisation of extinction in adults who are fearful

of spiders. Specifically, Tabibnia et al (2008) reported that spider-fearful adults exposed to pictures of spiders alongside unrelated negative affect labels (e.g., "cancer", "war", "bullet") experienced a greater generalisation of extinction learning (on a measure of skin conductance) when exposed to a novel set of spider pictures (novel spiders) 1-week later compared to participants exposed to pictures of spiders alongside slightly positive labels (e.g., "little", "pet", "living") and those who were exposure to pictures of spiders without any labels. No differences between conditions on a measure of heart rate were found. Notably, these findings were not replicated in a separate, methodologically similar study, by the same authors. Specifically, the study found non-fearful adults exposed to pictures of disturbing scenes alongside related and unrelated negative labels (e.g., "pain" and "bomb) experienced similar generalisation of extinction learning (on measures of heart rate and skin conductance) when shown a set of novel images 1-week later, compared to participants exposed to disturbing pictures alongside slightly positive labels (e.g., "body" and "healing") and those who were presented images without any labels (Tabibnia et al, 2008). Therefore, while the rationale for *how* affect labelling may enhance generalisation is largely unclear, the authors suggest that the inclusion of a specific category (spiders) and varied stimuli (different pictures of spiders) presented alongside the labels may have enhanced generalisation, highlighting the need for further research examining which variables are driving the observed effects.

Only two studies have investigated the effect of exposure optimisation strategies on the generalisation of extinction learning in the treatment of childhood anxiety symptoms/disorders (Byrne et al., 2015; Menzies & Clarke, 1993), with mixed findings. In the treatment of specific phobias, Byrne et al (2015) found that that children and young adolescents (aged 6-14 years) who received DCS administration 1-hour prior to prolonged exposure performed significantly better than those who received a placebo control, when the stimulus was presented in a novel context (i.e., a different spider/dog, presented outdoors instead of indoors, with no parent present). In a second study, Menzies & Clarke (1993) examined whether observational learning enhances exposure for children (aged 3-8 years) who were fearful of swimming. The study found that children who received vicarious exposure (i.e., observed an adult swimming instructor model display competent, fearless behaviour whilst in a swimming pool) prior to 15 minutes of gradual in-vivo exposure (i.e., a 50m heated indoor pool with steps) performed no better than children who were instructed to observe a variety of card games on a measure of approach related behaviour when assessed in a novel swimming pool (i.e., a 25m heated indoor pool with a ladder, in a different location).

To date, no studies have compared the effects of affect labelling or positive coping statements on the generalisation of exposure in young people to a novel context. Given the evidence for diminished extinction learning in adolescents (Ganella & Kim, 2014; Johnson & Casey, 2015; McGuire, Orr, Essoe, et al., 2016; Waters, Theresiana, Neumann, & Craske, 2017) and some evidence for poorer treatment outcomes among this age group (Ginsburg et al., 2011), it is important to ensure that extinction learning achieved during exposure generalises across novel stimuli and contexts and to identify how to optimise this generalisation. Examination of the effectiveness of adding potential optimisation strategies on the generalisability of extinction learning is an important step towards enhancing treatment outcomes for common and problematic fears and anxieties in young people, such as the fear of public speaking.

Aims

This study had two aims. Firstly, we aimed to investigate whether there were significant differences between the three verbalisation strategies (affect labelling, positive coping statements or neutral statements) in their ability to enhance the generalisation of extinction learning for adolescents with public speaking anxiety. Given the limited evidence to guide directional hypotheses, we set out to explore differences between the groups in the generalisation of learning. The study extends findings from Paper 2 by exploring whether extinction learning acquired during the 1-minute speech paradigm generalised when participants were asked to deliver a 2-minute speech to a different, smaller audience recorded in a different location, at 1-week follow-up.

Secondly, we aimed to explore whether there were significant differences between the three verbalisation strategy groups in broader social anxiety symptoms, cognitions, safety behaviours and attitudes at from pre-test to 1-week and 3-month follow-up. Given that there have been no previously published articles, to our knowledge, that have compared the effects of affect labelling and positive copings statements on social anxiety symptoms, cognitions, safety behaviours and attitudes in adolescents with public speaking anxiety, our analyses of group differences across timepoints were considered to be exploratory.

2. Method

2.1 Design

This study used a mixed-between design with the same sample of public speaking fearful adolescents, and between variable Group, as in Paper 2.

Aim 1

To address the first aim, a 3 (Group) x 2 (Context) mixed design was applied. The variable Context was (i) a 1-minute speech delivered in front of a classroom audience and (ii) a 2-minute speech delivered in front of a panel in a small room. Assessment took place during the 1-week follow-up (Session 3) (see Paper 2 for further details).

Aim 2

To address the second aim, a 3 (Group) x 3 (Time) mixed design was used. The variable Time was Session 1, 3 and 4. Assessment times were pre-exposure (Session 1), 1-week follow-up (Session 3) and 3-month follow-up (Session 4).

2.2 Participants

Participants for this study were those who took part in the study in Paper 2. Sample demographics are presented in Table 1 of Paper 2 and the consort diagram of participant flow through recruitment and study procedures can be found in Figure 1 of Paper 2.

2.3 Materials

2.3.1 *Exposure Stimulus*

1-minute Speech

Details concerning the 1-minute speech (classroom audience in a school setting) stimulus are available in Paper 2.

2-minute Speech

For the 2-minute (panel audience) stimulus, the footage was filmed in a small room, including a bench, and unfamiliar actors wearing standard school uniform (e.g., blue jumper, white shirt, trousers/skirt). The scene included 3 actors; two adolescents (1 male, 1 female) aged between 12-13 years, and a female teacher wearing glasses. The scene began with an empty room. The panel entered the room in silence after approximately 30 seconds and sat approximately 1.5 metres away from the camera. Once the panel were seated the teacher instructed “OK, you can start”.

2.3.2 Speech Topics

Like in Paper 2, participants selected a speech topic at random from an unfamiliar set of cards face down on a desk. Like before, the topic was different each time (i.e., for the original and novel contexts). Further details concerning the speech topics are available in Paper 2.

2.3.3 Assessment of Speech Task Anxiety

Speech anxiety across all three groups was measured twice at 1-week follow-up (Session 3); first in the 1-minute (original) context, and second in the 2-minute (novel) context. As in Paper 2, fear was measured as self-rated anxiety (Subjective Units of Distress; SUDS), heart rate, and observer ratings of expressed anxiety. SUDS were measured prior to and following the speeches, heart rate was measured 1-minute before, and 1-minute after, the speeches, and observer ratings of speech anxiety (i.e., general behaviour, body movements and speech related performance anxiety) were measured before, and during, the speeches (see Supplemental Material, Paper 2, for a diagram of anxiety assessment procedures). Full details concerning the speech task anxiety measures are available in Paper 2.

2.3.4 Self-report Measures

A battery of standardised and widely used self-report measures assessing different dimensions of social anxiety was administered to each participant. The measures were completed during the pre-test (Session 1), 1-week follow-up (Session 3) and 3-month follow-up (Session 4) assessments:

2.3.4.1 The Social Phobia Weekly Summary Scale (SPWSS; Clark et al., 2003)

The SPWSS was used a measure of social anxiety. The SPWRS is a 6-item questionnaire and uses 0 to 8 ratings of aspects of social anxiety such as avoidance, other-focused/self-focused attention in general & in difficult social situations, pre-event anticipatory worry, and post-event subsequent rumination (with higher scores indicating greater social anxiety). This was designed for use with adults but has been used successfully with adolescents (Leigh & Clark, 2015). For the sample included in the current study, Cronbach's alpha = .79

2.3.4.2 The Social Cognitions Questionnaire (SCQ; Wells, Stopa, & Clark, 1993) – adapted for children/adolescents

The SCQ is a 22-item scale covering negative automatic thoughts that are commonly reported in social anxiety provoking situations. Two subscales scores are obtained: a mean thought frequency, ranging from 1 (thought never occurs) to 5 (thought always occurs when I

am anxious); and a mean belief rating ranging from 0 (I do not believe this thought) to 100 (I am completely convinced this thought is true) with higher scores indicating greater frequency and beliefs. For the sample included in the current study, Cronbach's alpha = .95 (frequency) and .96 (belief).

2.3.4.3 The Social Attitudes Questionnaire (SAQ; (Clark, Wells, et al., 1995) – adapted for children and adolescents

The SAQ is a 41-item scale measuring negative social anxiety related beliefs. Each item is rated from 1 to 7 (Totally agree = 1, Agree very much = 2, Agree slightly = 3, Neutral = 4, Disagree slightly = 5, Disagree very much = 6, Totally disagree = 7), and a mean score is obtained (with higher scores indicating less negative social anxiety related beliefs). For the sample included in the current study, Cronbach's alpha = .96.

2.3.4.4 The Social Behaviour Questionnaire (SBQ; (Clark, Butler, et al., 1995) – adapted for children/adolescents

The SBQ is a 29-item scale measuring how often individuals use a range of common safety-seeking behaviours in social situations (e.g., try to come across well, try to control shaking). The frequency with which each behaviour is used in social situations is rated and uses 0 to 3 ratings (Never = 0, Sometimes = 1, Often = 2, Always = 3), and a mean score is obtained (with higher scores indicating greater use of safety-seeking behaviours). For the sample included in the current study, Cronbach's alpha = .90.

A measure of anxiety and depression symptoms was administered during Session 1, and again during Session 4[3]:

2.3.4.5 The Revised Child Anxiety and Depression Scale – Child Report (RCADS-C; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000)

See Paper 2 for full details.

2.4 Procedure

See Paper 2 for procedural details including –

i) Original speech task (1-minute, classroom audience)

[3] The naturalistic school setting brought time limitations and as a result, it was not possible to administer the RCADS-C during Session 3 (1-week follow-up)

ii) Assessment of speech anxiety

iii) Verbalisation strategies: affect labelling (AL), positive coping statements (PCS) and neutral sentences (control)

2.4.1 Novel Context

The procedure for the 2-minute (novel context) speech task was the same as the 1-minute (original context) speech tasks except that participants were told "we would like you to try and make the speech 2 minutes long this time" and the speech was delivered in front of a novel pre-recorded panel audience, situated in an unfamiliar location. The 2-minute speech occurred immediately after the final 1-minute speech task in the 1-week follow-up.

2.4.2 Social Anxiety Measures

Participants completed social anxiety measures at 3 assessment timepoints: Session 1 (pre-test), Session 3 (1-week follow-up) and Session 4 (3-month follow-up). The social anxiety measures were completed using a printed paper format. During Session 1, participants were given written instructions and completed the battery of questionnaires after signing informed assent forms and reporting on demographic characteristics (see Paper 2 for further details). In Session 3, participants were given written instructions and completed the questionnaires at the start of the session, prior to completing the final two speeches (original and novel contexts). In Session 4, participants were given verbal instructions and asked to complete the questionnaires for a final time. No speeches were delivered during the fourth, and final, session. At the end of Session 4, participants were thanked for their time and reminded that they would be notified if they had been selected for the prize draw (see Paper 2 for further details). The questionnaire responses were transferred into an online survey platform (Bristol Online Surveys) by undergraduate psychology students, blind to study conditions. The data was exported and cleaned by an undergraduate student and the author (HP).

2.4.3 Data Analysis

To assess the generalisation of extinction learning in a novel context, data were analysed using separate 2 (Context; original and novel) x 3 (Condition; AL, PCS and control) within-between (mixed) analysis of variance (ANOVA) with Context as a repeated-measure variable (heart rate: 1-minute anticipation and recovery from speech; SUDS: immediately prior to and after the speech; observer ratings of expressed anxiety: 1-minute anticipation and during the speech). Social anxiety outcomes (clinical and process questionnaire measures) were analysed

using separate 3 (Group; AL, PCS and control) x 3 (Time; pre-test, 1-week and 3-month follow-up) within-between (mixed) ANOVA with Time as a repeated-measure variable. The RCADS-C social anxiety subscale was analysed using a 3 (group; AL, PCS and control) x 2 (Time; pre-test and 3-month follow-up) within-between (mixed) ANOVA with Time as a repeated variable. A two-tailed test with a p value of < 0.05 was considered statistically significant. Eta squared ($\eta 2$) was calculated to examine the magnitude of the significant group x context/time interactions (small effect = 0.01; medium effect = 0.06; and large effect = 0.14) (Cohen, 1988) and Cohen's d was used to examine the magnitude of experimental effects between groups. Post-hoc contrast analysis was used to explore statistically significant group x time/context interactions.

3. Results

See Paper 2 for demographic and baseline outcome variable information and between group comparisons at baseline.

Hypothesis Testing

3.1 Generalisation in a Novel Context

Between group comparisons; 1-minute (original context) and 2-minute (novel context) speeches at 1-week follow-up

See Table 1 for raw means and SDs for the novel context and between conditions.

3.1.1 SUDS

There were no significant main effects of context (original vs novel) or context by condition interactions based on SUDS before or after the speeches (see Table 2).

3.1.2 Heart Rate

There were no significant main effects of context (original vs novel) or context by condition interactions based on measures of heart rate before or after the speech (see Table 2).

3.1.3 Observer Ratings of Speech Anxiety

There were no significant main effects of context (original vs novel) or context by condition based on observer ratings of speech anxiety before or during the speech (see Table 2).

3.2 Social Anxiety Measures

Change Over Sessions

See Table 3 for raw means and SDs for social anxiety measures (total) across assessment timepoints, and Table 4 for raw means and SDs for social anxiety measures by group and across assessment timepoints.

3.2.1 SPWRS

There was a small, significant change between sessions ($F(2,156) = 3.22$, $p = .04$, $\eta_p^2 = .04$) reflecting a significant decrease from Pre-test to 3-month follow-up (M = .30, 95% CI [.01 - .59], $p = .04$) and from 1-week follow-up to 3-month follow-up (M = .28, 95% CI [.02 - .56], $p = .04$) but not from Pre-test to 1-week follow-up (M = .01, 95% CI [-.23 - .26], $p = .93$). There was a small, non-significant session x group interaction ($F(4,156) = 1.02$, $p = .40$, $\eta_p^2 = .03$) (see Figure 1).

Table 1. Mean raw scores for dependent variables by group during the novel context (2-minute speech, panel audience) assessment

	Affect Label (n=27)	**Control (n=27)**	**Positive Coping Statements (n=27)**
	Novel Context (Session 3)	Novel Context (Session 3)	Novel Context (Session 3)
	Mean (SD)	Mean (SD)	Mean (SD)
Heart Rate			
Before	96.26 (10.82)	92.85 (8.87) [a]	93.20 (10.67)
After	92.84 (10.58) [a]	91.29 (9.53) [a]	88.79 (6.89)
SUDS			
Before	3.93 (2.66)	4.48 (2.38)	4.89 (1.95)
After	3.59 (2.75) [a]	3.48 (2.69)	4.56 (2.49)
Observer Ratings			
Before			
General behaviour	2.11 (.73) [a]	2.47 (.82)	2.42 (.85)
Bodily manifestations	4.18 (1.0) [a]	3.93 (.87)	4.09 (.87)
During			
General behaviour	2.18 (.89) [a]	2.43 (.86)	2.21 (.95)
Bodily manifestations	3.94 (.88) [a]	3.92 (.80)	3.82 (.89)
Speech Related Performance Anxiety	2.72 (1.25) [a]	2.70 (.82)	2.66 (.77)

Note. [a]Multiple imputation used to replace missing data

Table 2. Novel Context (2-minute speech, Panel) vs Original Context (1-minute, Classroom Audience; 1-week Follow-up/Session 3); Main Effects (Context) and Interactions (Context x Group)

Comparison	Main Effect (Stimulus)			Interaction (Context x Group)		
	Value		Effect Size	Value		Effect Size
	F	P	η_p^2	F	P	η_p^2
Heart Rate						
Before	3.10	.09	.04	1.09	.34	.03
After	.37	.55	.01	1.57	.21	.04
SUDS						
Before	4.15	.05	.05	.15	.86	.00
After	.16	.16	.03	.52	.60	.01
Observer Ratings						
Before						
General Behaviour	.13	.72	.00	1.55	.22	.04
Body Movement	.51	.70	.00	.08	.93	.00
During						
General Behaviour	1.63	.21	.02	2.90	.06	.07
Body Movement	3.09	.08	.04	.31	.74	.01
Speech Related Performance Anxiety	.35	.56	.00	.07	.93	.00

Table 3. Mean raw scores for total social anxiety measures across timepoints

	Total		
	Pre-Exposure (n=81)	1-week Follow-up (n=81)	3-month Follow-up (n=72)
Social Anxiety Measures			
SPWRS	3.71 (1.45)	3.69 (1.24)	3.41 (1.42)
RCADS-C social anxiety	15.78 (5.12)	-	13.41 (6.31)
Social Anxiety Process Measures			
SCQ-F	2.81 (.87)	2.57 (.90)	2.49 (0.94)
SCQ-B	44.55 (2.86)	41.65 (23.43)	38.78 (24.18)
SAQ	3.96 (.90)	4.02 (.97)	4.10 (1.04)
SBQ	1.32 (.44)	1.21 (.49)	1.13 (.55)

Note. SPRWS = The Social Phobia Weekly Summary Scale; RCAD-C = The Revised Child Anxiety and Depression Scale – Child Report; SCQ-F = Social Cognitions Questionnaire Frequency; SCQ-B = Social Cognitions Questionnaire Belief; SAQ = Social Attitudes Questionnaire; SBQ = Social Behaviour Questionnaire.

Table 4. Mean raw scores for social anxiety measures by group and across assessment timepoints

	Affect Label			**Control**			**Positive Coping Statements**		
	Pre-Exposure (n=27)	1-week Follow-up (n=27)	3-month Follow-up (n=24)	Pre-Exposure (n=27)	1-week Follow-up (n=27)	3-month Follow-up (n=22)	Pre-Exposure (n=27)	1-week Follow-up (n=27)	3-month Follow-up (n=26)
	Mean (SD)								
Social Anxiety Measures									
SPWRS	3.77 (1.53)	3.54 (1.40)	3.18 (1.60)	4.07 (1.48)	4.16 (1.26)	4.08 (1.19)	3.27 (1.25)	3.39 (0.92)	2.95 (1.23)
RCADS-C social anxiety	15.96 (5.99)	-	13.34 (7.74)	15.93 (5.09)	-	14.54 (5.77)	15.44 (4.64)	-	12.32 (5.21)
Social Anxiety Process Measures									
SCQ-F	2.82 (0.95)	2.55 (1.04)	2.45 (0.99)	2.99 (0.84)	2.72 (0.79)	2.70 (0.92)	2.63 (0.82)	2.45 (0.85)	2.33 (0.91)
SCQ-B	42.84 (27.12)	39.60 (29.42)	39.08 (28.77)	44.92 (19.04)	41.99 (17.55)	38.48 (21.95)	45.90 (22.47)	43.36 (22.54)	38.78 (22.13)
SAQ	3.83 (0.96)	3.95 (1.06)	4.04 (1.07)	3.95 (0.79)	3.91 (0.82)	3.95 (1.05)	4.12 (0.94)	4.18 (1.02)	4.21 (1.02)
SBQ	1.41 (0.44)	1.21 (0.51)	1.13 (0.64)	1.34 (0.48)	1.28 (0.42)	1.19 (0.49)	1.21 (0.40)	1.16 (0.54)	1.05 (0.52)

Note. SPRWS = The Social Phobia Weekly Summary Scale; RCAD-C = The Revised Child Anxiety and Depression Scale – Child Report; SCQ-F = Social Cognitions Questionnaire Frequency; SCQ-B = Social Cognitions Questionnaire Belief; SAQ = Social Attitudes Questionnaire; SBQ = Social Behaviour Questionnaire.

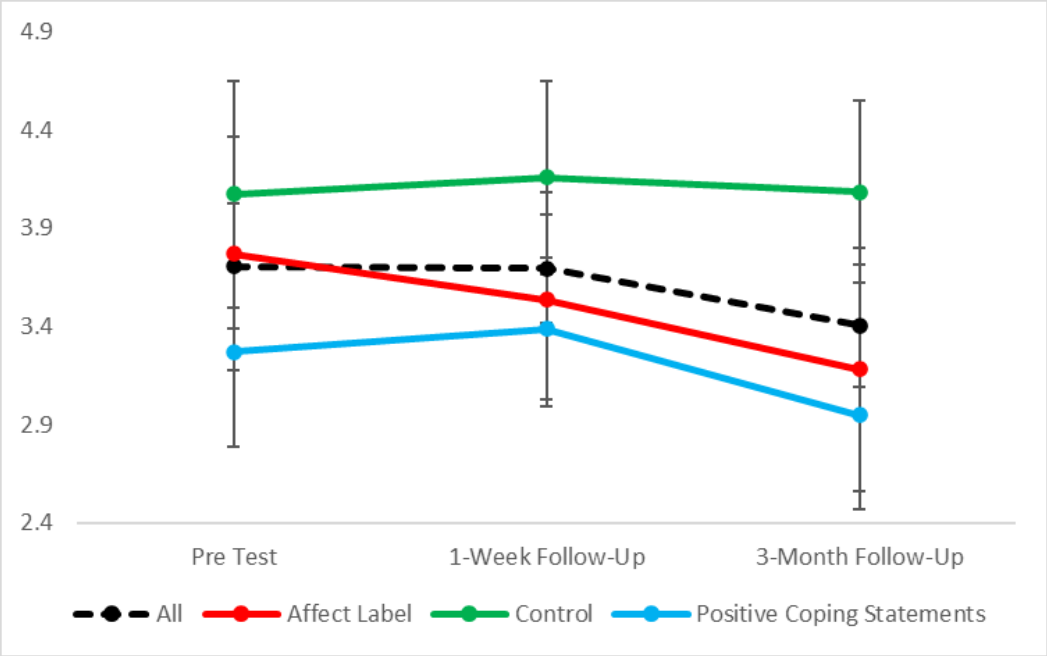

Figure 1. SPWRS across assessment time points

3.2.2 RCADS-C Social Anxiety Sub-scale

For the social anxiety subscale of the RCADS-C, there was a large, significant change over session ($F(1,78) = 18.75$, $p < .001$, $\eta_p^2 = .19$) reflecting a significant decrease from Pre-test to 3-month follow-up (M = 2.37, 95% CI [1.28 – 3.45], $p < .001$). There was a small, non-significant session x group interaction ($F(2,78) = .86$, $p = .43$, $\eta_p^2 = .02$) (see Figure 2).

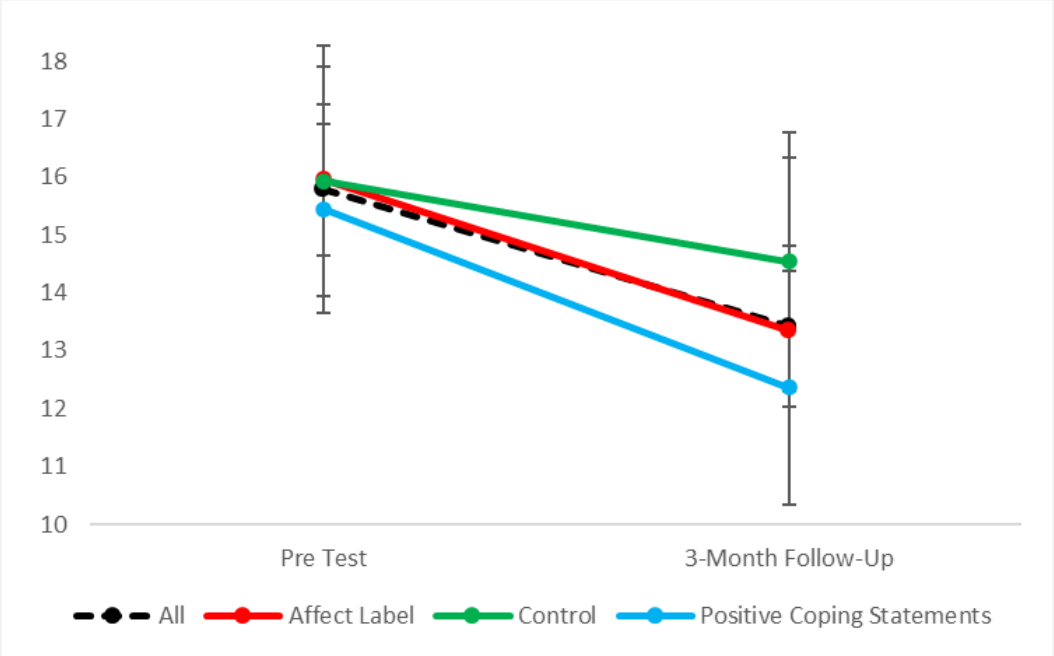

Figure 2. RCADS-C social anxiety across assessment time points

Table 5. Main Effects (Session) and Interactions (Session x Group) for social anxiety measures

Comparison	Main Effect (Session)			Interaction (Session x Group)		
	Value		Effect Size	Value		Effect Size
	F	P	η_p^2	F	P	η_p^2
Social Anxiety Measures						
SPWRS[a]	3.22	.04	.04	1.02	.40	.03
RCADS-C social anxiety[b]	18.75	< .001	.19	.86	.43	.02
Social Anxiety Process Measures						
SCQ-F[a]	12.39	< .001	.14	.18	.95	.00
SCQ-B[a]	3.48	.03	.04	.18	.95	.01
SAQ[a c]	1.21	.29	.02	.52	.72	.01
SBQ[a c]	10.72	< .001	.12	.73	.55	.02

Note. SPRWS = The Social Phobia Weekly Summary Scale; RCAD-C = The Revised Child Anxiety and Depression Scale – Child Report; SCQ-F = Social Cognitions Questionnaire Frequency; SCQ-B = Social Cognitions Questionnaire Belief; SAQ = Social Attitudes Questionnaire; SBQ = Social Behaviour Questionnaire.

[a] 3 (group) x 3 (time) mixed between ANOVA
[b] 3 (group) x 2 (time) mixed between ANOVA
[c] Mauchly's test indicated that the assumption of sphericity had been violated, degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity.

3.2.3 SCQ

For the frequency of social cognitions, there was a large, significant change over session ($F(2,156) = 12.39$, $p < .001$, $\eta_p^2 = .14$) reflecting a significant decrease from Pre-test to 1-week follow-up (M = .24, 95% CI [.11 – .37], $p < .001$) and Pre-test to 3-month follow-up (M = .32, CI [.14 – .50], $p < .001$), but not from 1-week follow-up to 3-month follow-up (M = .08, 95% CI [-.10 – .26], p = .84). There was no significant session x group interaction ($F(4,156) = .18$, $p = .95$, $\eta_p^2 = .00$) (see Figure 3).

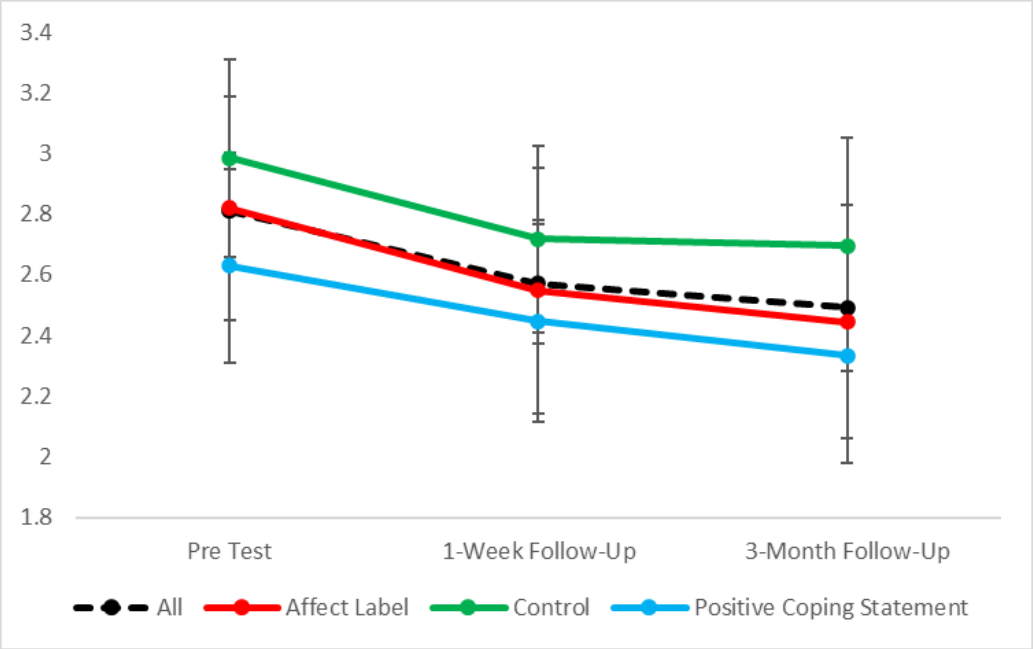

Figure 3. SCQ-f across assessment time points

A similar pattern was observed for social cognitions; there was a small, significant change over time ($F(2,156) = 3.48$, $p = .03$, $\eta_p^2 = .04$) reflecting a significant decrease from Pre-test to 1-week follow-up (M = 2.90, 95% CI [.51 – 5.29], $p = .02$) and Pre-test to 3-month follow-up (M = 5.77, 95% CI [.60 =- 10.94], $p = .03$) but not from 1-week follow-up to 3-month follow-up (M = 2.87, 95% CI [-2.08 – 7.82], $p = .25$). There was small, non-significant session x group interaction ($F(4,156) = .18$, $p = .95$, $\eta_p^2 = .01$) (see Figure 4).

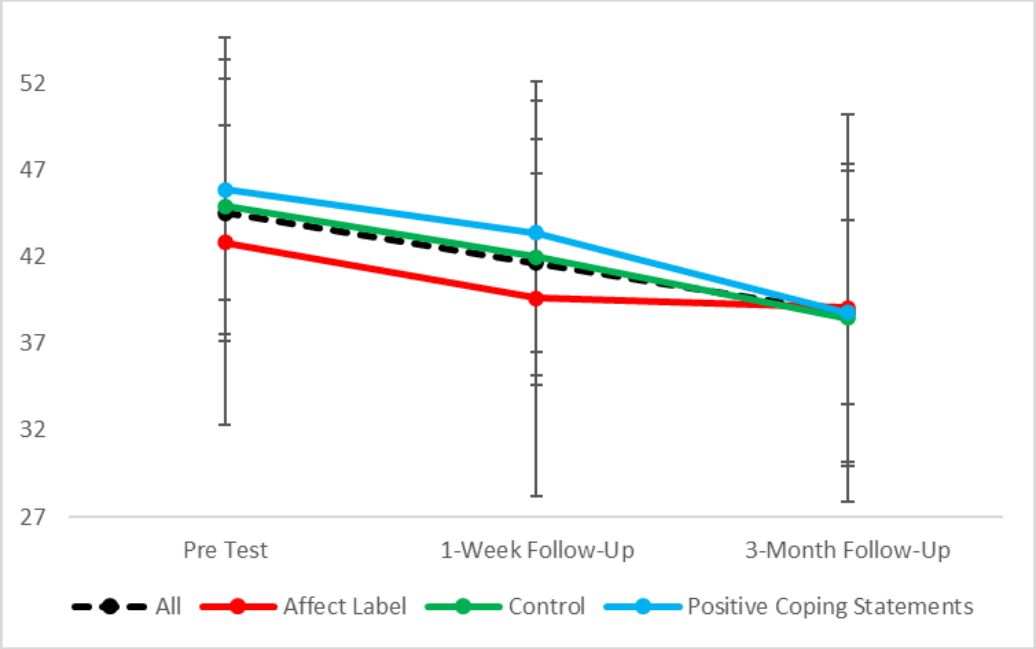

Figure 4. SCQ-b across assessment time points

3.2.4 SAQ

There were no significant main effects of time or time by group interactions based on a measure of attitudes about social anxiety (see Table 5 and Figure 5).

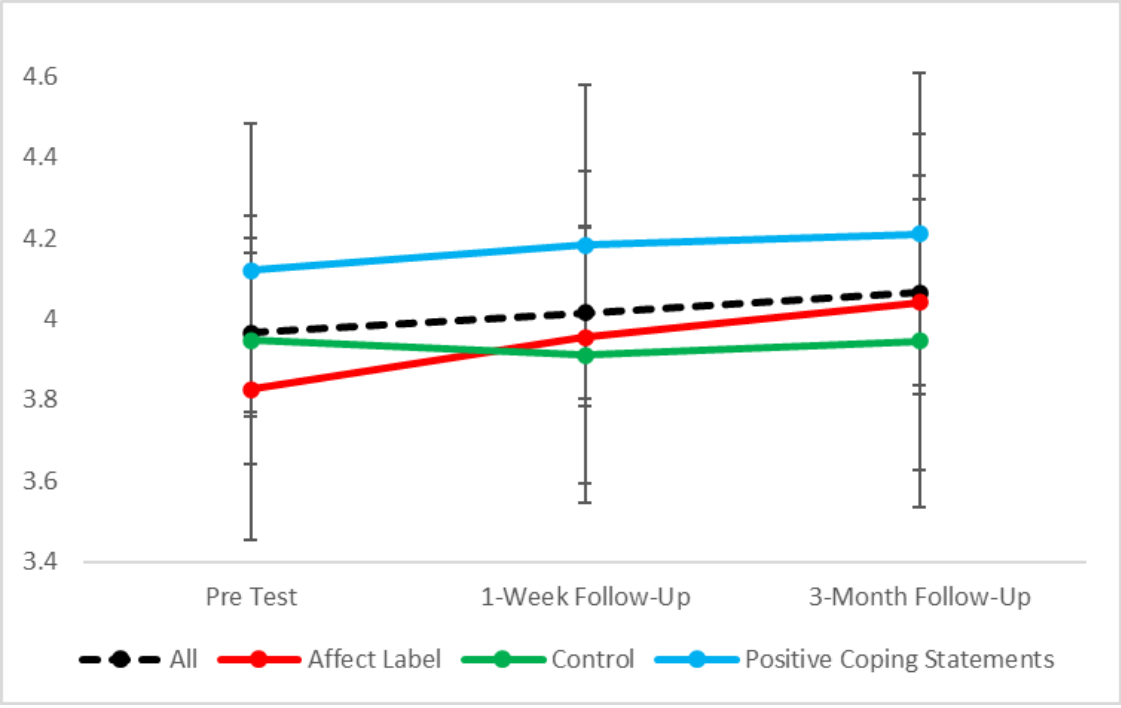

Figure 5. SAQ across assessment time points

3.2.5 SBQ

For the use of safety behaviours during social situations, there was a medium, significant main effect of time ($F(2,156) = 10.72$, $p < .001$, $\eta_p^2 = .12$) reflecting a significant decrease from Pre-test to 1-week follow-up (M = .10, 95% CI [.2 – .18], $p = .01$) and Pre-test to 3-month follow-up (M = .19, 95% CI [.08 – .31], $p < .001$), but not from 1-week follow-up to 3-month follow-up (M = .09, 95% CI [-.02 – .20], $p = .16$). There was a small, non-significant session x group interaction ($F(4,156) = .73$, $p = .55$, $\eta_p^2 = .02$) (see Figure 6).

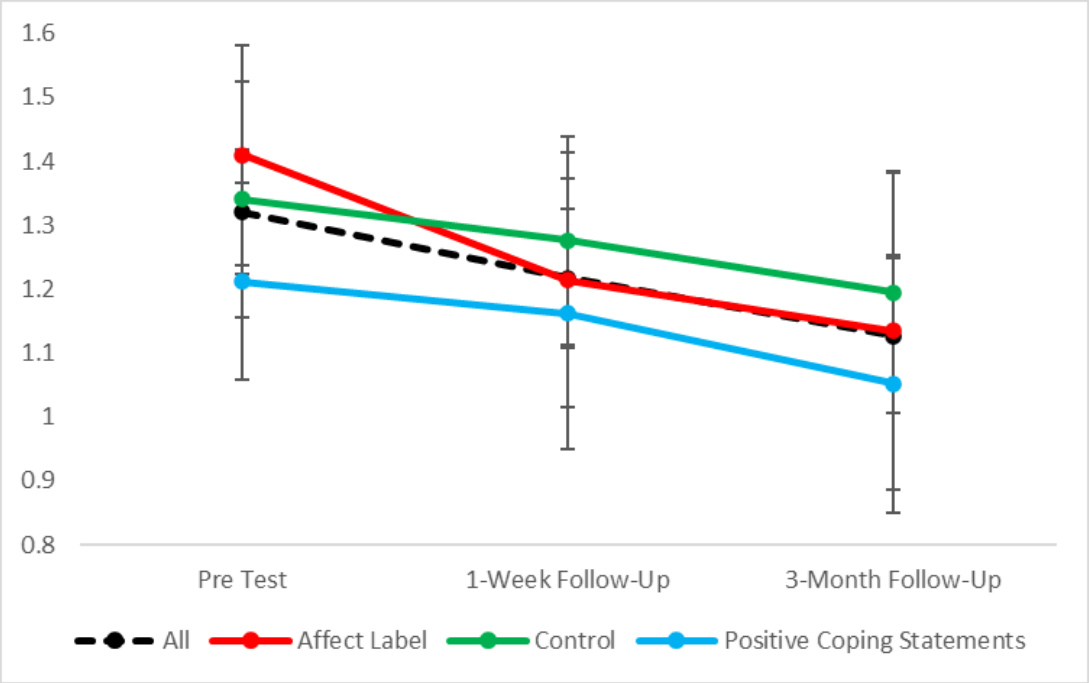

Figure 6. SBQ across assessment time points

4. Discussion

This study explored the effects of different verbalisation strategies on the generalisation of fear extinction learning for adolescents with public speaking anxiety. We found no differences in fear on any measure of anxiety in the novel context compared to the original context, suggesting that the reductions in fear seen across conditions in Paper 2 may have generalised to the novel context. However, there were no significant group differences between the different verbalisation strategies. In support of wider generalisation, significant improvements were also found in social anxiety symptoms, cognitions, and use of safety behaviours from pre-test to 1-month and 3-month follow-up, but again, there were no significant differences according to the type of verbalisation strategy employed.

While we found evidence that the effects of exposure may have generalised to a novel context, there were no differences between verbalisation strategy groups. This lack of group differences may relate to methodological issues or developmental differences between adolescents and adults, where group differences have been observed (Tabibnia et al., 2008). Specifically, unlike in adult studies, there was no evidence that affect labelling enhanced the generalisation of extinction learning across contexts. However, it is important to note that where affect labelling does appear to have brought benefits in terms of generalisation among adults, this has been based on a measure of skin conductance (Tabibnia et al., 2008), but not on heart rate. While these findings may not seem surprising given the lack of group differences at the one-week follow-up assessment in Study 2, it is possible that the novel condition was not distinct, or challenging enough, to elicit between group effects. Indeed, while the novel context in the current study appeared to elicit a moderate level of anxiety, in a study by Byrne et al., (2015), DCS augmentation effects were only observed during a more difficult, novel exposure condition. The authors suggested that group differences may not have been observed when the stimulus was presented in the original context because the setting was less challenging. The substantial, methodological differences between the current study and adult studies should also be noted. As highlighted in Paper 2, although the number of exposure trials was based on findings from previous literature (Fairchild, Van Goozen, Stollery, & Goodyer, 2008; McGuire, Orr, Wu, et al., 2016; McLaughlin et al., 2016), it is possible that the current study did not include enough exposure trials to elicit between group effects as findings from research with rodents indicates that adolescent rats required more extinction trials to achieve reductions of fear compared to younger and older rats (McCallum, Kim, & Richardson, 2010). Given that substantially less exposure trials were included in the current study compared to adult studies (e.g., Tabibnia et al, 2008) the exposure "dose" may not have been sufficient to elicit observable group differences.

The finding that social anxiety symptoms, cognitions and safety behaviours improved over time and effects were maintained in the longer-term, but with no differences between groups, may also indicate that the effects of exposure generalise without the use of affect labelling or positive coping statements. Consistent with research on adults (Hofmann, 2004; Hofmann, Schulz, Meuret, Moscovitch, & Suvak, 2006), the findings suggest that exposures designed to tackle public speaking anxiety may be associated with a reduction in broader symptoms of social anxiety. Notably, no significant changes over time were found for negative social anxiety-related beliefs. The pattern of findings may reflect that, in contrast to other constructs

(e.g., anxious cognitions), the artificial nature of the exposure exercises meant that disconformity evidence (e.g., "The audience did not pick on or laugh at me" and "No one laughed at my speech") for negative social attitudes was not provided. Indeed, the social attitudes measure includes items such as "My anxiety is obvious to other people", "If people see I'm anxious they will pick on me and humiliate me" and "If I make a mistake in a social situation people will laugh at me or be angry with me" whereas the anxious cognitions measure asks participants to rate cognitions such as "I will be unable to speak", "I am going to tremble or shake uncontrollably" and "I will be frozen with fear" (which are more likely to have been disconfirmed during the exposure exercises).

Given the growing interest in alternative exposure stimuli for the treatment of social anxiety (e.g., virtual reality; Anderson et al., 2013; Anderson, Rothbaum, & Hodges, 2003; Parrish, Oxhandler, Duron, Swank, & Bordnick, 2015) and the medium-large effect sizes that were found between pre-test and 1-week follow-up in the current study, it is possible that pre-recorded social stimuli may offer a cost-effective, approach to social exposures. While it is important to recognise that the lack of a no-exposure condition means that we cannot rule out the possibility that changes in social anxiety symptoms occurred due to external factors (e.g., time) independent of the experimental paradigm, the effects found it indicate the potential value of future studies to examine the clinical utility of pre-recorded material (e.g., classroom/panel audience), for example, by measuring changes in social anxiety symptoms in methodologically robust studies which include a no-exposure control condition and clinical samples.

This study is the first to address the effectiveness of exposure verbalisation strategies on the generalisation of extinction learning in young people with public speaking anxiety. Strengths include the inclusion of a novel context assessment and clinically relevant measures. As evident in the systematic review (Paper 1), to date only two studies have investigated the effect of exposure optimisation strategies on the generalisation of extinction learning for young people. The study is also the first to examine the effects of using a pre-recorded audience as exposure stimuli, on social anxiety symptoms. Third, the study design meant that it was possible to conduct the study and exposure trials where participants' public speaking anxiety is likely to have originated, as typically, students as often required to answer questions and deliver presentations in front of class. This may be particularly beneficial as there is suggestion that renewal of fear is greater when extinction occurs in the same context that the fear began (Craske et al., 2008). However, there are several limitations that warrant comment. First,

context renewal of fear is greater when more distinct contexts are encountered (Mystkowski et al., 2002; Mystkowski, Craske, Echiverri, & Labus, 2006). Although the novel stimulus exhibited several distinct characteristics compared to the original stimulus, both stimuli used a pre-recorded audience and the perceived aversiveness between the audiences (e.g., larger classroom vs smaller panel) is not clear. Therefore, it is possible that the findings indicate insufficient differences between the two contexts, rather than the generalisation of extinction learning. However, it is conceivable that if participants were responding in the same way to both contexts, that a reduction of fear would have been observed when encountering the novel context due to a carryover effect from facing the original exposure stimuli only 15 minutes beforehand. We also cannot conclude that the fear responses to the novel context reflected a 'generalisation' effect, rather than for example, reflecting there having been a lower level of fear for that context prior to exposure. This is clearly difficult to establish as if we had introduced the novel context earlier in the paradigm it would not have been 'novel' at the end, however given the nature of the task it seems unlikely that this would have been less fear provoking at the outset. Furthermore, and as highlighted in the study by Tabibnia et al (2008), multiple contexts were included across all conditions, which may have enhanced generalisation effects confounded across the study conditions, and account for the null findings. Unlike previous research with adults (Tabibnia et al., 2008), we did not collect skin conductance measures, therefore it is not clear whether comparable between group effects would have been evident on alternative measures of fear responding. Finally, while participants reported as having high performance anxiety, they were not identified based on elevated social anxiety symptoms and scored substantially below the clinical cut off for symptoms of overall anxiety and social anxiety, limiting the extent to which clinical implications can be drawn.

To conclude, the current study extended the findings from Paper 2 and compared the effects of adding different verbalisation strategies (positive coping statements, affect labelling, and neutral statements) on the *generalisation* of extinction learning for the adolescents with public speaking anxiety who took part in the study outlined in the previous chapter. We found no significant differences between the groups between the original, 1-minute speech context and a novel, 2-minute speech context at 1-week follow-up on any measure of fear nor on any measure of social anxiety. Interestingly, we found significant reductions in some measures of social anxiety from pre-test to 1-week follow up (e.g., anxious cognitions and behaviours) and this effect was maintained in the longer term. A broad implication may be that for adolescents with public speaking anxiety, the effects of exposure generalise without the use of verbalisation

strategies, and a recorded audience may provide a valuable exposure stimulus. However, like Paper 2, notable methodological limitations prevent firm conclusions from being made. Crucially, the study highlights the need for further experimental studies using more distinct generalisation contexts (compared to original contexts), standardised/high validity generalisation assessments (e.g., behavioural approach tests) and including samples with elevated social anxiety, in order to move towards ensuring that exposure generalises beyond the therapeutic context in the treatment of youth anxiety disorders. It would also be beneficial for future studies to isolate variables (e.g., verbalisation strategies versus multiple contexts) to determine what factors are driving generalisation effects.

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Chapter 5

General Discussion

5. Discussion

The overall aim of the studies included in this thesis was to enhance understanding of exposure optimisation for the treatment of child and adolescent anxiety disorders. This is of importance as exposure is believed to be the critical ingredient of CBT (Kendall et al., 2005; Peris et al., 2015; Peterman, Read, Wei, & Kendall, 2014), however, many do not benefit (James, James, Cowdrey, Soler, & Choke, 2015). Therefore, strategies designed to enhance exposure outcomes for children and young people were the focus of the studies.

The studies build on previous research in two crucial ways. First by capturing the current evidence base concerning the optimisation of exposure in children and young people and second, by examining the effectiveness of adding traditional and contemporary verbalisation strategies to exposure for adolescents fearful of public speaking. Whilst there is a wealth of translational, experimental research that has been used to design innovative, extinction informed exposure strategies (i.e., by targeting inhibitory learning) for adults (Craske, Hermans, & Vervliet, 2018; Craske et al., 2008; Craske, Treanor, Conway, Zbozinek, & Vervliet, 2014b), it is currently unclear how exposure can be optimised in young people. However, there is growing suggestion from fear conditioning and extinction studies with animals (Shechner, Hong, Britton, Pine, & Fox, 2014) and children and adolescents (Waters, Theresiana, Neumann, & Craske, 2017) that inhibitory learning strategies may also be applicable for young people. Consequently, the studies sought to i) capture the current state of empirical evidence concerning factors associated with differential outcomes from exposure in children and young people with anxiety symptoms/disorders (Paper 1), ii) examine the effectiveness of optimisation strategies on outcomes for young people with anxiety symptoms/disorders (Paper 1), iii) examine the strength of associations between characteristics of the process of exposure and outcomes for the treatment of young people with anxiety symptoms/disorders (Paper 1), iv) explore the effects of different verbalisation strategies on exposure for public speaking anxiety in adolescents (Paper 2 and Chapter 4) and v) examine whether extinction learning acquired during exposures designed to tackle public speaking anxiety generalises to a novel context and symptoms of social anxiety more broadly (Chapter 4).

The general discussion will present an overview of the findings from each of the studies in turn and consider the findings in the context of optimising exposure, specifically in relation to implications for future research and clinical interventions.

5.1 Overview of Findings

5.1.1 Chapter 2 (Paper 1): Optimising Exposure for Children and Adolescents with Anxiety: A Systematic Review

This study was a systematic review of the literature exploring factors associated with differential outcomes from exposure in children and young people with anxiety symptoms/disorders that examined i) specific exposure optimisation strategies and ii) specific characteristics of the process of exposure. The review identified 29 articles for inclusion. The results of the review revealed the existing literature to be a heterogeneous group of between (n=17) and within (n=12) subject studies, largely involving broad age ranges (e.g., 8-17 years) of referred clinical samples. Crucially, not one significant finding was replicated by another study for the same time point using the same methodology. There were methodological inconsistencies (e.g., study quality, conceptualisation of key factors and how constructs were measured), most studies did not include a follow-up beyond 3-months, or a generalisation assessment, and only one study examined age as a moderator. Given the notable methodological limitations, the review concluded that the results are tentative and should be interpreted with caution.

The evidence generally failed to support a role of habituation-based fear reduction in the successful treatment of child and adolescent anxiety disorders. However, consistent with strategies derived from inhibitory learning theory (e.g., Craske et al., 2008; Vervliet, Craske, & Hermans, 2013), there was preliminary evidence that some specific strategies may enhance the effects of exposure, such as dropping safety behaviours and parents and therapists discouraging avoidance (Benito, Conelea, Garcia, & Freeman, 2012; Hedtke, Kendall, & Tiwari, 2009) but the studies were not set up using this theoretical approach or terminology. Support for the use of pharmacological strategies to enhance memory consolidation was mixed (e.g., Byrne et al., 2015; Farrell et al., 2013; Scheeringa & Weems, 2014; Storch et al., 2010, 2016).

The review revealed that the majority of potential optimisation strategies identified within the adult literature (Craske et al., 2018, 2008, 2014b) have not been explored from a developmental perspective, and there was a notable scarcity of preclinical research, and

research with (only) adolescent samples. The paper recommended that, in line with research with adults (Craske et al., 2018; Vervliet et al., 2013), future research needs to examine targeted, theoretically-driven strategies in methodologically robust, preclinical studies, and use the findings from these studies to guide and prioritise the development of clinical research.

5.1.2 Chapter 3 (Paper 2): Optimising Exposure for Adolescents with Public Speaking Anxiety: Affect Labelling or Positive Coping Statements?

It is commonly believed that children and young people require cognitive strategies to tolerate exposure exercises (Manassis, Russell, & Newton, 2010), however, a recent dismantling study not only demonstrated the feasibility of delivering exposure without pre-exposure anxiety management (e.g., relaxation and cognitive restructuring), but also the potential to *enhance* outcomes (Whiteside et al., 2015). Further, equivalent fidelity ratings, dropouts and satisfaction between exposure with vs without anxiety management suggests that anxiety management strategies may not be necessary in the treatment of childhood anxiety disorders (Whiteside et al., 2015). Further, research with adults (Craske, 2015) and more recently children and young people (Whiteside et al., 2020) suggests that the use of relaxation may impede optimal outcomes from being achieved. There is also evidence from studies with adults that in the longer term, explicitly verbalising negative affective states and feared outcomes during exposure attenuates physiological arousal to feared stimuli compared to the use of cognitive reappraisal (Kircanski, Lieberman, & Craske, 2012) and exposure alone (Kircanski et al., 2012; Niles, Craske, Lieberman, & Hur, 2015). As identified in Paper 1, no studies had previously compared the effectiveness of verbalisation strategies on fear responding for young people. Paper 2 addressed this issue by using an experimental study to explore the effectiveness of different verbalisation strategies on exposure for public speaking anxiety in adolescents. Specifically, the study compared the effects of exposure with affect labelling, positive coping statements and neutral statements on fear responses in a community sample (n=81) of adolescents (age 13-14 years) with public speaking anxiety as they delivered a series of speeches in front of a pre-recorded classroom audience. Self-rated anxiety, heart rate, and observer ratings of expressed anxiety were assessed pre-test, immediate post-test and at 1-week follow-up. It was hypothesised that adolescents instructed to use affect labelling would show significantly greater reduction of fear than adolescents instructed to use positive coping statements and neutral statements, at 1-week follow up. Potential differences in post-exposure anxiety between exposure with neutral statements and exposure with positive coping statements were also explored.

The main finding from the study was that significant improvements in self-rated anxiety and objective performance related anxiety were observed across all conditions. However, given methodological shortcomings (e.g., lack of a no-exposure control condition) the extent to which external factors (e.g., time) may have accounted for the observed improvements was unclear. Neither affect labelling or positive coping statements enhanced exposure on any measure from pre-test to 1-week follow-up. Although, consistent with adult research, the positive coping statements group had a greater reduction in self-rated anxiety compared to the other groups immediately post-exposure, (Kircanski et al., 2012), there was no advantage in the longer term. In contrast to previous research with adults (Kircanski et al., 2012; Niles et al., 2015), there was no advantage for the affect labelling group on any measure, at any timepoint. While the findings may suggest that habituation is not a necessary precursor for long term therapeutic benefit (Craske et al., 2008), the results failed to support the use of an inhibitory learning strategy for the optimisation of exposure for adolescents. Although group differences were not significant from pre-test to follow-up, there were noticeably different patterns across the different conditions, with continued reductions in fear for affect labelling, stability for neutral statements, and a significant, partial return of fear for positive coping statements from post-test to 1-week follow-up. The finding that the use of positive coping statements did not facilitate exposure long-term, compared to the two other strategies, adds to evidence suggesting that anxiety management strategies may not improve outcomes in young people with anxiety (Whiteside et al., 2015). Therefore, while greater initial fear reduction (as seen in the positive coping statements group) may provide advantages such as enhanced self-efficacy / perceived ability to cope with more challenging exposures earlier on in treatment, the advantages were short-lived, further research is required to determine the applicability of exposure strategies across different developmental periods, types of anxiety symptoms/disorders and severity. Crucially, this study demonstrated the possibility of conducting innovative experimental research with young people, however, notable limitations highlighted the importance of further research including more exposure trials and clinical samples to ultimately identify how to move towards enhancing exposure outcomes for child and adolescent anxiety disorders.

5.1.3 Chapter 4 (Study 3): Generalisation of Exposure

The risk of relapse may be increased if a different exposure stimulus is encountered (Rowe & Craske, 1998) or if the previously feared stimulus is encountered in a different context to that in which treatment took place (Culver, Stoyanova, & Craske, 2011; Mineka, Mystkowski, Hladek, & Rodriguez, 1999; Mystkowski, Craske, & Echiverri, 2002; Rodriguez, Craske,

Mineka, & Hladek, 1999). Research with adults has demonstrated that the generalisation of extinction learning may be enhanced using strategies such as DCS (Ledgerwood, Richardson, & Cranney, 2005), scopolamine (Zelikowsky, Pham, & Fanselow, 2012) and affect labelling (Tabibnia, Lieberman, & Craske, 2008). As identified in Paper 1, no studies have previously compared the effectiveness of verbalisation strategies on the generalisation of fear responding for young people. Chapter 4 (Study 3) addressed this issue by extending the findings from Paper 2, to explore the effectiveness of different verbalisation strategies on the generalisation of exposure for public speaking anxiety in adolescents. The study also examined whether extinction learning acquired during Study 2 extended to broader social anxiety symptoms, cognitions, safety behaviours and attitudes. Fear was assessed twice; during a 1-minute speech delivered in an original context, and during a 2-minute speech delivered in a novel context. as in Paper 2, fear was measured through self-rated anxiety, heart rate, and observer ratings of expressed anxiety. Social anxiety symptoms, cognitions, safety behaviours and attitudes were measured at pre-test, 1-week follow-up and 3-month follow-up. Given the limited evidence to guide directional hypotheses, the study was exploratory.

The main finding from the study was that there were no significant differences on any measure of fear between the original context and the novel context at the one-week follow-up assessment, for any condition. In other words, extinction learning appeared to generalise to the novel context, however, there was no advantage of affect labelling or positive coping statements on this effect. Significant improvements over time were found in social anxiety symptoms, cognitions and use of safety behaviours from pre-test to 1-month and 3-month follow-up, but again, no differences between groups. A broad implication of this study is that for adolescents with public speaking anxiety, the effects of exposure appears to generalise without the use of verbalisation strategies, and recorded audiences may provide a valuable exposure stimulus. Again however, notable methodological limitations such as limited differences between the original and novel context stimuli, restricted outcomes measures, and sample characteristics (such as not being identified based on elevated social anxiety symptoms), prevent firm conclusions from being made. The study concluded that moving forwards, further experimental studies using more distinct generalisation contexts and samples with elevated social anxiety symptoms (e.g., high fear of negative evaluation) are needed.

5.2 Key Issues Identified in the Thesis

One of the most important issues to emerge from this thesis is the lack of clarity concerning the optimisation of exposure in children and young people along with notable challenges, and gaps, in the field. Crucially, Chapter 2 demonstrated a clear lack of study replication and highlights that evidence concerning exposure optimisation in children and young people is at a very early stage. Although there is preliminary evidence that some specific strategies may enhance the effects of exposure, not one significant finding had been replicated, and the majority of strategies identified within the adult literature have not been explored with children or young people. To address these challenges, methodologically robust research is needed that includes preclinical, analogue studies to guide the development of future clinical research. Chapter 2 also identified a lack of theoretically driven research, methodological issues such as inconsistent conceptualisation of concepts and outcomes measures, and a lack of research that takes developmental stage into account. The following section will attempt to address each of these issues and highlights implications for future research directions.

5.2 Implications for Future Research

5.2.1 Theoretically driven research

The inhibitory learning theoretical approach has significant implications for how an exposure strategy is designed yet we currently lack evidence for its applicability in young people. In Paper 1, although some characteristics appeared to be consistent with the suggestion that inhibitory learning strategies were associated with improved exposure outcomes (Benito et al., 2012; Hedtke et al., 2009; Tiwari, Kendall, Hoff, Harrison, & Fizur, 2013), the studies were not set up using this theoretical approach or terminology so direct conclusions could not be drawn. Similarly, there were some characteristics which may be consistent with inhibitory learning strategies that were *not* associated with improved outcomes (e.g., differences between expected and actual distress; Kircanski & Peris, 2015). While these findings may represent differences in the applicability of particular inhibitory learning strategies across development, they may also highlight methodological shortcomings such as limited experimental control and poor internal validity. For example, in CBT for childhood anxiety disorders, exposures may follow a cognitive approach and be set up as "behavioural experiments" to collect evidence which may be used as an opportunity to challenge dysfunctional cognitions. Conceptually, this strategy differs from the inhibitory learning model, which focusses on developing, and enhancing the retrievability of an inhibitory memory to compete with the original fear memory

(Craske et al., 2008; Craske, Treanor, Conway, Zbozinek, & Vervliet, 2014a). For example, behavioural experiments are derived from cognitive models (e.g., Clark, 1999), and seek to identify, challenge, and modify anxious thoughts through experiments which may include exposure, but also cognitive strategies such as probability estimation. Strategies which challenge assumptions and reduce anxiety may also be used prior to behavioural experiments. Inhibitory "violation of expectancies" exposures, however, are derived from extinction learning, and the premise that a powerful, aversive memory has previously formed, and underpins anxiety symptoms. The focus and goal of treatment, therefore, is to identify what the original memory means in terms of expectations (e.g., "The dog will bite me if I get within 3 metres of it") and create a new, non-threatening memory that violates the expectation, is powerful enough to compete with the aversive memory (i.e., win a "retrieval competition) and generalise to other contexts. In practice, extinction strategies which maximise learning may be used as part of the exposure trial. For example, continuing exposure for the duration determined to most effectively violate expectancies (rather than when fear has declined), presenting two cues during the same exposure after conducting initial exposure with at least one of them (deepened extinction) and using a cue during exposure or encouraging the individual to mentally reinstate previous, successful exposures (mental reinstatement / retrieval cues) (Craske et al, 2014). As such, the extent to which cognitive and behavioural strategies blend during exposure sessions and which strategies contribute towards outcomes, is uncertain in these types of studies, and it is not clear whether the findings can truly be accounted for by inhibitory learning approaches. Moving forwards, future studies should consider theoretically led research that directly explores the effectiveness of specific inhibitory learning strategies on exposure outcomes. Subsequent studies should examine a broader range of optimisation strategies (e.g., violation of expectancies, multiple contexts, occasional reinforced extinction, reconsolidation, deepened extinction, and retrieval cues) (Craske et al., 2018, 2008; Vervliet et al., 2013) through experimental manipulation, using study designs with a high level of control and internal validity (e.g., between subject studies with an "EXP plus" vs "EXP alone" vs waitlist or "no EXP" conditions).

Novel approaches to exposure may also be explored using clinical trials; however, it will be important to ensure that treatment conditions are set up using specific theoretical approaches. Based on findings from fear conditioning and extinction studies, McGuire & Storch, (2018) have recently developed guidelines for the clinical application of inhibitory learning theory in children and young people, although they have yet to be empirically tested.

These guidelines may be used to define and develop an inhibitory learning driven treatment manual so that clinicians understand the foundations and specific procedures and ensure that treatment conditions are guided by relevant theory. An initial step may be to develop pilot studies that closely examine the feasibility and acceptability of a novel treatment, followed by evaluating the extent to which outcomes can be attributed to the treatment (e.g., using no-treatment control designs). Future research may then use comparative study designs to assess the relative effectiveness of inhibitory learning theory guided treatment compared to more "traditional" approaches (e.g., Kendall, Choudhury, Hudson, & Webb, 2002; Kendall & Hedtke, 2006). Notably, an important limitation in comparative treatment designs is the potential for differences in the quality of treatment conditions. For example, therapists may be more familiar with, or well versed, in using a more "traditional" approach, and differences in outcomes may be due to quality differences, rather than the type of treatment delivered (Spokas, Rodebaugh, & Heimberg, 2013). While assessment of treatment adherence, fidelity, and therapist competence can help to determine whether a therapy has been accurately represented, Study 1 highlighted that research within the field has typically lacked these qualities and it will be important for future research to overcome these limitations. It may also be interesting for future studies to explore whether features of exposure practice (e.g., differences between expected and actual distress; Kircanski & Peris, 2015) are associated with improved outcomes when exposures are set up using theoretically driven approaches.

5.2.2 Conceptualisation of variables

As demonstrated in Paper 1, the mixed results and lack of replication between studies may be due to variability concerning the conceptualisation of exposure optimisation and process variables. Although a number of studies explored the relationship between some characteristics of exposure (e.g., quantity of exposure; (Benito et al., 2018; Hedtke et al., 2009; Kircanski & Peris, 2015), within session fear reduction; (Benito et al., 2018; Kircanski & Peris, 2015; Peterman et al., 2016; Waters et al., 2015) and outcomes, there was variation in how these constructs were measured. This is of importance as variability between constructs limits study comparability. Research with adults may provide a basis for creating agreement upon variable conceptualisation within the literature (e.g., (Craske et al., 2008), however, the conceptualisation of exposure-related variables in the treatment of child and adolescent anxiety is not clear. Although preliminary, Benito et al., (2018) found that greater habituation (when operationalised as fear decreases resulting from learning processes) during exposures that were more consistent with inhibitory learning theory (e.g., almost half of the participants never had

any observed exposures ending with zero fear) (Craske et al., 2008) was significantly associated with enhanced outcomes. Therefore, habituation defined in this way, may be a more accurate, and practical marker of extinction learning during exposures and may be particularly useful for future research that is driven by inhibitory learning theory. Similarly, therapists' approach is likely to vary according to the theory used when designing exposures, which have important implications concerning exposure processes of interest. While some studies have included a test of therapist adherence and patient fidelity, measures typically addressed whether exposure was completed or not, rather than specific processes (e.g., therapist, parent and client behaviours) using clear operational definitions based on specific characteristics and the theoretical approach. Conceptualising adherence and fidelity according to the theoretical approach will help to ensure more accurate assessments of treatment quality. Moving forwards, future studies should aim to develop reliable and valid conceptualisations of exposure variables to enhance the accuracy, comparability, and replicability of studies within the field.

5.2.3 Type and Timing of Measures

The variation in results highlighted in this thesis may be due to differences between studies in the timing and type of measures used to assess fear/anxiety. For example, previous experimental research with adults has used a variety of dependent measures such as skin conductance, heart rate, subjective ratings of distress and behavioural approach tests (Kircanski et al., 2012; Niles et al., 2015; Tabibnia et al., 2008). Additionally, measures have been assessed during different phases of exposure; in the study by Kircanski et al., (2012) subjective fear was assessed following the final step of each test trial, whereas participants in the study by Niles et al., (2015) rated their current anxiety level prior to and following each speech task, which were then averaged. However, in Paper 2, subjective fear was rated prior to and following each speech task and the ratings were analysed and reported separately in order to examine differences in anticipatory anxiety and post-event rumination.

There was also variation in the type and timing of fear measures between the clinical studies included in Paper 1 as some studies included trial-by-trial fear ratings, whereas others assessed fear/anxiety using different phases of treatment. For example, Kircanski & Peris, (2015) included session-by-session ratings of subjective fear, whereas Benito et al., (2018) included ratings of fear from exposure sessions selected according to difficulty (e.g., easy, medium and difficult), which may have contributed towards the different findings. In terms of dependent measures, the clinical studies were somewhat consistent in that the majority included

a clinician rating of anxiety or a self-report measure of symptom severity. However, while identifying reductions in symptom severity and anxiety is often a central focus in studies like those included within Paper 1, a principle goal for exposure-based treatment is for individuals to learn that they can cope with anxiety, rather than eliminate this experience altogether (Peterman et al., 2014) and to improve overall quality of life and functioning. Indeed, functional interference measures (e.g., the Child Anxiety Impact Scale-CAIS; Langley, Bergman, McCracken, & Piacentini, 2004) may be a more meaningful assessment of outcomes for children and young people, parents and clinicians (Creswell et al., 2020), and should be considered in these types of studies.

Moving forwards, it may be more suitable for preclinical studies to use measures that have been recommended for fear conditioning and extinction research (e.g., skin conductance response, fear potentiated startle and self-rated anxiety) based on their sensitivity to extinction effects (Ryan, Zimmer-Gembeck, Neumann, & Waters, 2019) and for clinical trials to use measures that have been recommended for treatment trials for anxiety disorders (e.g., a multi-dimensional measure of anxiety symptoms, a measure of target symptoms, and a measure of interference or impact caused by anxiety that is separate from anxiety symptoms) (e.g., Creswell et al., 2020). Further, for consistency, it may be more appropriate for studies to measure fear as a process variable on trial-by-trial basis. However, trial-by-trial ratings of anxiety were not elicited in Paper 2 due to concerns that this could influence participant responding, an area in need of further exploration (Ryan et al., 2019). Taken together, it will be important for future studies to determine optimal dependent measures that produce replicable effects in both experimental and clinical studies of child and young people who are anxious.

5.2.4 Developmental differences

The findings from the studies presented in this thesis suggest that to enhance exposure outcomes for child and adolescent anxiety disorders it is necessary to take age into account. While treatment approaches differ in terms of language and parent involvement, they generally include the same techniques for children and adolescents (e.g., Kendall et al., 2002; Kendall & Hedtke, 2006), and protocols for adolescents have typically been developed from either younger (e.g., (Kendall et al., 2002; Kendall & Hedtke, 2006) or older (e.g., Pincus, May, Whitton, Mattis, & Barlow, 2010) age groups. However, there is growing evidence from research with animals (Ganella & Kim, 2014; Li, Kim, & Richardson, 2012; McCallum, Kim,

& Richardson, 2010) and fear conditioning and extinction research with children and adolescents (McGuire et al., 2016; Waters et al., 2017) that exposures may need to be devised differently across ages.

Adolescence appears to be a unique period marked by impaired extinction learning relative to younger and older developmental stages (Ganella & Kim, 2014; McCallum, Kim, & Richardson, 2010; McGuire et al., 2016; Waters et al., 2017), which may be due to developmental distinctions in the neural circuitry underlying extinction (Kim, Hamlin, & Richardson, 2009), whereas compared to adolescents and adults, younger children appear to demonstrate greater generalisation of aversive expectancies to "safe" stimuli during conditioning and extinction (Waters et al., 2017). As such, younger children may require more support to process learning before and after exposure (e.g., to differentiate between threatening and safe situations), whereas adolescents, alternatively, may require a greater number of exposure trials to elicit experimental effects (McCallum, Kim, & Richardson, 2010).

Younger children may demonstrate poorer insight compared to adolescents, and require more support to identify/articulate feared outcomes (McGuire & Storch, 2018). However, the results from the systematic review highlighted that even though the majority of studies included a broad age range (e.g., 7-17 years), only one study examined age as a moderator, (Farrell et al., 2018), only 14% included younger children (e.g., 3-8 years) (Benito et al., 2012; Byrne et al., 2015; Menzies & Clarke, 1993; Weiss, McCullagh, Smith, & Berland, 1998) and only 10% included an adolescent sample (Leyfer, Carpenter, & Pincus, 2019; Mataix-Cols et al., 2014; Olivares-Olivares, Ortiz-González, & Olivares, 2019). Therefore, it will be important for future research to take account of age, and the effectiveness of distinct exposure strategies, by focussing on specific age groups or by ensuring that studies are sufficiently powered to test for subgroup differences (e.g., moderation analysis of participant age). Fear conditioning and extinction studies have demonstrated that differential conditioning is evident at approximately 6-years (McGuire et al., 2016), therefore, future studies may wish to include children from this age onwards, and consider grouping children and adolescents into cohorts based on distinct developmental stages (e.g., by school year).

5.2.5 Robust, experimental studies

A particularly notable finding from Paper 1 was the lack of preclinical, experimental research with children and young people in the field of exposure optimisation. This is conspicuous given that CBT treatment manuals for adults have typically been developed using

analogue studies with animals and preclinical samples (e.g., exposure response prevention for OCD; Houts, 2006; Solomon, Kamin, & Wynne, 1953). Yet, much of the literature in the field of exposure optimisation for youth anxiety has been conducted using data from a small subset of clinical trials (e.g., the Child and Adolescent Multimodal Study, CAMS; Compton et al., 2010). In line with adult research, (Craske et al., 2018; Vervliet et al., 2013) it may be more efficient to expand the field first by examining targeted, theoretically-driven strategies in methodologically robust, preclinical studies, and using the findings from these studies to guide and prioritise the development of clinical research. Clinical analogue studies are relatively easy to conduct and can be used in the early stages of treatment research (Reynolds & Streiner, 1998). While analogue studies have been criticised for lacking application to "real life", they have been used successfully to study various disorders such as OCD (Abramowitz et al., 2014) and PTSD (Ehring, 2013), and exhibit several advantages including increased accessibility to adequately powered samples (McNeil & Hayes, 2014). Although studies using clinical samples offer more immediate implications for understanding and treating psychological disorders, analogue studies offer more precise experimental control and enhanced internal validity.

As such, it is recommended that future research should examine targeted, theoretically driven strategies in methodologically robust, preclinical studies, and the findings from these studies should be used to guide and prioritise the development of clinical research with children and young people. Encouragingly, the successful delivery of the studies in Chapters 3 and 4 demonstrated the feasibility of conducting preclinical research with adolescents in a naturalistic setting. However, variations between study designs may account for the mixed results and lack of replication between these studies and previous research with adults (Kircanski et al., 2012; Niles et al., 2015). Similarly, a recent review of fear conditioning and extinction research in youth identified that studies have yielded mixed results due to developmental processes and variations in study design, methodology and dependent measures (Ryan et al., 2019). While there are no specific recommendations concerning the optimal standards for clinical analogue studies in youth, it may be sensible for future experimental research designs to be informed using recent recommendations for the design of differential fear conditioning and extinction experiments (Ryan et al., 2019). For example, use at least two distinct exposure stimuli relevant to the targeted fear (e.g., at least two different spiders for individuals fearful of spiders), ensure that the exposure stimuli elicits at least a moderate level of fear/anxiety based on at least one measure of fear and use at least 5 exposure trials along with the exposure strategy of interest. This approach may help to address problems concerning the reproducibility of findings and

advance the translation of experimental research on extinction into clinical science research and practice (Ryan et al., 2019).

Established areas of weakness within the current evidence base highlight priority areas for future experimental research. The first priority is for preclinical research to work towards optimising exposure for anxiety disorders with poorer treatment outcomes such as social anxiety disorder (Compton et al., 2010). Indeed, the findings from the systematic review highlighted that only one study has explored the optimisation of exposure for adolescents with social anxiety disorder. Therefore, at a preclinical level, future studies may need to recruit samples based on, for example, elevated fear of negative evaluation (e.g., Stopa & Clark, 2001). Given that exposures vary between disorders (Benjamin et al., 2010), it will also be important for future research to establish how best to design exposures for different types of fear (e.g., specific vs abstract) and methods of exposure (e.g., in vivo vs imaginal). Second, future preclinical research should ensure the use of consistent, valid outcome measures. While the findings from the systematic review highlighted that most clinical trials included outcome measures that are recommended for treatment trials (e.g., a clinician rating of disorder severity or a disorder specific symptom measure) (Creswell et al., 2020), these measures may not be suitable for preclinical research. Third, it will be important for experimental research to include longer term follow-ups and generalisation assessments to capture accurate representations of the effectiveness of exposure strategies. While most of the studies included within the review included a follow-up assessment, only seven included a follow-up beyond 3-months, and only two assessed the generalisation of extinction. In line with adult research (Craske et al., 2018), future studies should focus on generalisation across contexts such as re-encountering the feared stimulus in a different location with a different experimenter or therapist. For example, a person with elevated anxiety sensitivity exercising with the therapist in the therapist's office to increase their heart rate, then exercising with a different therapist outside at re-test, or someone with elevated fear of negative evaluation delivering a speech in front the therapist, then delivering a speech in front of an audience at re-test. Fourth, and as highlighted in Paper 2, the number of trials required to observe facilitative extinction effects in experimental research with young people is unclear and warrants further attention. For example, compared to younger children and adults, adolescents may require more extinction trials to achieve reductions in fear expression (McCallum et al., 2010). Although the optimal dose for preclinical studies remains unclear, 8-12 trials are recommended to observer successful extinction effects in studies with children and young people (Ryan et al., 2019). It will also be important for future preclinical

research to consider including a no-exposure control condition. Although a particular advantage of experimental research is maximised internal validity and methodological rigour, the absence of a no-exposure control condition in Paper 2 and Study 3 meant that it was not possible to account for the potential influence of external factors (e.g., time) that were not specific to experimental conditions. The inclusion of a no-exposure control condition will allow future research to account for key variables and enhance the internal validity of outcomes. Finally, to determine the applicability of exposure optimisation effects across different participant groups, future experimental research needs to be adequately powered to test the potential moderating effects of variables such as age.

5.3 Clinical Implications

Although post-exposure and post-treatment assessments are an indicator of therapeutic progress, greater "improvements" (e.g., reduced symptoms or fear responding) may not predict longer term outcomes (Woods & Bouton, 2008). The efficacy of exposure-based treatment relies heavily on the generalisability of learning beyond the therapeutic context (Craske et al., 2018), and given the likely range of situations and stimuli that may trigger harm expectancies (i.e., anxious thoughts), it is unlikely that immediate post-exposure/post-treatment or short-term follow-up assessments accurately capture the extent to which treatment gains have truly generalised. Indeed, the findings from Paper 2 highlighted that for the positive coping statements group, a greater reduction of fear immediately post-exposure was not maintained long term. In fact, by 1-week follow-up the positive coping statements condition experienced a significant return of fear. This is important as clinicians may interpret post-treatment or post-exposure assessments as an indication of therapeutic success that does not warrant further attention during later sessions/assessment timepoints. However, some young people may require a gradual tapering of treatment or regular booster sessions to maintain and generalise treatment gains. As such, clinicians may wish to spread exposure trials apart and introduce longer follow-up assessments to ensure that an accurate picture of therapeutic benefit is acquired.

The findings from Paper 1 generally failed to find support for a role of habituation-based fear reduction. The strategies in the review provided some very preliminary evidence that, during exposure, clinicians may find it beneficial to (i) ensure that the young person is engaged and able to master the information and skills, (ii) focus on the reduction of safety behaviours, (iii) ensure that both they and the parent/carer discourage the young person's avoidance (iv)

encourage the young person to do 'difficult' exposures within and between session exposures, (v) look for greater emotional ups and downs, (vi) not try to do too many exposure exercises within the session (perhaps aiming for quality rather than quantity), and (vii) encourage the young person to discuss and process the experience following exposure. Furthermore, while traditional habituation models recommend a 50% reduction in SUDS before progressing to the next stage of an exposure hierarchy, the use of the 50% rule was not supported by the literature (Peterman et al., 2016) therefore clinicians may wish to guide the progression of exposures using other therapeutic indicators (e.g., once a feared outcome has been violated). As highlighted previously, recent guidelines by McGuire & Storch (2018) offer practical examples for the use of several inhibitory learning strategies with children and young people. For example, clinicians may incorporate variability into exposure sessions by varying the stimuli, duration, intensity and progression of exposure. An adolescent with OCD may be encouraged to touch different bins around the clinician's office for varied lengths of time which may become more random (e.g., rolling a dice to see how long the exposure will last). The intensity could be varied by encouraging the adolescent to push both hands into the bin while it is filled with various amounts of rubbish or by changing the type of rubbish in the bin (e.g., perishable vs non-perishable items). While initial exposure mastery is not required for inhibitory learning, the authors recommend that some mastery is obtained before introducing variability to reduce the risk of patient drop-out.

Based on the findings from Paper 2 and Study 3, at this point, it is not possible to suggest one verbalisation strategy over another. Specifically, the findings suggest that i) exposure appears to be associated with reduced fear without the use of positive coping statements of affect labelling, ii) no verbalisation strategy was superior to another, iii) no verbalisation strategy seemed more tolerable or acceptable (e.g., drop-out), iv) it is not clear whether verbalisation strategies are necessary, or beneficial, and v) it is not possible to recommend an alternative approach at this stage. While these findings add to the growing body of evidence which suggest that introducing exposure without preparatory anxiety management is tolerable (Whiteside et al., 2015, 2019), a better understanding of the necessary treatment components across developmental stages is required before firm conclusions can be made about how to optimise both outcomes and efficiency of treatments for anxiety disorders. Given the necessity and therapeutic benefit of verbalisation strategies on exposure outcomes for young people remains unclear, clinicians may, for now, need to approach their use according to case conceptualisation and individual need. For example, clinicians may find it beneficial to use

strategies such as positive coping statements when elevated perceptions of threat or hopeless thoughts interfere with the young person participating in exposure exercises, and cognitive restructuring techniques may be used to support the young person to re-evaluate anxious thoughts and facilitate engagement.

5.4 Strengths and Limitations of the Thesis

The papers and chapter consider the strengths and limitations for the individual studies therefore, this section is focussed on the overall thesis.

5.4.1 Strengths

This thesis addressed novel questions concerning the optimisation of exposure for child and adolescent anxiety disorders using innovative and rigorous methods as illustrated through the use of well-specified protocols (e.g., Preferred Reporting Items for Systematic Reviews and Meta-analysis; PRISMA (Moher et al., 2009), the inclusion of effect sizes to aid the interpretation of findings(wherever possible), and the development and use of coding schemes (i.e., systematic review criteria for inclusion (Paper 1) and guidelines for adolescent speech coding (Paper 2 and Study 3). The studies incorporated second raters for study inclusion, (Paper 1), quality ratings (Paper 1) and video coding (Paper 2 and Study 3) and achieved good – excellent levels of inter-rater reliability. A major strength of the thesis was the successful delivery of a unique, experimental public speaking paradigm conducted with adolescents in a naturalistic setting. Given that a key recommendation from Paper 1 was the development of methodologically robust, preclinical, experimental studies, this thesis demonstrated the feasibility of conducting this type of design and paves the way for future exposure research with children and young people. A strength of the empirical studies (Paper 2 and Study 3) was the inclusion of a discrete adolescent age range that is associated with the onset of several problematic anxiety disorders (Kessler et al., 2005; Stein, 2006). Another strength was the application of a novel pre-recorded audience task to both run exposure trials and assess performance anxiety within school settings; indeed, this task may have potential going forwards as a tool for reducing symptoms of social anxiety more broadly.

5.4.2 Limitations

The findings and implications of the thesis should be considered in light of a number of limitations. Firstly, the limited age ranges and sample sizes across the studies did not allow for the examination of possible differences in the associations between features of exposure sessions and treatment outcome according to the participants' developmental level. Given that

adolescents may require a greater dose of exposure trials to achieve observable extinction effects (McCallum et al., 2010), the experimental conditions may have been insufficiently potent for this developmental stage, and experimental effects may have been washed out.

The generalisability of the findings is also limited by several factors. For example, in the two empirical studies (Paper 2 and Study 3), the same community sample of adolescents was used, and several of the studies included in Paper 1 used data from the same clinical trial (e.g., Hedtke et al., 2009; Peterman et al., 2016; Tiwari et al., 2013). Further, all the samples included within the studies were "treatment seeking" therefore the results may not apply to children and young people with less access to, or readiness to engage in, exposure-based treatment. In addition, the samples included within the studies were primarily Caucasian and from relatively high socio-economic, backgrounds, therefore the results may not be generalisable to young people from more diverse ethnic and socio-economic backgrounds. The nature of anxiety disorders/symptoms between the studies were fairly homogenous in that participants were typically identified based on restricted fears/disorders (e.g., specific phobia, OCD, public speaking anxiety), and while some of the studies included within Paper 1 included individuals with mixed anxiety disorders (e.g., generalised anxiety, separation anxiety and social anxiety disorder) and co-morbid difficulties (e.g., depression), exclusion criteria often included intellectual difficulties, autism spectrum disorder and/or psychosis, which limits the generalisability of the findings to real-world populations, particularly those who may seek access and receive treatment from services.

The systematic review and two empirical studies only included measures of symptoms/anxiety, on the basis that the effectiveness of exposure is indicated by improvements in these domains. Further, the structured approach used in the studies (e.g., CBT manual, rigorous public speaking paradigm), may not represent how clinicians approach treatment in clinical settings. For example, in clinical practice, it is likely that clinicians will draw on individualised formulations/case conceptualisations to inform the focus and components of treatment. The potential optimisation strategies identified in Study 1 were based on findings from within-subject clinical trials. As these studies did not use a randomised, or controlled approach, the extent to which the outcomes were influenced by other factors is unclear.

The artificial nature of the exposure stimuli used in the empirical studies may mean that the behaviour of the adolescents might not represent anxious behaviours seen in everyday life, anxiety provoking situations (e.g., delivering a presentation in front of a live audience at

school). Furthermore, none of the studies in this thesis included a no-exposure control condition, therefore the extent to which changes were driven by exposure, or by other factors (e.g., time, contact with health care providers/researchers, gaining more knowledge about the problem) is not clear. Although studies that included information taken from recorded exposure sessions typically ensured reliability between video raters, there was often no formal assessment of rater integrity and the number of exposure sessions were restricted, which limits the richness, and potentially the validity, of data.

The studies do not tell us anything about the optimal timing, or combined use, of strategies. Given the likelihood that several therapeutic processes (e.g., therapist extensiveness, the use of safety behaviours, emotional changes) are often consecutively present during exposure, the studies included within the thesis may have failed to address the specificity of factors to the clinical effects. Finally, the studies did not consider other potential moderators of outcome. For example, the quality of exposure experiences likely moderates the augmenting effects of optimisation strategies (e.g., Smits et al., 2013), yet none of the studies accounted for hidden factors such as exposure quality, nor between session exposures.

Finally, due to a paucity of available evidence, the literature reviewed within the thesis is primarily described as being focussed on anxiety disorders, broadly defined. While Paper 1 (Systematic Review, Chapter 2) also includes anxiety related difficulties more broadly, a specific focus of anxiety (i.e., of public speaking) is studied in the empirical chapters (Paper 2 and Chapter 4).

5.5 Conclusion

Although CBT is an effective treatment for child and adolescent anxiety disorders, many do not benefit (James et al., 2015) While exposure is the critical ingredient of CBT for childhood anxiety disorders (Ale, McCarthy, Rothschild, & Whiteside, 2015; Kendall et al., 2005; Peris et al., 2015; Peterman et al., 2014; Whiteside et al., 2015, 2019), this thesis found a distinct lack of clear evidence concerning how best to design and conduct exposures for children and young people. The findings of the systematic review were somewhat consistent with the use of inhibitory learning strategies, however, a lack of study replication and methodological limitations meant that clinical implications remain tentative at this stage. Additionally, we found no evidence for the optimisation of exposure among adolescents from using traditional, nor contemporary, verbalisation strategies. Taken together, the results from this thesis highlight the need for a better understanding of the complex mechanisms underlying

exposure such as the relationship between habituation and inhibitory learning processes and for further research concerning the optimisation of exposure in childhood anxiety disorders. Moving forwards, research needs to examine novel exposure strategies using experimentally robust studies driven by theoretical approaches, using consistent conceptualisations and outcomes measures and, critically, taking developmental stage into account.

5.6 References

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Chapter 6

Appendices

Appendix 1: Ethical Approval Email: Original Submission

From: Graham Schafer >
Sent: 12 April 2016 09:51:14
To: Hannah Louise Rogers
Cc: Polly Waite; Anastasia Christakou; PCLS Ethics (pclsethics@reading.ac.uk)
Subject: RE: 2016-038-PW - Moderators of Exposure Therapy: A Comparison of Cognitive Techniques in the Treatment of Adolescents with Public Speaking Anxiety

Dear Hannah

I have reviewed the submission and, so long as you action the points I made on the original approval (which I will trust you to do), there is no need to submit to UREC. This is my decision on behalf of SPCLS REC. My decision is based on my judgement of the severity (or otherwise) of the distress which might be caused, the safeguards in place, and the information provided to the participants.

You may proceed with the study.

GS

-----Original Message-----
From: Hannah Louise Rogers [mailto:]
Sent: 11 April 2016 09:04
To: Graham Schafer
Cc: Polly Waite
Subject: Re: 2016-038-PW - Moderators of Exposure Therapy: A Comparison of Cognitive Techniques in the Treatment of Adolescents with Public Speaking Anxiety

Dear Graham,

Many thanks for your feedback. Could you please confirm whether we will need to obtain UREC's approval for this application as well?

Kind regards,
Hannah

_____
From: Polly Louise Waite < >
Sent: 07 April 2016 15:12
To: Graham Schafer
Cc: Hannah Louise Rogers
Subject: RE: 2016-038-PW - Moderators of Exposure Therapy: A Comparison of Cognitive Techniques in the Treatment of Adolescents with Public Speaking Anxiety

Hi Graham,

Thanks very much for this.

Best wishes

Polly

Polly Waite | Tel: Anxiety and Depression in Young People Research Unit (AnDY) | Room 222 | School Of Psychology & Clinical Language Sciences | University of Reading | Whiteknights Campus | RG6 6AL Clinical Lecturer | Honorary Clinical Psychologist - Berkshire Healthcare Foundation Trust CAMHS Anxiety & Depression Pathway www.researchgate.net/profile/Polly_Waite
http://www.twitter.com/pollywaite
http://andyresearchclinic.com/
https://twitter.com/andy_res_clin

_____

From: Graham Schafer [g.w.schafer@reading.ac.uk]
Sent: 07 April 2016 15:10
To: PCLS Ethics
Cc: Polly Louise Waite
Subject: RE: 2016-038-PW - Moderators of Exposure Therapy: A Comparison of Cognitive Techniques in the Treatment of Adolescents with Public Speaking Anxiety

This is a very well-worked out study and I hereby given it favourable ethical opinion for conduct, subject to implementation or consideration of the following:

1. Check spellings throughout. Headteachers and parents may be more impressed to hear from the 'Principal' rather than the 'Principle' Investigator.

2. Tidy up the formatting of public documents (e.g. spaces, ideally tabs, after numbers in lists).

3. Appendix F: The telephone number MUST NOT be that of the student.

4. Appendices H, R (and study design). My reading of the ethical situation is that it would be acceptable for you to deceive parents as well as the children about who will view their video footage, if that would result in a better study. This is because the children are old enough to understand and communicate the debrief to the parents (and you are covered additionally by Appendix R). Your fallback could be to share this information with the Head but not the parents. (If my advice here cuts across established procedures, or if it is not helpful, please feel free to ignore me).

5. Consider (though it is not a condition for approval) whether it might be sensible to allow the Heads freedom to amend the Parent letter as they see fit. So long as this did not change the protocol of the actual study it would not need to be re-reviewed for ethical approval.
GS

From: PCLS Ethics [mailto:pclsethics@reading.ac.uk]
Sent: 07 April 2016 11:47
To: Graham Schafer
Subject: FW: 2016-038-PW - Moderators of Exposure Therapy: A Comparison of Cognitive Techniques in the Treatment of Adolescents with Public Speaking Anxiety

Hi Graham,

I am being chased for this application, could you please review.

Thanks

Louise

From: PCLS Ethics
Sent: 14 March 2016 14:38
To: 'Graham Schafer'
Subject: 2016-038-PW - Moderators of Exposure Therapy: A Comparison of Cognitive Techniques in the Treatment of Adolescents with Public Speaking Anxiety

Hi Graham,

Please find attached a new ethics application.

Kind Regards

Louise

From: Hannah Louise Rogers [mailto:]
Sent: 11 March 2016 14:47
To: PCLSethics@reading.ac.uk<mailto:PCLSethics@reading.ac.uk>
Cc: Polly Louise Waite; Catharine Creswell
Subject: New application

Dear PCLS Ethics,

Please find attached a new SREC application for your consideration.

Please be aware that this project will take place in secondary schools within the Thames Valley area.

Yours sincerely,

Hannah Rogers

Hannah Rogers
Doctoral Researcher
School of Psychology and CLS
University of Reading
Room no. 202

Appendix 2: Ethical Approval Email: Amendments 1

From: Graham Schafer < >
Sent: 06 June 2016 11:14:38
To: Hannah Louise Rogers; PCLS Ethics (pclsethics@reading.ac.uk)
Cc: Polly Waite; Cathy Creswell
Subject: RE: Proposed amendments to: 2016-038-PW - Moderators of Exposure Therapy: A Comparison of Cognitive Techniques in the Treatment of Adolescents with Public Speaking Anxiety

I have reviewed this application on behalf of SPCLS REC and I hereby give it favourable ethical opinion for conduct.
GS

-----Original Message-----
From: Hannah Louise Rogers [mailto:]
Sent: 03 June 2016 15:56
To: Graham Schafer
Cc: Polly Waite; Cathy Creswell
Subject: Re: Proposed amendments to: 2016-038-PW - Moderators of Exposure Therapy: A Comparison of Cognitive Techniques in the Treatment of Adolescents with Public Speaking Anxiety

Dear Graham,

Please find attached a letter that details a number of proposed amendments to the above mentioned study, along with a folder which contains the relevant updated appendices, for your consideration.

I would be extremely grateful if you could confirm whether it will be possible to respond to the proposed amendments before Thursday 9th June as I have been invited to attend a school assembly and commence the initial screening process on Friday 10th June.

I look forward to hearing from you.

Many thanks in advance,
Hannah

Appendix 3: Ethical Approval Email: Amendments 2

From: Graham Schafer
Sent: Thursday, 16 June, 2016 2:58 PM
To: 'Hannah Louise Rogers '; PCLS Ethics (pclsethics@reading.ac.uk) <pclsethics@reading.ac.uk>
Cc: 'Polly Waite' < >
Subject: FW: Proposed amendments to: 2016-038-PW - Moderators of Exposure Therapy: A Comparison of Cognitive Techniques in the Treatment of Adolescents with Public Speaking Anxiety

I am happy with this amendment to proceed.
GS

From: Hannah Louise Rogers [mailto:]
Sent: Thursday, 16 June, 2016 2:45 PM
To: Graham Schafer < >
Cc: Polly Waite < >
Subject: Re: Proposed amendments to: 2016-038-PW - Moderators of Exposure Therapy: A Comparison of Cognitive Techniques in the Treatment of Adolescents with Public Speaking Anxiety

Dear Graham,

We would like to propose an amendment to the study procedure:

A reduction in the frequency of baseline heart rate recordings from 5 time points, to 1. This time point will be measured *before* subjects have received SUDS instructions during Session 1

A re-evaluation of the study procedure identified that baseline heart rate data will only be required *prior* to subjects commencing any of the speech tasks, rather than at multiple time points. Heart rate data collected after commencing the speech task is more likely to be confounded by other factors e.g. arousal / fear in anticipation of, or following, speech task procedures. We therefore propose that the baseline heart rate measure is conducted *before* subjects have received SUDS instructions, rather than after. This will reduce potential priming effects that the SUDS may have on the baseline heart rate. The Instructions (Appendix J), Speech Task Schematic Diagrams (Appendix I) and Procedure Flow Charts (Appendix T) have been amended as appropriate.

I look forward to hearing from you.

Many thanks in advance,
Hannah

Appendix 4: Ethical Approval Email: Amendments 3

I am happy for the proposed amendments to be effected and on behalf of SPCLS REC I give the revised project favourable ethical opinion for conduct.

GS

From: Hannah Louise Rogers [mailto:]
Sent: 05 July 2016 12:02
To: Graham Schafer < >
Cc: Polly Waite < >; Cathy Creswell < >
Subject: Re: Proposed amendments to: 2016-038-PW - Moderators of Exposure Therapy: A Comparison of Cognitive Techniques in the Treatment of Adolescents with Public Speaking Anxiety

Dear Graham,

We would like to propose a number of amendments to the study procedure.

The proposed amendments are based on recent observations that have been made whilst conducting the study in a secondary school:

1. The removal of x 1 Exposure Trial from Session Two

An evaluation of Session Two has established that it is not feasible to conduct all five speeches (inc. x 4 Exposure Trials followed by the second Behavioural Approach Test (BAT 2)) within the time available. We therefore propose the removal of x 1 Exposure Trial from Session Two to allow sufficient time to effectively conduct the session within the given time frame. The letter to school heads (Appendix A), instructions (Appendix J) and experimental sessions; flow charts (Appendix T) have been updated as appropriate.

2. The removal of the RCADS questionnaire and BAT 4 from Session Three

It has become apparent that the battery of questionnaires administered during Session One and Session Three take longer for the majority of participants to complete than originally anticipated. As a result, the time allowance for Session Three is very limited, and narrow timescales between school lessons are likely to increase participant's anxiety and confound the results. This is particularly problematic as the final BATs are conducted towards the end of Session Three. We therefore propose the removal of the RCADS questionnaire and BAT 4 from Session Three to streamline the procedure and allow adequate time to complete the final BATs and study Debrief. The instructions (Appendix J) and experimental sessions; flow charts (Appendix T) have been updated as appropriate.

3. A reduction in the length of the final speech (now BAT 4) from 5 minutes, to 2 minutes

A review of the initial speeches delivered during Session One and Session Two would indicate that it is not practical to instruct participants to plan and deliver a five minute speech (BAT 4) during Session Three. To ensure that the final speech task is feasible, and does not incur elevated levels of anxiety that would overshadow observable effects between conditions, we propose a reduction in the length of the final speech task from 5 minutes, to 2 minutes. The speech task schematic diagrams (Appendix I) and instructions (Appendix J) have been updated as appropriate.

4. Session arrangements are confirmed with participants via a discrete note from within the school (e.g. from Reception)

To ensure that session arrangements (e.g. time / location), in addition to any sudden / unexpected changes, are communicated efficiently to the participants, we would like to propose that session arrangements are confirmed via a discrete note from within the school (e.g. Reception). The letter to school heads (Appendix A) has been updated as appropriate.

I look forward to hearing from you.

Kind regards,
Hannah

Appendix 5: Ethical Approval Email: Amendments 4

I have reviewed the above amendment on behalf of SPCLS REC and I give it favourable ethical opinion for conduct.

G

From: Hannah Louise Rogers [mailto:]
Sent: 02 December 2016 12:42
To: Graham Schafer
Cc: Polly Waite; Cathy Creswell
Subject: Re: 2016-038-PW follow-up

Hi Graham,

Further to our discussion, we would like to propose an amendment to the study procedure:

1. **Adolescents who complete the main study will be invited to take part in a later follow-up study 3-6 months later. Only those with parental consent, and who have agreed to be contacted, will be eligible to take part.**

To determine whether there are any between group differences in the anxiety and mood related questionnaire responses over time, we propose asking participants to answer the same set of questionnaires (see Appendix K) during the follow-up session.

We also propose that during the follow-up session, participants are asked to complete an additional questionnaire about their experiences during, and since, taking part in the study (see Appendix W). The questionnaire includes -

(i) Two questions previously administered during the eligibility screening procedure

(ii) Questions about participants' experiences whilst taking part in the main study

(iii) Questions related to social experiences since taking part in the study, and

(iv) Questions related to public speaking experiences since taking part in the study

Re-administering the eligibility screening questions will allow us to examine whether participants' responses change, or remain, over time. In addition, the questionnaire will allow us to explore whether there are any between group differences in the responses given which may suggest that, over time, one (or more) condition is more effective than others. Finally, the questionnaire will allow us to explore whether there are any between group differences in what participants found helpful, and difficult, about taking part in the study, in addition to any further comments provided.

The questionnaire was developed with input from an active Patient and Public Involvement (PPI) group of adolescents who have experienced mental health difficulties, and their parents. The adolescents were consulted about the questionnaire, and subsequently, adaptations were made to reflect the feedback provided.

We anticipate that the follow-up session will take no longer than a typical school lesson (approximately 50 minutes). To inform and remind parents and adolescents of the follow-up study, and to give opportunity to opt-out if preferred, a letter will be sent home to parents via the school (see Appendix V) beforehand.

The information sheet for school heads (Appendix A), information leaflets for adolescents and parents (Appendix E), parent consent form (Appendix G), adolescent assent and debrief form (Appendix P), debrief letter to parents (Appendix R) and flow charts (Appendix T) have all been updated as appropriate.

I look forward to hearing from you.

Kind regards,

Hannah

From: Graham Schafer >
Sent: 08 November 2016 17:16:19
To: Hannah Louise Rogers
Subject: RE: 2016-038-PW follow-up

An amendment would work.

If you want to talk on the phone I am here for another 40 minutes, or else in and out of the office for the rest of the week, Friday pm being good…
G

From: Hannah Louise Rogers [mailto:]
Sent: 01 November 2016 16:30
To: Graham Schafer < >
Subject: 2016-038-PW follow-up

Hi Graham,

I hope you're well. I just popped by your office hoping to catch you during office hours but I see you're not around today.

I am hoping to conduct a 3-4 month follow-up of the adolescents who take part in my study. This would predominantly involve completing another set of questionnaires. I just wondered how you would recommend I proceed with this e.g. submit a new SREC application or add an additional amendment to 2016 - 038 - PW? There were one or two other things I was hoping to run by you as well if possible.

I am back in school collecting data as of tomorrow and will be there over the next few weeks, but could discuss over the phone if that suits you?

Many thanks in advance,
Hannah

Hannah Rogers

Doctoral Researcher

School of Psychology and CLS

University of Reading

Room no. 202

www.researchgate.net/profile/Hannah_Rogers4

http://andyresearchclinic.com/
https://twitter.com/andy_res_clin

Appendix 6: Information Letter for Schools

Department of Psychology and Clinical Language Sciences
University of Reading
Harry Pitt Building
Whiteknights Road
Reading RG6 6AL

Information sheet for secondary school heads

[DATE]

Principal Investigator: ***Dr Polly Waite***

Researcher: ***Hannah Rogers***

Dear [insert name],

Research Study: Tackling Public Speaking Fear in Teenagers

A fear of public speaking can lead young people to adapt their life choices in order to avoid speaking in front of others, reducing educational and occupational opportunities. We are conducting a research study comparing strategies to help adolescents overcome *public speaking fear*. We are interested in finding out whether new strategies that have been investigated in adults work better than traditional strategies in adolescents. This information will help us to develop more effective interventions for adolescents with public speaking fears.

What the main study will involve

Adolescents who fear and try to avoid public speaking will be recruited from schools within the Thames Valley area. In the first instance, we would ask Year 9 students to complete two questions in relation to public speaking. This will establish whether they meet criteria to participate in the main study.

After the initial questions have been completed, information packs will be sent to students who meet criteria, inviting them to take part in the main study. An information pack will also be sent to the student's parent/guardian along with a reply slip and parent / guardian consent form for them to complete and return to us. Caregivers will be given opportunity to ask questions if required. The researcher will contact all students with parental consent to discuss the study and answer any questions. If the student would still like to take part, they will be invited to attend three sessions (Session 1; 2 hours, Sessions 2 and 3; 1 hour) that will be delivered in school, outside of the classroom and away from peers. Session arrangements will be agreed in advance with a school faculty member (e.g. year 9 head) and confirmed with

students via a discrete note from within the school (e.g. Reception). The second session will be scheduled to take place one day after the first session, and the final session will be scheduled to take place one week after the first session.

The students will be asked to deliver five short speeches during the first session, four speeches in the second session and, and two speeches in the final session. They will choose their speech topic (e.g. TV programmes) by selecting a card at random, and be given 5 minutes to prepare beforehand. Students will be asked to wear a physical activity tracker around their wrist to monitor heart rate and report their fear level using a 0-10 scale. Footage of a pre-recorded classroom audience, including age matched peers and a teacher, will be played to the students throughout the duration of their speeches. The actors in the classroom footage have been instructed to behave as a classroom naturally would whilst watching a peer deliver a speech. This audience material was developed and reviewed using input from a Patient and Public Involvement group of adolescents at the University of Reading.

The students' speeches will be recorded using video recording equipment that is owned by the research group within the university. All data will be kept confidential. Due to the nature of the study it is important to elicit a social-evaluate situation that will result in some distress. Therefore students will be told that their footage will be evaluated by a teacher and other teenagers who attend a school in a different area. This will not however be the case. Upon completing the final session students will be fully debriefed about this and a letter will also be sent home to their parents.

During the first session, students will be randomly assigned to one of three experimental conditions. Depending on which condition they are allocated to, the students will be asked to do one of the following before some of their speeches:

1. Come up with and say out loud a sentence to describe how you are feeling and how you think the other people will judge your performance e.g. "I feel scared, I think the other people will think I look nervous''
2. Come up with and say out loud a sentence to help you feel less worried e.g. "It will be fine because I am well planned".
3. Come up with and say out loud a sentence e.g. "The time is 09:30, my speech will be about the summer holidays''

During the first and final session, students will be asked to complete relevant questionnaires. During the final session only, students will be asked to complete a brief checklist to record specific social activities that they have participated in during the last week (e.g. speaking in a group, putting hand up in class). Students will be asked not to share details of the study with their friends or peers until it has been confirmed that we have completely finished conducting the study. We will also provide information about how to seek help in case any students or parents are concerned. As a token of our appreciation, all students who consent to take part will be entered in to a prize draw to win one of three £50 Amazon vouchers. The prize draw will take place once the study is complete. The winners will be contacted individually by a member of the research team.

Follow-up study

Within six months of completing the main study, the students will be invited to attend a follow-up session where they will be asked to complete a set of questionnaires. This is so that we can see whether the questionnaire responses differ over time. Students will also be asked to complete some questions about their experiences during and since taking part in the study. The follow-up session will be held in school, and away from peers. The duration of the session will be one lesson / period long. A letter will be sent home to parents one week before the researcher contacts the students about taking part in the follow-up study. This will also give opportunity for parents to opt their son / daughter out of the follow-up study if preferred.

School Involvement:

1. The researcher will visit the school on a pre-arranged date to explain the study to year 9 students. This would need to take place during a school assembly or similar. Then, students will be asked to complete two initial screening questions:

(i) How **anxious would you feel** giving a speech in front of people your age?

(ii) How likely are you to **try and avoid** giving a speech in front of people your age?

These would need to be returned by the students to the researcher on their way out of assembly.

2. The researcher will review the initial screening responses and identify which students would be eligible to take part in the main study. We would like your school to send home information packs to the parents and students which will contain the following documents:

(i) A letter for parents, from the school, with some brief information about the research and screening process (attached). *You will have opportunity to amend this letter as you see fit provided that the proposed alterations do not change the study protocol and have been reviewed by the researcher beforehand.*
(ii) Individual parent and adolescent information leaflets detailing what the main study and follow-up study will involve (attached)
(iii) A letter inviting the adolescent to participate in the main study (attached)
(iv) A letter for parents, from the University, regarding their son/daughter's invitation to take part in the main study (attached)
(v) Parent/guardian reply slip (attached)
(vi) Parent/guardian consent form (attached)
(vii) Envelope

We will prepare the necessary materials and liaise with you about the best way to organise sending the information packs. Students who wish to take part in the study will be instructed to return the parent / guardian reply slip and consent form in a sealed envelope to an agreed school faculty member.

3. Study sessions will need to take place on school grounds, away from classmates, in a quiet classroom setting, at a time that is convenient to the school. Key school staff (as agreed with the school) will be kept up to date with the arrangements. The researcher will return to the school over several agreed periods of time to ensure that all students who wish to participate will have opportunity to complete all three sessions.

This application has been reviewed by the University of Reading Ethics Committee and has been given favourable ethical opinion for conduct. Everyone working on this study has been through the formal Enhanced Disclosure and Barring process and have been approved by the School of Psychology at the University of Reading to work with adolescents. All of the information provided will be kept confidential, unless we are concerned about the welfare or safety of the student, in which case we will raise this with you and / or the student's parents (as appropriate). *Students will be free to withdraw from the study at any time and we will not use their data if they do not want us to.* The information we collect during the speech sessions (e.g. anxiety questionnaires, heart rate, fear reports, speech footage) will not have students' names on and will be kept strictly confidential in locked cabinets. This study will form a part of Hannah Rogers's PhD and the overall results may be included in publications of scientific journals and be presented to other interested academics and clinicians at conferences. All information we collect will be limited to researchers involved in the study and will be destroyed upon completion of the research project.

We hope you will be able to help us with this exciting piece of research. We will endeavour to ensure that the impact of the school's routine is minimal. We will also provide a report of our findings to both the schools and the participating families once the study has been completed. We will soon be in touch by telephone to discuss the study further with you.

Many thanks in advance for your help.

Yours sincerely,

Dr Polly Waite — Principal Investigator

Hannah Rogers — Researcher (main contact)

Appendix 7: Information Sheets for Adolescents

Appendix 8: Information Sheets for Parents

Appendix 9: Assent Forms for Adolescents

University of Reading

ADOLESCENT ASSENT FORM

Title of Project: Tackling Public Speaking Fear in Teenagers

Principal Investigator: Dr Polly Waite

Please indicate which points you agree with by ***ticking the box:***

☐ I confirm that I have read and understood the Information Leaflet for the above study. I have had opportunity to consider the information, ask questions, and have had these answered satisfactorily by a member of the research team.

☐ I understand that my participation in this study is completely voluntary and that I am free to withdraw at any time, and without giving reason.

☐ I give permission for the speeches that I deliver as part of this research study to be video and audio recorded.

☐ I understand that some of the data and material collected during the study may be looked at by individuals from the University of Reading. I give permission for these individuals to have access to my information.

☐ I understand that I will not receive a full explanation of the study until after I have attended and completed all 3 of the sessions unless I choose to withdraw my participation, at which point I will receive a full explanation of the study.

☐ I agree to take part in the above study.

☐ I am happy to be contacted in the future about taking part in the follow-up study.

This study was reviewed and given a favourable ethical opinion for conduct by the University of Reading's Ethics Committee (UREC).

I have spoken to: _____ about what will happen during the study.

(name of researcher)

My name is: _____ Date: _____

My signature: _____

Name of researcher: _____ Date: _____

Researcher's signature: _____

Appendix 10: Consent Forms for Parents

University of Reading

CONSENT FORM FOR PARENTS/GUARDIANS

OF ADOLESCENTS WHO ARE FEARFUL OF PUBLIC SPEAKING

Title of Project: Tackling Public Speaking Fear in Teenagers

*Please indicate which points you agree with by **initialling the box:***

☐ I confirm that I have read and understand the Information Leaflet for the above study. I have had opportunity to consider the information, ask questions, and have had these answered satisfactorily by a member of the research team where required.

☐ I understand that my son/daughter's participation in this study is completely voluntary and that I am free to withdraw their participation at any time and without giving reason.

☐ I give permission for the speeches that my child delivers as part of this research study to be video and audio recorded.

☐ I understand that some of the data and material collected during the study may be looked at by members of the research team at the University of Reading. I give permission for these individuals to have access to my son/daughter's information.

☐ I understand that my son/daughter will not receive a full explanation of the study until after they have attended and completed all 3 of the sessions unless I or they choose to withdraw their participation, at which point we will both receive a full explanation of the study as soon as possible.

☐ I agree for my son/daughter to take part in the above study.

☐ I am happy for my son/daughter to be contacted in the future about taking part in the follow-up study.

This study was reviewed and given a favourable ethical opinion for conduct by the School of Psychology & Clinical Language Sciences Research Ethics Committee.

My son/daughter's name: _____

My name: _____

My signature: _____ Date: _____

PLEASE RETURN USING THE ENVELOPE PROVIDED DIRECTLY TO [INSERT NAME]

Appendix 11: Instruction Manual for Affect Labelling Condition

SESSION 1

INITIAL INSTRUCTIONS

Thank you for agreeing to take part in our study *''Tackling Public Speaking Fear in Teenagers''*. This study is interested in comparing different ways to improve public speaking fear.

By now you should have had a chance to read the information leaflets that were sent to you, and discuss the study further with a member of the research team.

Before we begin any task related activities, please take some time to carefully read through the following information so that you have a good understanding of what to expect from today's session.

1. Assent

Your parent has given consent for you to take part in this study. Once you have read these instructions, had an opportunity to ask the researcher questions, and if you are still happy to take part, we would like you to sign two copies of the attached assent form. One copy is for you to keep, and the other should be handed back to the researcher which we will keep for our records.

2. Questionnaires

You will be given a selection of questionnaires which will take approximately 20 minutes to complete. If you are not sure how to answer a question or get stuck, please ask the researcher who will be able to help you.

3. Heart rate

You will be given an activity tracker to wear around your wrist. This will allow us to record your heart rate before you start the speech task (details below). You will be given a short video clip to watch while we do this. We will also record your heart rate during your first speech.

4. Speech Task

During today's session, we would like you to deliver five short speeches. There will be a selection of speech topics to choose from. The topics will be written on cards which will be face down on the desk. You will then be asked to select a card. The card that you select will contain the topic of your next speech. **We would like you to try and make each speech 1 minute long.** It is important that you try to make each speech

clear and explain what your beliefs / thoughts / opinions are of your given topic. This might include thinking about your likes / dislikes and giving examples. You will have **5 minutes to plan and prepare** each speech. You will also be given some speech pointers to help you prepare beforehand.

You will deliver your speeches in front of a pre-recorded classroom audience. You will see the audience enter the room and sit down. The teacher will indicate when to start your speech, and the researcher will tell you when to stop. Please try to focus your attention on the audience as you would if you were presenting to a real classroom. **Your speeches will be recorded and then evaluated at a later date by pupils your own age and a teacher from a different school, in a different area.**

We will ask you to report how you felt before and after the first speech. We will also ask you to report how you felt the first speech went. The researcher will show you which scales we would like you to use to do this and talk you through how to use them beforehand.

A step by step guide of what will happen before, during and after the first speech can be found at the end of this sheet.

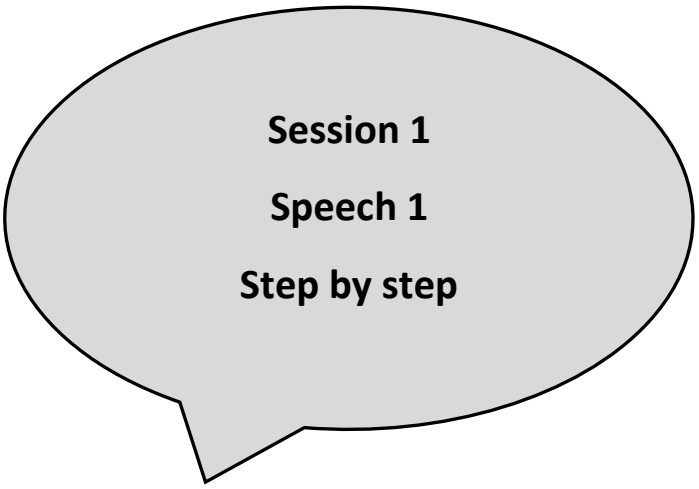
The first speech will be a little different from the rest of the speeches that we will ask you to deliver today. You will be given more information about speeches 2-5 once you have completed the first speech.

5. 5 minute “cool down” period

After you have completed the fifth speech you will be given a 5 minute ‘’cool-down’’ period to relax.

6. Confirm Session 2

Before you leave we will check that you are still happy to attend tomorrow’s session.



1. Select speech topic. **5 minutes** to prepare
2. **Report fear** using the 0-10 point scales
3. Walk over to **red mat** where you will stand to deliver the speech
4. Classroom projected on to the wall where you are facing
5. Wait for **1 minute while the audience enters the room**. You will be prompted by the teacher when to begin your speech
6. You will be prompted by the researcher when to stop
7. Walk back to the desk and **report fear level and how you felt the speech went** using the 0-10 point scales
8. Wait for **3 minutes**

If you are unsure about any of the information that you have read up until this point, please let the researcher know and they will be able to help.

Please let the researcher know once you are ready continue

SESSION 1

SPEECHES 2-5 INSTRUCTIONS

Well done! You have delivered your first speech ☺

The procedure for the next *4 speeches* will be similar, but a little different to the one you have just delivered.

Now we are going to add something else to the task –

Before you begin your speech, we would like you to **come up with, write down and say a sentence out loud** that includes two features;

- A **negative word** to **describe how you feel about doing the speech**
- A **negative way that** you think the other people will judge your performance

To help you to come up with a sentence you will be given a template (i.e. "I feel_____ I think the other people will_____") along with a variety of words and phrases (e.g. "embarrassed" and "think I look boring") that can be used to make up a sentence. You may use these when coming up with your sentence, or you can use your own if you think of a word/ phrase more suitable to describe how you are feeling and / or how the other people will judge your performance.

Example 1

"I feel scared, I think the other people will think I look stupid"

Here, "scared" is the negative word to describe how you feel about doing the speech. "Think I look stupid" is the negative way that you think the other people might judge your performance.

Example 2

"I feel embarrassed, I think the other people will think I look boring".

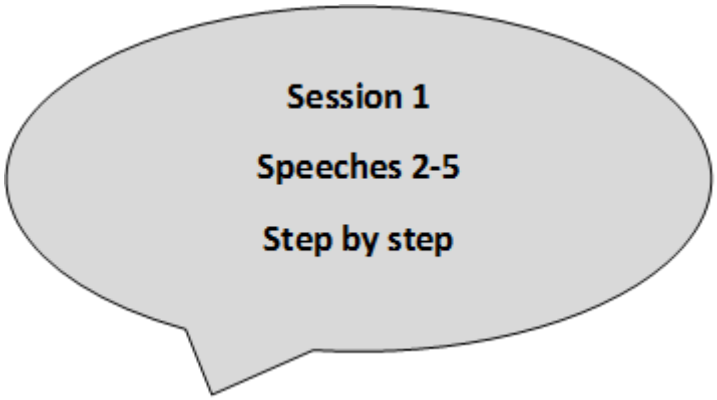
Here, "embarrassed" is the negative word to describe how you feel about doing the speech. "Think I look boring" is the negative way that you think the other people might judge your performance.

The researcher will prompt you before each speech of when to come up with and say your sentence. It would be good if you could try to come up with **a new sentence each time**, but if you can't, it is OK to use your previous sentence.

We will practice beforehand using an imaginary situation so that you feel more confident coming up with and saying these sorts of sentences out loud.

As before, a pre-recorded classroom audience will be projected on the wall while you deliver each speech. Please try to focus on the audience as you would if you were delivering a real classroom talk. **Don't forget; your speeches will be recorded and assessed at a later date by other people including teenagers and a teacher from a different school, in a different area.**

Please turn over for a step by step guide of what will happen before, during and after each speech.



1. Select speech topic. **5 minutes** to prepare
2. Come up with and write down sentence
3. Walk over to **red mat** where you will stand to deliver the speech
4. **Say sentence out loud**
5. Classroom is projected on to the wall where you are facing
6. Wait for **1 minute while the audience enters the room.** You will be prompted by the teacher when to begin your speech
7. You will be prompted by the researcher when to stop
8. Walk back to the desk and wait for **1.5 minutes**

REPEAT 4 TIMES USING DIFFERENT TOPICS FOR EACH SPEECH

Please let the researcher know when you are ready to continue. We will then practice coming up with and saying some sentences out loud

SESSION 2

INITIAL INSTRUCTIONS

Well done for completing Session 1 of our study *"Tackling Public Speaking Fear in Teenagers"*. It's great that you have come back to complete the second session.

Session 2 will be similar to Session 1, but there will be some differences that we would like you to be aware of. Please take some time to carefully read through the following information so that you have a good understanding of what to expect from today's session.

1. Assent

You will not need to sign another assent form today. You are still free to withdraw at any time.

2. Questionnaires

You will not be required to complete any questionnaires today.

3. Heart rate

As before, we would like to record your heart rate only this will be during your final speech today, rather than the first. You will be given an activity tracker to wear around your wrist. Please wear this on the same wrist as yesterday.

4. Speech Task

The speech task will be the same as yesterday, but today we would like you to deliver four short speeches, instead of five–

There will be a selection of speech topics to choose from. The topics will be written on cards which will be face down on the desk. You will then be asked to select a card. The card that you select will contain the topic of your next speech. ***We would like you to try and make each speech 1 minute long.*** *It is important that you try to make each speech clear and explain what your beliefs / thoughts / opinions are of your given topic. This might include thinking about your likes / dislikes and giving examples. You will have* ***5 minutes to plan and prepare*** *each speech. You will also be given some speech pointers to help you prepare beforehand.*

You will deliver your speeches in front of a pre-recorded classroom audience. You will see the audience enter the room and sit down. The teacher will indicate when to start your speech, and the researcher will tell you when to stop. Please try to focus your

attention on the audience as you would if you were presenting to a real classroom. ***Your speeches will be recorded and then evaluated at a later date by pupils your own age and a teacher from a different school, in a different area.***

As with speeches 2-5 during yesterday's session, we would like to add something to the speech task. Further instructions and a step by step guide of what will happen before, during and after the first three speeches can be found at the end of this sheet. You will be given more information about the fourth speech once you have completed 1-3.

5. <u>5 minute "cool down" period</u>

Like before, after you have completed your fourth speech you will be given a 5 minute "cool-down" period to relax.

6. <u>Confirm Session 3</u>

Before you leave we will check that you are still happy to attend the final speech session in six days' time.

SESSION 2, SPEECHES 1-3

INSTRUCTIONS

The procedure for the first *3 speeches* will be the same as speeches 2-5 during yesterday's session –

Before you begin your speech, we would like you to **come up with, write down** and **say a sentence out loud** that includes two features;

- A **negative word** to **describe how you feel about doing the speech**
- A **negative way** that you think the other people will judge your performance

Like yesterday, to help you to come up with a sentence you will be given a template (i.e. "I feel_____ I think the other people will_____") along with a variety of words (e.g. "embarrassed" and "think I look boring") that can be used to make up a sentence. You may use these when coming up with your sentence, or you can use your own if you think of a word/phrase more suitable to describe how you are feeling and / or how you think the other people will judge your performance.

Example 1

"I feel scared, I think the other people will think I look stupid".

Here, "scared" is the negative word to describe how you feel about doing the speech. "Think I look stupid" is the negative way that you think the other people might judge your performance.

Example 2

"I feel embarrassed, I think the other people will think I look boring".

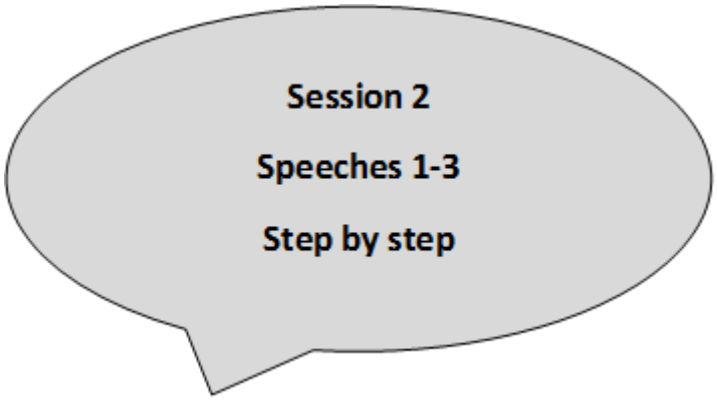
Here, "embarrassed" is the negative word to describe how you feel about doing the speech. "Think I look boring" is the negative way that you think the other people might judge your performance.

The researcher will prompt you before each speech of when to come up with and say your sentence. It would be good if you could try to come up with **a new sentence each time**, but if you can't, it is OK to use your previous sentence.

We will practice beforehand using an imaginary situation so that you feel more confident coming up with and saying these sorts of sentences out loud.

As before, a pre-recorded classroom audience will be projected on the wall while you deliver each speech. Please try to focus on the audience as you would if you were delivering a real classroom talk. **Don't forget; your speeches will be recorded and assessed at a later date by other people including teenagers and a teacher from a different school, in a different area.**

Please turn over for a step by step guide of what will happen before, during and after each speech.



1. Select speech topic. **5 minutes** to prepare
2. Come up with and write down sentence
3. Walk over to **red mat** where you will stand to deliver the speech
4. **Say sentence out loud**
5. Classroom is projected on to the wall where you are facing
6. Wait for **1 minute while the audience enters the room.** You will be prompted by the teacher when to begin your speech
7. You will be prompted by the researcher when to stop
8. Wait for **1.5 minutes**

REPEAT 3 TIMES USING DIFFERENT TOPICS FOR EACH SPEECH

Please let the researcher know when you are ready to continue. We will then practice coming up with and saying some sentences out loud

SESSION 2

Further Instructions

Well done! You have delivered the first 3 of today's speeches! ☺

The procedure for the final speech today will be the same as the first speech delivered during yesterday's session.

As before, there will be a selection of speech topics to choose from. The topics will be written on cards which will be face down on the desk. You will be asked to select a card. The card that you select will contain the topic of your next speech. Like before, ***we would like you to try and make your speech 1 minute long.*** *It is important that you try to make your speech clear and explain what your beliefs / thoughts / opinions are of your given topic. This might include thinking about your likes / dislikes and giving examples. You will have* ***5 minutes to plan and prepare*** *the speech. You will also be given some speech pointers to help you prepare beforehand.*

You will deliver your speech in front of a pre-recorded classroom audience. You will see the audience enter the room and sit down. The teacher will indicate when to start your speech, and the researcher will tell you when to stop. Please try to focus your attention on the audience as you would if you were presenting to a real classroom. ***Your speeches will be recorded and then evaluated at a later date by pupils your own age and a teacher from a different school, in a different area.***

We will ask you to report how you felt <u>before</u> and <u>after</u> the speech. We will also ask you to report how you felt the speech went. The researcher will show you which scales we would like you to use to do this and talk you through how to use them beforehand.

Although the procedure is similar to what you did during the other speeches that you have delivered today, you **will not** be required to come up with, write down or say a sentence this time.

Please turn over for a step by step guide of what will happen before, during and after the speech.

1. Select speech topic. **5 minutes** to prepare
2. **Report fear** using the 0-10 point scale
3. Walk over to **red mat** where you will stand to deliver the speech
4. Classroom projected on to the wall where you are facing
5. Wait for **1 minute while classroom audience enters the room**. You will be prompted by the teacher when to begin your speech
6. You will be prompted by the researcher when to stop
7. Walk back to the desk and **report fear level and how you felt the speech went** using the 0-10 point scales
8. Wait for **3 minutes**

If you are unsure about any of the information that you have read up until this point, please let the researcher know and they will be able to help.

Please let the researcher know once you are ready continue

SESSION 3

INSTRUCTIONS

Well done for completing Session 1 and 2 of our study *"Tackling Public Speaking Fear in Teenagers"*. It's great that you have come back to complete the final session ☺

The final session will be slightly similar to the first two sessions, but there will be some differences that we would like you to be aware of. Please take some time to carefully read through the following information so that you have a good understanding of what to expect from today's session.

1. Assent

You will not need to sign another assent form today. You are still free to withdraw at any time.

2. Questionnaires

You will be given a selection of questionnaires which will take approximately 20 minutes to complete. If you are not sure how to answer a question or get stuck, please ask the researcher who will be able to help you.

3. Social Activities Checklist

You will also be given a 'Social Activities Checklist' to record what social activities you have taken part in since the first session. The researcher will go through the checklist with you and explain how to use it. If anything is unclear or you are not sure what you need to do, please let the researcher know so that they can help.

4. Heart rate

We would like to record your heart rate throughout the duration of today's session. You will be given an activity tracker to wear around your wrist. Please wear this on the same wrist as before.

5. Speech Task

During today's session, we would like you to deliver **two speeches**. You will be given a selection of speech topics to choose from at random. **We would like you to try and make the first speech 1 minute long.** It is important that you try to make your speeches clear and explain what your beliefs / thoughts / opinions are of your given topic. This might include thinking about your likes / dislikes and giving examples. You will have **5 minutes to plan and prepare** your speech. You will also be given some speech pointers to help you prepare.

Like before –

You will deliver your speeches in front of a pre-recorded classroom audience. You will see the audience enter the room and sit down. The teacher will indicate when to start your speech, and the researcher will tell you when to stop. Please try to focus your attention on the audience as you would if you were presenting to a real classroom. ***Your speeches will be recorded and then evaluated at a later date by pupils your own age and a teacher from a different school, in a different area.***

We will ask you to report how you felt before and after each speech. We will also ask you to report how you felt each speech went. *Like before, the researcher will show you which scales we would like you to use to do this and talk you through how to use them beforehand.*

The first speech will be a little different from the final speech that we will ask you to deliver today. A step by step guide of what will happen before, during and after your first speech can be found at the end of this sheet.

You will be given more information about the final speech once you have delivered the first.

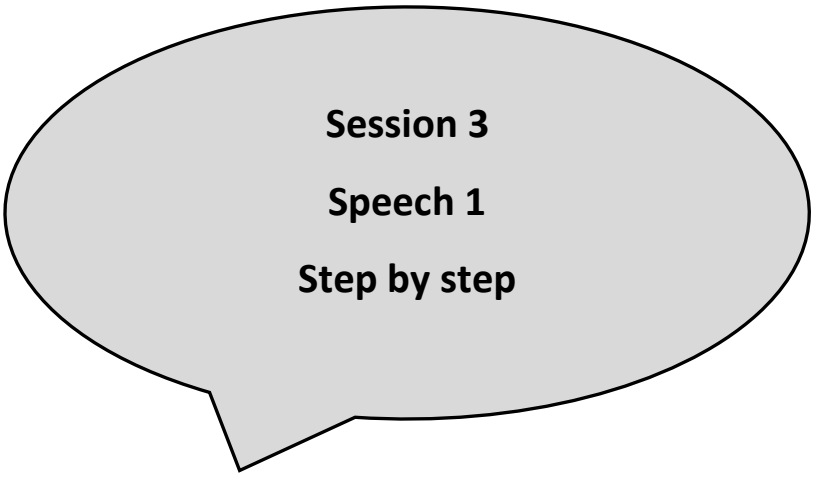
6. 5 minute "cool-down" period

After you have completed the final speech you will be given a 5 minute ''cool-down'' period to relax.

7. Debrief

Once you have completed the 5 minute "cool-down", the researcher will explain the study in full and you will be given opportunity to ask any questions that you may have.

8. Study complete



1. Select speech topic. **5 minutes** to prepare
2. **Report fear** using the 0-10 point scale
3. Walk over to **red mat** where you will stand to deliver the speech
4. Classroom projected on to the wall where you are facing
5. Wait for **1 minute while the audience enters the room**. You will be prompted by the teacher when to begin your speech
6. You will be prompted by the researcher when to stop
7. Walk back to the desk and **report fear level and how you felt the speech went** using the 0-10 point scales
8. Wait for **3 minutes**

If you are unsure about any of the information that you have read up until this point, please let the researcher know and they will be able to help.

Please let the researcher know once you are ready continue

SESSION 3

FINAL SPEECH

Well done! You have completed your first speech for today's session! ☺

The procedure for the final speech will be the same as the speech that you have just delivered, BUT, we would like you to try and make it **2 minutes long** this time.

Please let the researcher know when you are ready to continue

Appendix 12: Instruction Manual for Positive Coping Statements Condition

SESSION 1

INITIAL INSTRUCTIONS

Thank you for agreeing to take part in our study *''Tackling Public Speaking Fear in Teenagers''*. This study is interested in comparing different ways to improve public speaking fear.

By now you should have had a chance to read the information leaflets that were sent to you, and discuss the study further with a member of the research team.

Before we begin any task related activities, please take some time to carefully read through the following information so that you have a good understanding of what to expect from today's session.

7. Assent

Your parent has given consent for you to take part in this study. Once you have read these instructions, had an opportunity to ask the researcher questions, and if you are still happy to take part, we would like you to sign two copies of the attached assent form. One copy is for you to keep, and the other should be handed back to the researcher which we will keep for our records.

8. Questionnaires

You will be given a selection of questionnaires which will take approximately 20 minutes to complete. If you are not sure how to answer a question or get stuck, please ask the researcher who will be able to help you.

9. Heart rate

You will be given an activity tracker to wear around your wrist. This will allow us to record your heart rate before you start the speech task (details below). You will be given a short video clip to watch while we do this. We will also record your heart rate during your first speech.

10. Speech Task

During today's session, we would like you to deliver five short speeches. There will be a selection of speech topics to choose from. The topics will be written on cards which will be face down on the desk. You will then be asked to select a card. The card that you select will contain the topic of your next speech. **We would like you to try and make each speech 1 minute long.** It is important that you try to make each speech

clear and explain what your beliefs / thoughts / opinions are of your given topic. This might include thinking about your likes / dislikes and giving examples. You will have **5 minutes to plan and prepare** each speech. You will also be given some speech pointers to help you prepare beforehand.

You will deliver your speeches in front of a pre-recorded classroom audience. You will see the audience enter the room and sit down. The teacher will indicate when to start your speech, and the researcher will tell you when to stop. Please try to focus your attention on the audience as you would if you were presenting to a real classroom. **Your speeches will be recorded and then evaluated at a later date by pupils your own age and a teacher from a different school, in a different area.**

We will ask you to report how you felt <u>before</u> and <u>after</u> the first speech. We will also ask you to report how you felt the first speech went. The researcher will show you which scales we would like you to use to do this and talk you through how to use them beforehand.

A step by step guide of what will happen before, during and after the first speech can be found at the end of this sheet.

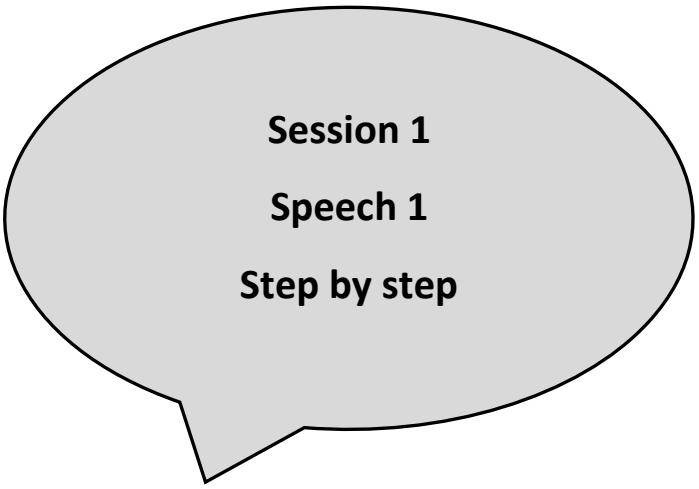
The first speech will be a little different from the rest of the speeches that we will ask you to deliver today. You will be given more information about speeches 2-5 once you have completed the first speech.

11. <u>5 minute “cool down” period</u>

After you have completed the fifth speech you will be given a 5 minute ‘’cool-down’’ period to relax.

12. <u>Confirm Session 2</u>

Before you leave we will check that you are still happy to attend tomorrow’s session.



9. Select speech topic. **5 minutes** to prepare
10. **Report fear** using the 0-10 point scales
11. Walk over to **red mat** where you will stand to deliver the speech
12. Classroom projected on to the wall where you are facing
13. Wait for **1 minute while the audience enters the room**. You will be prompted by the teacher when to begin your speech
14. You will be prompted by the researcher when to stop
15. Walk back to the desk and **report fear level and how you felt the speech went** using the 0-10 point scales
16. Wait for **3 minutes**

If you are unsure about any of the information that you have read up until this point, please let the researcher know and they will be able to help.

Please let the researcher know once you are ready continue

SESSION 1, SPEECHES 2-5

INSTRUCTIONS

Well done! You have delivered your first speech ☺

The procedure for the next *4 speeches* will be similar, but a little different to the one that you have just delivered.

Now we are going to add something else to the task –

Before each speech, we would like you to **come up with, write down and say a sentence out loud** to **help you feel less worried**.

You might find it useful to think about –

- What someone who cares about you would say to help you feel less worried or what you would say to help a friend in a similar situation

To help you to come up with a sentence you will be given a template (i.e. "It will be_____ because_____") along with a variety of words and phrases (e.g. "fine" and "I am well planned") that can be used to make up the sentence. You may use these when coming up with your sentence, or you can use your own if you think of words/phrases that are more suitable to help you feel less worried.

Example 1

If you are worried that you will look awkward and the other people will laugh at your speech, you could say –

"It will be fine because the other people won't laugh at my speech".

Example 2

If you are worried that you will forget your words and the other people will think you look stupid, you could say -

"It will be okay because I am well planned".

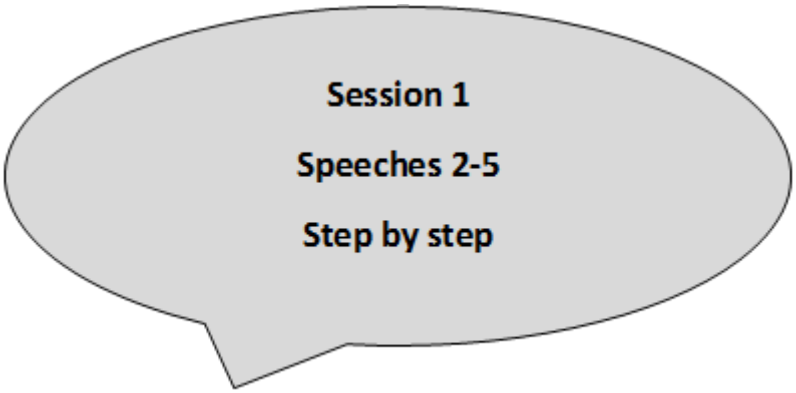
These are different ways to think about the situation and make you feel less worried about it.

The researcher will prompt you before each speech of when to come up with and say your sentence. It would be good if you could try to come up with **a new sentence each time**, but if you can't, it is OK to use your previous sentence.

We will practice beforehand using an imaginary situation so that you feel more confident coming up with and saying these sorts of sentences out loud.

As before, a pre-recorded classroom audience will be projected on the wall while you deliver each speech. Please try to focus on the audience as you would if you were delivering a real classroom talk. **Don't forget; your speeches will be recorded and assessed at a later date by other people including teenagers and a teacher from a different school, in a different area.**

Please turn over for a step by step guide of what will happen before, during and after each speech.



1. Select speech topic. **5 minutes** to prepare
2. Come up with and write down sentence
3. Walk over to **red mat** where you will stand to deliver the speech
4. **Say sentence out loud**
5. Classroom is projected on to the wall where you are facing
6. Wait for **1 minute while the audience enters the room.** You will be prompted by the teacher when to begin your speech
7. You will be prompted by the researcher when to stop
8. Wait for **1.5 minutes**

REPEAT 4 TIMES USING DIFFERENT TOPICS FOR EACH SPEECH

Please let the researcher know when you are ready to continue. We will then practice coming up with and saying some sentences out loud

SESSION 2

INITIAL INSTRUCTIONS

Well done for completing Session 1 of our study *"Tackling Public Speaking Fear in Teenagers"*. It's great that you have come back to complete the second session.

Session 2 will be similar to Session 1, but there will be some differences that we would like you to be aware of. Please take some time to carefully read through the following information so that you have a good understanding of what to expect from today's session.

7. Assent

You will not need to sign another assent form today. You are still free to withdraw at any time.

8. Questionnaires

You will not be required to complete any questionnaires today.

9. Heart rate

As before, we would like to record your heart rate only this will be during your final speech today, rather than the first. You will be given an activity tracker to wear around your wrist. Please wear this on the same wrist as yesterday.

10. Speech Task

The speech task will be the same as yesterday, but today we would like you to deliver four short speeches, instead of five–

There will be a selection of speech topics to choose from. The topics will be written on cards which will be face down on the desk. You will then be asked to select a card. The card that you select will contain the topic of your next speech. ***We would like you to try and make each speech 1 minute long.*** *It is important that you try to make each speech clear and explain what your beliefs / thoughts / opinions are of your given topic. This might include thinking about your likes / dislikes and giving examples. You will have* ***5 minutes to plan and prepare*** *each speech. You will also be given some speech pointers to help you prepare beforehand.*

You will deliver your speeches in front of a pre-recorded classroom audience. You will see the audience enter the room and sit down. The teacher will indicate when to start your speech, and the researcher will tell you when to stop. Please try to focus your attention on the audience as you would if you were presenting to a real classroom.

Your speeches will be recorded and then evaluated at a later date by pupils your own age and a teacher from a different school, in a different area.

As with speeches 2-5 during yesterday's session, we would like to add something to the speech task. Further instructions and a step by step guide of what will happen before, during and after the first three speeches can be found at the end of this sheet. You will be given more information about the fourth speech once you have completed 1-3.

11. 5 minute "cool down" period

Like before, after you have completed your fourth speech you will be given a 5 minute "cool-down" period to relax.

12. Confirm Session 3

Before you leave we will check that you are still happy to attend the final speech session in six days' time.

SESSION 2, SPEECHES 1-3

INSTRUCTIONS

The procedure for the first *3 speeches* will be the same as speeches 2-5 during yesterday's session -

Before each speech, we would like you to **come up with, write down** and **say a sentence out loud** to **help you feel less worried**.

You might find it useful to think about –

- What someone who cares about you would say to help you feel less worried or what you would say to help a friend in a similar situation

Like yesterday, to help you to come up with a sentence you will be given a template (i.e. "It will be_____ because_____") along with a variety of words and phrases (e.g. "fine" and "I am well planned") that can be used to make up the sentence. You may use these when coming up with your sentence, or you can use your own if you think of words/phrases that are more suitable to help you feel less worried.

Example 1

If you are worried that you will look awkward and the other people will laugh at your speech, you could say –

"It will be fine because the other people won't laugh at my speech".

Example 2

If you are worried that you will forget your words and the other people will think you look stupid, you could say -

"It will be okay because I am well planned".

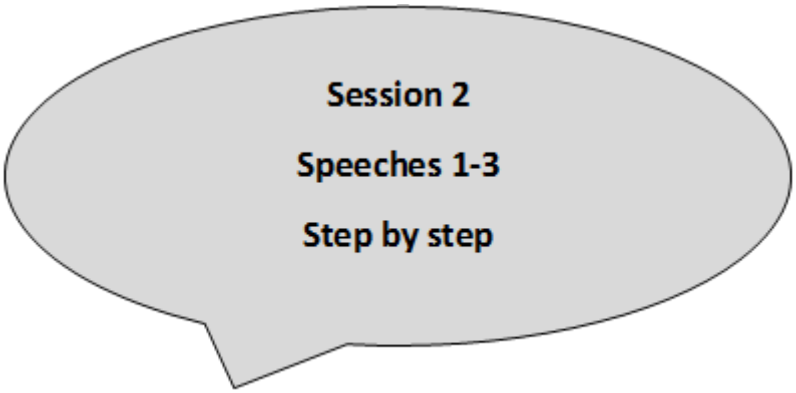
These are different ways to think about the situation and make you feel less worried about it.

The researcher will prompt you before each speech of when to come up with and say your sentence. It would be good if you could try to come up with **a new sentence each time**, but if you can't, it is OK to use your previous sentence.

We will practice beforehand using an imaginary situation so that you feel more confident coming up with and saying these sorts of sentences out loud.

As before, a pre-recorded classroom audience will be projected on the wall while you deliver each speech. Please try to focus on the audience as you would if you were delivering a real classroom talk. **Don't forget; your speeches will be recorded and assessed at a later date by other people including teenagers and a teacher from a different school, in a different area.**

Please turn over for a step by step guide of what will happen before, during and after each speech.



1. Select speech topic. **5 minutes** to prepare
2. Come up with and write down sentence
3. Walk over to **red mat** where you will stand to deliver the speech
4. **Say sentence out loud**
5. Classroom is projected on to the wall where you are facing
6. Wait for **1 minute while the audience enters the room.** You will be prompted by the teacher when to begin your speech
7. You will be prompted by the researcher when to stop
8. Wait for **1.5 minutes**

REPEAT 3 TIMES USING DIFFERENT TOPICS FOR EACH SPEECH

Please let the researcher know when you are ready to continue. We will then practice coming up with and saying some sentences out loud

SESSION 2

Further Instructions

Well done! You have delivered the first 3 of today's speeches! ☺

The procedure for the final speech today will be the same as the first speech delivered during yesterday's session.

As before, there will be a selection of speech topics to choose from. The topics will be written on cards which will be face down on the desk. You will be asked to select a card. The card that you select will contain the topic of your next speech. Like before, ***we would like you to try and make your speech 1 minute long.*** *It is important that you try to make your speech clear and explain what your beliefs / thoughts / opinions are of your given topic. This might include thinking about your likes / dislikes and giving examples. You will have* ***5 minutes to plan and prepare*** *the speech. You will also be given some speech pointers to help you prepare beforehand.*

You will deliver your speech in front of a pre-recorded classroom audience. You will see the audience enter the room and sit down. The teacher will indicate when to start your speech, and the researcher will tell you when to stop. Please try to focus your attention on the audience as you would if you were presenting to a real classroom. ***Your speeches will be recorded and then evaluated at a later date by pupils your own age and a teacher from a different school, in a different area.***

We will ask you to report how you felt before and after the speech. We will also ask you to report how you felt the speech went. The researcher will show you which scales we would like you to use to do this and talk you through how to use them beforehand.

Although the procedure is similar to what you did during the other speeches that you have delivered today, you **will not** be required to come up with, write down or say a sentence this time.

Please turn over for a step by step guide of what will happen before, during and after the speech.

9. Select speech topic. **5 minutes** to prepare
10. **Report fear** using the 0-10 point scale
11. Walk over to **red mat** where you will stand to deliver the speech
12. Classroom projected on to the wall where you are facing
13. Wait for **1 minute while classroom audience enters the room**. You will be prompted by the teacher when to begin your speech
14. You will be prompted by the researcher when to stop
15. Walk back to the desk and **report fear level and how you felt the speech went** using the 0-10 point scales
16. Wait for **3 minutes**

If you are unsure about any of the information that you have read up until this point, please let the researcher know and they will be able to help.

Please let the researcher know once you are ready continue

SESSION 3

INSTRUCTIONS

Well done for completing Session 1 and 2 of our study *"Tackling Public Speaking Fear in Teenagers"*. It's great that you have come back to complete the final session ☺

The final session will be slightly similar to the first two sessions, but there will be some differences that we would like you to be aware of. Please take some time to carefully read through the following information so that you have a good understanding of what to expect from today's session.

9. Assent

You will not need to sign another assent form today. You are still free to withdraw at any time.

10. Questionnaires

You will be given a selection of questionnaires which will take approximately 20 minutes to complete. If you are not sure how to answer a question or get stuck, please ask the researcher who will be able to help you.

11. Social Activities Checklist

You will also be given a 'Social Activities Checklist' to record what social activities you have taken part in since the first session. The researcher will go through the checklist with you and explain how to use it. If anything is unclear or you are not sure what you need to do, please let the researcher know so that they can help.

12. Heart rate

We would like to record your heart rate throughout the duration of today's session. You will be given an activity tracker to wear around your wrist. Please wear this on the same wrist as before.

13. Speech Task

During today's session, we would like you to deliver **two speeches**. You will be given a selection of speech topics to choose from at random. **We would like you to try and make the first speech 1 minute long.** It is important that you try to make your speeches clear and explain what your beliefs / thoughts / opinions are of your given topic. This might include thinking about your likes / dislikes and giving examples. You

will have **5 minutes to plan and prepare** your speech. You will also be given some speech pointers to help you prepare.

Like before –

You will deliver your speeches in front of a pre-recorded classroom audience. You will see the audience enter the room and sit down. The teacher will indicate when to start your speech, and the researcher will tell you when to stop. Please try to focus your attention on the audience as you would if you were presenting to a real classroom. ***Your speeches will be recorded and then evaluated at a later date by pupils your own age and a teacher from a different school, in a different area.***

We will ask you to report how you felt before and after each speech. We will also ask you to report how you felt each speech went. *Like before, the researcher will show you which scales we would like you to use to do this and talk you through how to use them beforehand.*

The first speech will be a little different from the final speech that we will ask you to deliver today. A step by step guide of what will happen before, during and after your first speech can be found at the end of this sheet.

You will be given more information about the final speech once you have delivered the first.

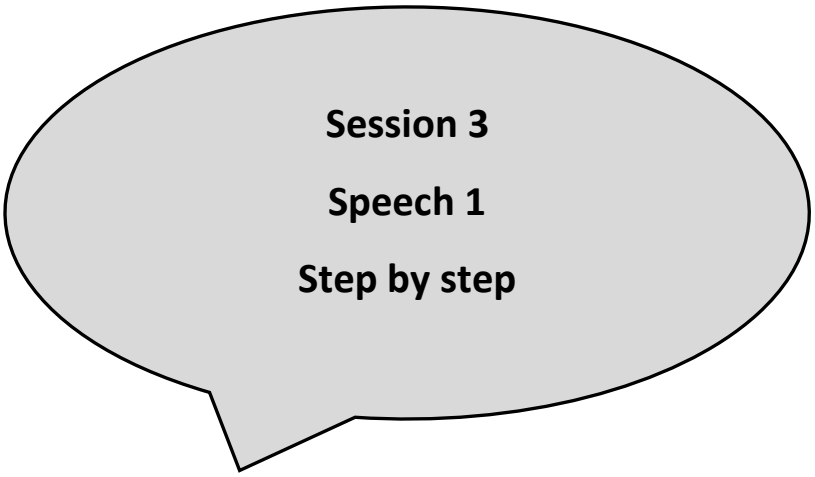
14. 5 minute "cool-down" period

After you have completed the final speech you will be given a 5 minute ''cool-down'' period to relax.

15. Debrief

Once you have completed the 5 minute "cool-down", the researcher will explain the study in full and you will be given opportunity to ask any questions that you may have.

16. Study complete



9. Select speech topic. **5 minutes** to prepare
10. **Report fear** using the 0-10 point scale
11. Walk over to **red mat** where you will stand to deliver the speech
12. Classroom projected on to the wall where you are facing
13. Wait for **1 minute while the audience enters the room**. You will be prompted by the teacher when to begin your speech
14. You will be prompted by the researcher when to stop
15. Walk back to the desk and **report fear level and how you felt the speech went** using the 0-10 point scales
16. Wait for **3 minutes**

If you are unsure about any of the information that you have read up until this point, please let the researcher know and they will be able to help.

Please let the researcher know once you are ready continue

SESSION 3

FINAL SPEECH

Well done! You have completed your first speech for today's session! ☺

The procedure for the final speech will be the same as the speech that you have just delivered, BUT, we would like you to try and make it **2 minutes long** this time.

Please let the researcher know when you are ready to continue

Appendix 13: Instruction Manual for Neutral Sentence Condition

SESSION 1

INITIAL INSTRUCTIONS

Thank you for agreeing to take part in our study *''Tackling Public Speaking Fear in Teenagers''*. This study is interested in comparing different ways to improve public speaking fear.

By now you should have had a chance to read the information leaflets that were sent to you, and discuss the study further with a member of the research team.

Before we begin any task related activities, please take some time to carefully read through the following information so that you have a good understanding of what to expect from today's session.

13. Assent

Your parent has given consent for you to take part in this study. Once you have read these instructions, had an opportunity to ask the researcher questions, and if you are still happy to take part, we would like you to sign two copies of the attached assent form. One copy is for you to keep, and the other should be handed back to the researcher which we will keep for our records.

14. Questionnaires

You will be given a selection of questionnaires which will take approximately 20 minutes to complete. If you are not sure how to answer a question or get stuck, please ask the researcher who will be able to help you.

15. Heart rate

You will be given an activity tracker to wear around your wrist. This will allow us to record your heart rate before you start the speech task (details below). You will be given a short video clip to watch while we do this. We will also record your heart rate during your first speech.

16. Speech Task

During today's session, we would like you to deliver five short speeches. There will be a selection of speech topics to choose from. The topics will be written on cards which will be face down on the desk. You will then be asked to select a card. The card that you select will contain the topic of your next speech. **We would like you to try and make each speech 1 minute long.** It is important that you try to make each speech

clear and explain what your beliefs / thoughts / opinions are of your given topic. This might include thinking about your likes / dislikes and giving examples. You will have **5 minutes to plan and prepare** each speech. You will also be given some speech pointers to help you prepare beforehand.

You will deliver your speeches in front of a pre-recorded classroom audience. You will see the audience enter the room and sit down. The teacher will indicate when to start your speech, and the researcher will tell you when to stop. Please try to focus your attention on the audience as you would if you were presenting to a real classroom. **Your speeches will be recorded and then evaluated at a later date by pupils your own age and a teacher from a different school, in a different area.**

We will ask you to report how you felt <u>before</u> and <u>after</u> the first speech. We will also ask you to report how you felt the first speech went. The researcher will show you which scales we would like you to use to do this and talk you through how to use them beforehand.

A step by step guide of what will happen before, during and after the first speech can be found at the end of this sheet.

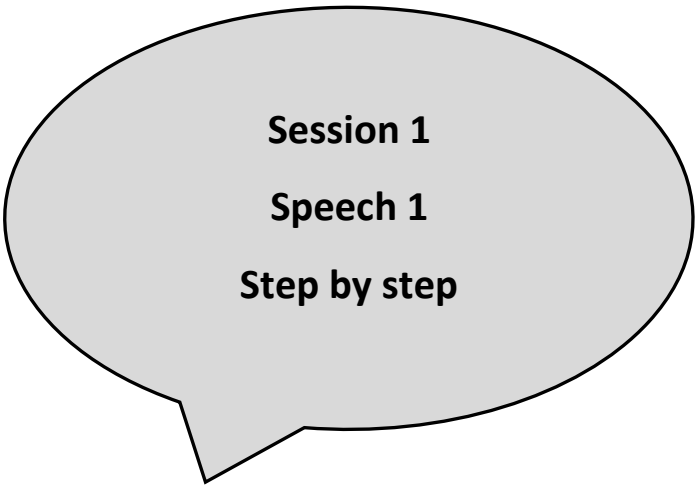
The first speech will be a little different from the rest of the speeches that we will ask you to deliver today. You will be given more information about speeches 2-5 once you have completed the first speech.

17. <u>5 minute “cool down” period</u>

After you have completed the fifth speech you will be given a 5 minute ‘’cool-down’’ period to relax.

18. <u>Confirm Session 2</u>

Before you leave we will check that you are still happy to attend tomorrow’s session.



17. Select speech topic. **5 minutes** to prepare
18. **Report fear** using the 0-10 point scales
19. Walk over to **red mat** where you will stand to deliver the speech
20. Classroom projected on to the wall where you are facing
21. Wait for **1 minute while the audience enters the room**. You will be prompted by the teacher when to begin your speech
22. You will be prompted by the researcher when to stop
23. Walk back to the desk and **report fear level and how you felt the speech went** using the 0-10 point scales
24. Wait for **3 minutes**

If you are unsure about any of the information that you have read up until this point, please let the researcher know and they will be able to help.

Please let the researcher know once you are ready continue

SESSION 1, SPEECHES 2-5

INSTRUCTIONS

Well done! You have delivered your first speech ☺

The procedure for the next *4 speeches* will be similar, but a little different to the one that you have just delivered.

Now we are going to add something else to the task –

Before each speech, we would like you to **come up with, write down and say a sentence out loud**.

You will be given a template (i.e. "The time is_____ my speech will be about_____" which we would like you to use each time.

Example 1

"The time is 09:30, my speech will be about the summer holidays".

Here, "09:30" and "the summer holidays" are the words you have used to come up with the sentence.

Example 2

"The time is 10:30, my speech will be about the weather"

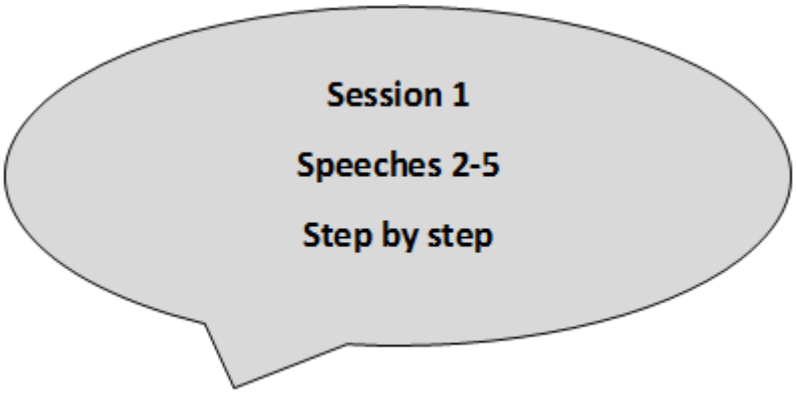
Here, "10:30" and "the weather" are the words you have used to come up with the sentence.

The researcher will prompt you before each speech of when to come up with and say your sentence.

We will practice beforehand so that you feel more confident coming up with and saying these sorts of sentences out loud.

As before, a pre-recorded classroom audience will be projected on the wall while you deliver each speech. Please try to focus on the audience as you would if you were delivering a real classroom talk. **Don't forget; your speeches will be recorded and assessed at a later date by other people including teenagers and a teacher from a different school, in a different area.**

Please turn over for a step by step guide of what will happen before, during and after each speech.



1. Select speech topic. **5 minutes** to prepare
2. Come up with and write down sentence
3. Walk over to **red mat** where you will stand to deliver the speech
4. **Say sentence out loud**
5. Classroom audience is projected on to the wall where you are facing
6. Wait for **1 minute while the audience enters the room.** You will be prompted by the teacher when to begin your speech
7. You will be prompted by the researcher when to stop
8. Walk back to the desk and wait for **1.5 minutes**

REPEAT 4 TIMES USING DIFFERENT TOPICS FOR EACH SPEECH

Please let the researcher know when you are ready to continue. We will then practice completing and saying some sentences out loud

SESSION 2

INITIAL INSTRUCTIONS

Well done for completing Session 1 of our study *"Tackling Public Speaking Fear in Teenagers"*. It's great that you have come back to complete the second session.

Session 2 will be similar to Session 1, but there will be some differences that we would like you to be aware of. Please take some time to carefully read through the following information so that you have a good understanding of what to expect from today's session.

13. Assent

You will not need to sign another assent form today. You are still free to withdraw at any time.

14. Questionnaires

You will not be required to complete any questionnaires today.

15. Heart rate

As before, we would like to record your heart rate only this will be during your final speech today, rather than the first. You will be given an activity tracker to wear around your wrist. Please wear this on the same wrist as yesterday.

16. Speech Task

The speech task will be the same as yesterday, but today we would like you to deliver four short speeches, instead of five–

There will be a selection of speech topics to choose from. The topics will be written on cards which will be face down on the desk. You will then be asked to select a card. The card that you select will contain the topic of your next speech. ***We would like you to try and make each speech 1 minute long.*** *It is important that you try to make each speech clear and explain what your beliefs / thoughts / opinions are of your given topic. This might include thinking about your likes / dislikes and giving examples. You will have* ***5 minutes to plan and prepare*** *each speech. You will also be given some speech pointers to help you prepare beforehand.*

You will deliver your speeches in front of a pre-recorded classroom audience. You will see the audience enter the room and sit down. The teacher will indicate when to start your speech, and the researcher will tell you when to stop. Please try to focus your attention on the audience as you would if you were presenting to a real classroom.

Your speeches will be recorded and then evaluated at a later date by pupils your own age and a teacher from a different school, in a different area.

As with speeches 2-5 during yesterday's session, we would like to add something to the speech task. Further instructions and a step by step guide of what will happen before, during and after the first three speeches can be found at the end of this sheet. You will be given more information about the fourth speech once you have completed 1-3.

17. <u>5 minute "cool down" period</u>

Like before, after you have completed your fourth speech you will be given a 5 minute "cool-down" period to relax.

18. <u>Confirm Session 3</u>

Before you leave we will check that you are still happy to attend the final speech session in six days' time.

SESSION 2, SPEECHES 1-3

INSTRUCTIONS

The procedure for the first *3 speeches* will be the same as speeches 2-5 during yesterday's session -

Before each speech, we would like you to **come up with, write down and say a sentence out loud**.

You will be given a template (i.e. "The time is_____ my speech will be about_____" which we would like you to use each time.

Example 1

"The time is 09:30, my speech will be about the summer holidays".

Here, "09:30" and "the summer holidays" are the words you have used to come up with the sentence.

Example 2

"The time is 10:30, my speech will be about the weather".

Here, "10:30" and "the weather" are the words you have used to come up with the sentence.

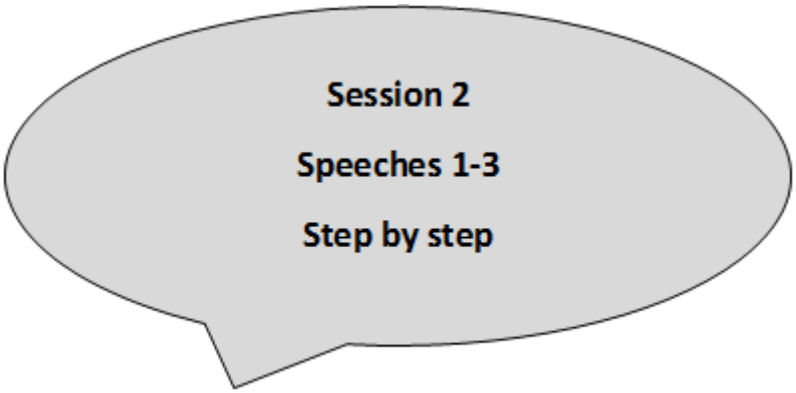
The researcher will prompt you before each speech of when to come up with and say your sentence.

We will practice beforehand so that you feel more confident coming up with and saying these sorts of sentences out loud.

As before, a pre-recorded classroom audience will be projected on the wall while you deliver each speech. Please try to focus on the audience as you would if you were delivering a real classroom talk. **Don't forget; your speeches will be**

recorded and assessed at a later date by other people including teenagers and a teacher from a different school, in a different area.

Please turn over for a step by step guide of what will happen before, during and after each speech.



1. Select speech topic. **5 minutes** to prepare
2. Come up with and write down sentence
3. Walk over to **red mat** where you will stand to deliver the speech
4. **Say sentence out loud**
5. Classroom is projected on to the wall where you are facing
6. Wait for **1 minute while the audience enters the room.** You will be prompted by the teacher when to begin your speech
7. You will be prompted by the researcher when to stop
8. Wait for **1.5 minutes**

REPEAT 3 TIMES USING DIFFERENT TOPICS FOR EACH SPEECH

Please let the researcher know when you are ready to continue. We will then practice completing and saying some sentences out loud

SESSION 2

Further Instructions

Well done! You have delivered the first 3 of today's speeches! ☺

The procedure for the final speech today will be the same as the first speech delivered during yesterday's session.

As before, there will be a selection of speech topics to choose from. The topics will be written on cards which will be face down on the desk. You will be asked to select a card. The card that you select will contain the topic of your next speech. Like before, ***we would like you to try and make your speech 1 minute long.*** *It is important that you try to make your speech clear and explain what your beliefs / thoughts / opinions are of your given topic. This might include thinking about your likes / dislikes and giving examples. You will have* ***5 minutes to plan and prepare*** *the speech. You will also be given some speech pointers to help you prepare beforehand.*

You will deliver your speech in front of a pre-recorded classroom audience. You will see the audience enter the room and sit down. The teacher will indicate when to start your speech, and the researcher will tell you when to stop. Please try to focus your attention on the audience as you would if you were presenting to a real classroom. ***Your speeches will be recorded and then evaluated at a later date by pupils your own age and a teacher from a different school, in a different area.***

We will ask you to report how you felt before and after the speech. We will also ask you to report how you felt the speech went. The researcher will show you which scales we would like you to use to do this and talk you through how to use them beforehand.

Although the procedure is similar to what you did during the other speeches that you have delivered today, you **will not** be required to come up with, write down or say a sentence this time.

Please turn over for a step by step guide of what will happen before, during and after the speech.

17. Select speech topic. **5 minutes** to prepare
18. **Report fear** using the 0-10 point scale
19. Walk over to **red mat** where you will stand to deliver the speech
20. Classroom projected on to the wall where you are facing
21. Wait for **1 minute while classroom audience enters the room**. You will be prompted by the teacher when to begin your speech
22. You will be prompted by the researcher when to stop
23. Walk back to the desk and **report fear level and how you felt the speech went** using the 0-10 point scales
24. Wait for **3 minutes**

If you are unsure about any of the information that you have read up until this point, please let the researcher know and they will be able to help.

Please let the researcher know once you are ready continue

SESSION 3

INSTRUCTIONS

Well done for completing Session 1 and 2 of our study *"Tackling Public Speaking Fear in Teenagers"*. It's great that you have come back to complete the final session ☺

The final session will be slightly similar to the first two sessions, but there will be some differences that we would like you to be aware of. Please take some time to carefully read through the following information so that you have a good understanding of what to expect from today's session.

17. Assent

You will not need to sign another assent form today. You are still free to withdraw at any time.

18. Questionnaires

You will be given a selection of questionnaires which will take approximately 20 minutes to complete. If you are not sure how to answer a question or get stuck, please ask the researcher who will be able to help you.

19. Social Activities Checklist

You will also be given a 'Social Activities Checklist' to record what social activities you have taken part in since the first session. The researcher will go through the checklist with you and explain how to use it. If anything is unclear or you are not sure what you need to do, please let the researcher know so that they can help.

20. Heart rate

We would like to record your heart rate throughout the duration of today's session. You will be given an activity tracker to wear around your wrist. Please wear this on the same wrist as before.

21. Speech Task

During today's session, we would like you to deliver **two speeches**. You will be given a selection of speech topics to choose from at random. **We would like you to try and make the first speech 1 minute long.** It is important that you try to make your speeches clear and explain what your beliefs / thoughts / opinions are of your given topic. This might include thinking about your likes / dislikes and giving examples. You will have **5 minutes to plan and prepare** your speech. You will also be given some speech pointers to help you prepare.

Like before –

You will deliver your speeches in front of a pre-recorded classroom audience. You will see the audience enter the room and sit down. The teacher will indicate when to start your speech, and the researcher will tell you when to stop. Please try to focus your attention on the audience as you would if you were presenting to a real classroom. ***Your speeches will be recorded and then evaluated at a later date by pupils your own age and a teacher from a different school, in a different area.***

We will ask you to report how you felt before and after each speech. We will also ask you to report how you felt each speech went. *Like before, the researcher will show you which scales we would like you to use to do this and talk you through how to use them beforehand.*

The first speech will be a little different from the final speech that we will ask you to deliver today. A step by step guide of what will happen before, during and after your first speech can be found at the end of this sheet.

You will be given more information about the final speech once you have delivered the first.

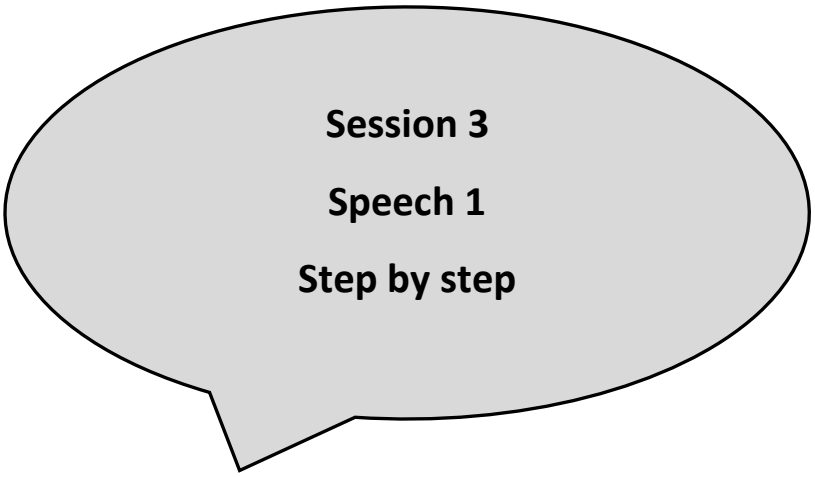
22. 5 minute "cool-down" period

After you have completed the final speech you will be given a 5 minute ''cool-down'' period to relax.

23. Debrief

Once you have completed the 5 minute "cool-down", the researcher will explain the study in full and you will be given opportunity to ask any questions that you may have.

24. Study complete



17. Select speech topic. **5 minutes** to prepare
18. **Report fear** using the 0-10 point scale
19. Walk over to **red mat** where you will stand to deliver the speech
20. Classroom projected on to the wall where you are facing
21. Wait for **1 minute while the audience enters the room**. You will be prompted by the teacher when to begin your speech
22. You will be prompted by the researcher when to stop
23. Walk back to the desk and **report fear level and how you felt the speech went** using the 0-10 point scales
24. Wait for **3 minutes**

If you are unsure about any of the information that you have read up until this point, please let the researcher know and they will be able to help.

Please let the researcher know once you are ready continue

SESSION 3

FINAL SPEECH

Well done! You have completed your first speech for today's session! ☺

The procedure for the final speech will be the same as the speech that you have just delivered, BUT, we would like you to try and make it **2 minutes long** this time.

Please let the researcher know when you are ready to continue

Appendix 14: Demographic and Questionnaire Measures

TEEN QUESTIONNAIRES

Your participant number _____

Today's date ____/____/____

Your age _____

Your school year Year _____

Your birthday _____

Year you were born _____

Your gender Male (boy) / Female (girl) (please circle)

Can you tell us about what your parent(s) or guardian(s) do for a living?

Please tell us about each person on a separate line. Who is this about? **(e.g. Mum/Dad/Guardian)**	**Works (yes/no)**	**If they work, what is their job?**

Over the page, we'd like to ask you lots of questions about what you think and what you do. Please do not spend too much time on each question – there are no right or wrong answers.

COVER SHEET (FOR SSWRS, SCQ, SBQ, SAQ)

For:

- Social Summary Weekly Rating Scale (SSWRS)
- Social Cognitions Questionnaire (SCQ)
- Social Behaviour Questionnaire (SBQ)
- Social Attitudes Questionnaire (SAQ)

The next four questionnaires focus on what you think and what you do in **social situations**. A social situation always involves being with other people in some way. You might be interacting with them or just around them. The situation could be face-to-face or via phone or social media. It might be at home, in school, or when you are out and about.

Here are some examples:

- Taking part in a classroom activity
- Speaking in assembly
- Texting people
- Using social media
- Asking for help in a shop
- Eating in public
- Being filmed or photographed
- Meeting someone
- Going to a party

Social Summary Weekly Rating Scale (SSWRS) – adapted for children/adolescents

a) Please circle a number from the scale below that best describes how much of a problem social anxiety has been for you in the last week:

0	1	2	3	4	5	6	7	8
No problem		Slight problem		Definite problem		Marked problem		Severe problem

b) Please circle a number from the scale below to show how often in the last week you have avoided social situations or doing something in those situations.

0	1	2	3	4	5	6	7	8
Not at all		Rarely		Sometimes		Often		Always

c) For social situations ***in general***, please choose a number from the scale below to show how much your mind was focused on yourself or on other people and what was going on around you in the last week.

0	1	2	3	4	5	6	7	8
Entirely externally focused				Both equally				Entirely self focused

d) For social situations ***that you found difficult,*** please choose a number from the scale below to show to show how much your mind was focused on yourself or on other people and what was going on around you in the last week.

0	1	2	3	4	5	6	7	8
Entirely externally focused				Both equally				Entirely self focused

e) Over the past week how often have you gone over in your mind things that you think might go wrong in a social situation ***before*** entering the situation.

0	1	2	3	4	5	6	7	8
Not at all		Rarely		Sometimes		Often		Always

f) Over the past week how often have you gone over social interactions in your mind ***after*** they have finished.

0	1	2	3	4	5	6	7	8
Not at all		Rarely		Sometimes		Often		Always

ADAPTED Social Cognitions Questionnaire (SCQ)

Listed below are some thoughts that go through people's minds when they are nervous or frightened. Indicate, on the **LEFT** hand side of the form, how often in the last week each thought has occurred; rate each thought from 1-5 using the following scale:

1. Thought never occurs
2. Thought rarely occurs
3. Thought occurs during half of the times when I am nervous
4. Thought usually occurs
5. Thought always occurs when I am nervous

How often do you have this thought? (Rate from 1-5)		**How much do you believe this thought? (Rate from 0-100)**
___	I will be unable to speak	___
___	I am unlikeable	___
___	I am going to tremble or shake uncontrollably	___
___	People will stare at me	___
___	I am being an idiot	___
___	People won't want to be friends with me	___
___	I will be frozen with fear	___
___	I will drop or spill things	___
___	I am going to be sick	___
___	I am not good enough	___
___	I will babble or talk funny	___
___	I am not as good as others	___
___	I will be unable to concentrate	___
___	I will be unable to write properly	___
___	People are not interested in me	___
___	People won't like me	___
___	People will make fun of me	___
___	I will sweat/perspire	___
___	I am going red	___
___	I am weird/different	___
___	People will see I am nervous	___
___	People think I am boring	___
___	I will embarrass myself	___
___	People will be angry with me	___
___	I will wet myself/have diarrhoea	___
___	I will get picked on and teased	___
___	I will look stupid	___
___	I will be forced to do things I don't want to do	___
___	People will laugh at me	___
	Other thoughts not listed (please specify):	
___	_____	___
___	_____	___

When you feel anxious how much do you believe each thought to be true. Please rate each thought by choosing a number from the scale below, and put the number which applies on the **RIGHT** hand side of the form.

0 10 20 30 40 50 60 70 80 90 100

I do not believe this thought — I am completely convinced this thought is true

Social Behaviour Questionnaire (SBQ) – adapted for children/adolescents

Please circle the word which best describes how often you do the following things when you are anxious in, or before a social situation.

Try not to attract attention	Never	Sometimes	Often	Always
Make an effort to get your words right	Never	Sometimes	Often	Always
Check that you are coming across well	Always	Often	Sometimes	Never
Avoid eye contact	Never	Sometimes	Often	Always
Talk less	Always	Often	Sometimes	Never
Avoid asking questions	Always	Often	Sometimes	Never
Try to picture how you appear to others	Never	Sometimes	Often	Always
Grip cups or glasses tightly	Never	Sometimes	Often	Always
Position yourself so as not to be noticed	Always	Often	Sometimes	Never
Try to control shaking	Always	Often	Sometimes	Never
Choose clothes that will prevent or hide sweating	Never	Sometimes	Often	Always
Wear clothes or makeup to hide blushing	Never	Sometimes	Often	Always
Rehearse sentences in your mind	Always	Often	Sometimes	Never
Check what you are going to say	Always	Often	Sometimes	Never
Blank out or switch off mentally	Never	Sometimes	Often	Always
Avoid talking about yourself	Never	Sometimes	Often	Always
Keep still	Always	Often	Sometimes	Never
Ask lots of questions	Always	Often	Sometimes	Never
Stay on the edge of groups	Never	Sometimes	Often	Always
Avoid pauses in speech	Always	Often	Sometimes	Never
Hide your face	Never	Sometimes	Often	Always
Try to think about other things	Always	Often	Sometimes	Never
Use alcohol/drugs to manage anxiety	Always	Often	Sometimes	Never
Talk more	Always	Often	Sometimes	Never
Try to fit in and ‘act normal’	Always	Often	Sometimes	Never
Try to stay in control of your behaviour	Never	Sometimes	Often	Always
Make an effort to come across well	Always	Often	Sometimes	Never
Planning things to talk about before a conversation	Never	Sometimes	Often	Always
Wear clothes so I blend in.	Always	Often	Sometimes	Never
Seek reassurance from my friends and family	Never	Sometimes	Often	Always
Get other people to speak for me or do things for me	Always	Often	Sometimes	Never
Have an excuse or ‘get out’ planned	Never	Sometimes	Often	Always
Look busy (checking phone etc.)	Always	Often	Sometimes	Never

Social Attitudes Questionnaire (revised) – adapted for children/adolescents

This questionnaire lists different attitudes or beliefs which people sometimes hold. Read EACH statement carefully and decide how much you agree or disagree with each statement. For each of the attitudes, show your answer by putting a circle round the words which BEST DESCRIBE HOW YOU THINK. Be sure to choose only one answer for each attitude.

Because people are different, there is no right or wrong answer to these statements. To decide whether a given attitude is typical of your way of looking at things, simply keep in mind what you are like MOST OF THE TIME.

I don't need everyone to accept me.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I must not show signs of weakness to others

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If I make a mistake in a social situation people will not want to be friends with me.

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Everyone will stare at me and think I'm strange if I don't act normally

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm unlikeable

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Other people are more anxious than I am

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm different

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Other people are better at getting it right socially than me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I must appear funny and intelligent

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I look as anxious as I feel

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If other people think I'm not as good as them, then I'm not

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm unacceptable

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Anxiety is not a sign of weakness

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Other people are more sorted and able to cope than I am

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Others are more acceptable and likeable than me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

My anxiety is obvious to other people

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If someone doesn't like me, it is my fault

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

To be worthwhile, I don't need approval from other people

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I must not let anyone see I am anxious

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

People think I am uninteresting

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If others really get to know me, they won't like me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Unless I appear calm and cool, people will not want to be friends with me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm not as good as others

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm vulnerable

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Other people are less anxious than I am

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

People can see right through me, and see my weakness

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I don't need to be liked by everyone

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm a weird person

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If people see I'm anxious, they will pick on me and humiliate me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If I disagree with someone, they will think I am stupid or will not want to be friends with me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm odd/weird

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm important to other people

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

People see anxiety as a sign of weakness

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I have to do things right to be accepted

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Unless I am funny and interesting, people won't like me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If I keep up appearances, I might just about get by

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

My opinions mean nothing

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

When people see that I'm anxious, they see the real, second-rate me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm attractive

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If people notice I am anxious they will think I am odd

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

People will take advantage if they spot a sign of weakness

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If someone thought that I was not as good as them, I couldn't stand it

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If I am quiet, people will think I'm boring

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm not good enough

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If people see that I'm anxious, they will think I am weak or second-rate

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm interesting

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If people look at me, it means they are thinking bad things about me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I'm a boring person

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

Even if people see my anxiety, it doesn't mean that I am not as good as them

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

I must always live up to other people's expectations

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If I make a mistake in a social situation people will laugh at me or be angry with me

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

If people see I am anxious I will be forced to do things I don't want to do

TOTALLY AGREE	AGREE VERY MUCH	AGREE SLIGHTLY	NEUTRAL	DISAGREE SLIGHTLY	DISAGREE VERY MUCH	TOTALLY DISAGREE

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?

Please let the researcher know when you have finished.

Today you have answered questions about a range of things including anxiety and feeling down or low. If these questions have raised any concerns or worries, please get in touch with us (or ask your parent/guardian to get in touch) on 0118 378 5534 or visit our website where you can find further information about support, resources and treatment.

http://andyresearchclinic.com/need-help/

Appendix 15: Observer Coding Scheme for Speech Videos

GUIDELINES FOR ADOLESCENT SPEECH CODING

There are <u>two</u> questions that are being asked within the coding scheme –

1. **Anxiety/nervousness – how anxious/nervous did the adolescent seem <u>before</u> the talk?** *This item* contains 2 schemes –*

i) General behaviour
ii) Bodily manifestations

2. **Anxiety/nervousness – how anxious/nervous did the adolescent seem <u>during</u> the talk?** *This item* contains 3 schemes –*

i) General behaviour
ii) Bodily manifestations
iii) Speech

*All items should be coded per <u>20 seconds</u>**

1 & 2. Anxiety (before and during the talk)

Adolescent anxiety is a general measure of how confident and relaxed the adolescent is about giving their talk. An anxious adolescent will seem ill at ease and/or appear nervous and uncomfortable before and/or during the talk. 3 elements of anxiety will be considered for determining an overall level of anxiety for each adolescent – general behaviour, bodily manifestations and the speech/talk.

Anxious Adolescent

(i) General Behaviour

An anxious adolescent is will appear reluctant and/or nervous about delivering their talk. They may require encouragement from the researcher to begin. They are unlikely to introduce themselves or the talk. The adolescent may seem uncomfortable during their talk. They may try to conceal their face (e.g. by using their notebook or hands). They may come across as sad, awkward or ill at ease. They may also pace, look away or rock from side to side.

(ii) Facial Expression / Bodily Manifestations

An anxious adolescent will show clear manifestations of anxiety, in facial expression and body language. Facial expressions indicative of anxiety include fixed/frozen expressions, nervousness, watchfulness, fearful expressions, sad expressions, mouthing (e.g. sticking tongue out or biting lip), a passive face with a fixed stare (possible at the camera or the 'audience'), a nervous smile or laugh, facial twitches and/or grimaces.

Bodily Manifestations: a motionless, shy/closed or rigid posture (often with hunching of the shoulders), nervous movements with the hands (e.g. wringing of hands), nervous self-touching (particularly of the face and hair), fidgeting and cowering away from the camera.

(iii) Speech/Talk

An anxious adolescent may take time to get going, stutter or stumble over their words. They are likely to read from their notes for the majority of the talk, and avoid looking towards the 'audience' or camera. They are unlikely to summarise the talk, and may simply stand waiting for the researcher to turn the camera off (without indicating that their talk is finished), or even walk away from the camera before it has been switched off. They may demonstrate a difficult tone of voice and/or pace (e.g. mumbling or rushing).

Confident Adolescent

(i) General Behaviour

A confident adolescent is likely to appear happy and assured about delivering their talk. They will appear at ease, directing their face towards the camera and with little to no attempts to conceal it (e.g. by using their notebook or hands). They may introduce themselves, or their talk, by saying something like "Hello, my name is XX and I'm going to talk about XX". The adolescent will seem relaxed throughout their speech.

(ii) Bodily Manifestations (i.e. facial expressions and body language)

A confident adolescent will show confidence through their body language and facial expressions. Confident body language may include a strong stance, looking towards the audience with a composed posture. They may emphasise their points with hand movements or gestures and facial expressions such as smiling. Confident facial expressions may include smiling (not smirking) and using expressions to emphasise points (e.g. raising eyebrows).

(iii) Speech/Talk

They will speak freely, with ease and minimal stuttering or stumbling over their words, and will not require any encouragement from the researcher to begin. They may use notes as guidance or reminders, but overall, they look towards the 'audience' for most of the time (NB. without a fixed/frozen composition). Overall, they will use a comfortable tone of voice and pace.

Within each code there are 7* separate categories. The adolescent should fit in to one. Within each category there is a list of 'essential' and 'additional' criteria. For the score to be obtained, all the essential criteria must be met. If the essentials are met but the additionals are not, then the individual would for example, score a 3. However, if there are uncertainties between whether the individual should, for example, score a 3 or a 4, then the additionals should be looked at to allow for the score to be matched to a 3 or a 4.

(i) General Behaviour

Behavioural signs that the adolescent is feeling confident / relaxed –

- **Appears calm/relaxed/at ease in front of the camera** *e.g. notes held in a relaxed posture, looking towards the camera NB. without fixed/fearful expression*
- **Talks promptly** *e.g. gets the talk going with ease*
- **Use of gestures to emphasize points** *e.g. hand movements (NB. not nervous fidgeting)*

Behavioural signs that the adolescent is feeling uncomfortable/anxious /nervous –

- **Appears eager to get away from the camera** *e.g. walking away as soon as the talk is finished,*
- **Seeks reassurance from the researcher** (NB. may not always be clear from the footage where the researcher is)
- **Attempts to conceal their face** *e.g. behind notes, hands, clothes*
- **Nervous laugh/coughing (**NB. not related to a cold/illness**)**
- **Pacing or rocking/swaying from side to side**
- **Gulping/increased swallowing**
- **Breathing** *e.g. deep/shallow*

Behavioural signs that the adolescent is feeling distressed -

- **Appears distressed** *e.g. crying*

(ii) Bodily Manifestations (i.e. facial expressions and body language)

Facial Expressions

Facial expressions that suggest the adolescent is feeling confident / relaxed

- **Confident expression[s]** *e.g. calm, happy, friendly*
- **Genuine/warm smile**

Facial expressions that suggest the adolescent is feeling anxious / uncomfortable

- **Anxious/uncomfortable expressions** *e.g. fixed/frozen, fearful, sad, nervous watchfulness (NB. may be towards the audience), passive*
- **Nervous smile and/or mouthing/chewing** *e.g. sticking tongue out / biting lip/mouth / tight lip / pulling down of lip corners, chewing pen/clothes*
- **Facial twitches and/or grimaces/winces**
- **Eyes** *e.g. tense, wild/open, fixed stare (NB. may be towards audience), increased blinking*
- **Frowning/raised eyebrows**
- **Flared nostrils**

NB. May show rapid fluctuations in the above expressions = clear sign depending on the sign[s] being measured, the frequency and duration of fluctuations.

Facial expressions that suggest the adolescent is feeling distressed

- **Distressed facial expressions** *e.g. terror, shame, humiliation*

Body Language

Body language that suggest the adolescents is feeling confident / relaxed

- **Good eye contact / direction of gaze** *e.g. looking towards the audience / camera (NB. may alternate briefly between notes and back towards the camera / 'audience')*
- **Confident/carefree posture/stance** *e.g. strong, confident (NB. no hunching of shoulders, hands in pockets), body facing towards the camera, head held high/facing towards the camera*

Body language that suggest the adolescent is feeling anxious / uncomfortable

- **Poor eye contact / avoidant gaze** *e.g. down, to the side, up) from the audience / camera for a long periods of time (NB. not alternating briefly between notes and back towards the camera / 'audience')**
- **Anxious posture** *e.g. rigid, awkward, hunched shoulders*
- **Anxious hand actions** *e.g. hand movements (wringing hands), fidgeting, hands in pockets, self-touching gestures (hair, face, jewellery, neck, wristbands)*
- **Crossed arms**
- **Cowering away from the camera**
- **Shaking** *e.g. hands*

Body Language that suggests the adolescent is feeling distressed –

- **Frozen composition**
- **Excessive shaking**

(iii) Speech

Speech signs that the adolescent is feeling confident / relaxed -

- **Speaks freely** *e.g. improvises, does not read straight from notes, does not rely on notes*
- **Voice is comfortable in tone** *e.g. not too quiet / loud*
- **Comfortable pace** *e.g. no/little stumbling of words. (NB. where there is minor stumbling over words, the adolescent will recover well)*

Speech signs that the adolescent is feeling anxious / uncomfortable -

- **Slight/some hesitation, awkwardness or multiple attempts to get the speech going**
- **Voice is uncomfortable in tone or pace** *e.g. too quiet, loud, rushed, rapid, abrupt, staggered, mumbled*
- **Stumbling or stuttering over words** *(NB. more than minor stumbling with some difficulty recovering from)*
- **Long pauses or periods of quiet / not talking**
- **Repeatedly saying 'um' or 'like'***

Speech signs that the adolescent is feeling distressed -

- **Negative comments to the researcher about the talk either during or at the end of the talk** *e.g. "That was rubbish"*
- **Very little talking (e.g. < 10 seconds), long periods of quiet**

Child anxiety scale (1-7) – Code every 20 seconds*

	ESSENTIAL		ADDITIONAL
1	The adolescent shows no obvious signs of anxiety. Overall, they seem relaxed and confident.		The talk will be delivered well. The adolescent shows one or more clear sign[s] that they are feeling confident and relaxed.
2	The adolescent seems anxious in a small way – one or more mild signs of anxiety.		Although the talk will be delivered well, the adolescent may only show mild signs that they are feeling confident.
3	The adolescent seems somewhat anxious - 1 clear sign of anxiety/shyness.		Overall the talk will be delivered adequately and the adolescent may show some minor signs that they are feeling confident. There may also be some brief/mild indication[s] of anxiety.
4	The adolescent seems moderately anxious - 2 clear signs of anxiety/shyness.		Although the talk will be delivered adequately, the adolescent will seem somewhat reluctant to do it. They may appear uncomfortable for more than just a brief episode.
5	The adolescent seems anxious for more than half of the time and shows 3 clear signs of anxiety/shyness.		Although some of the talk will be delivered adequately, the adolescent will seem clearly reluctant to do it. They are likely to appear uncomfortable for at least half of the time.
6	The adolescent seems anxious for most of the time. They will show more than 3 different, clear signs of anxiety/shyness.		Most of the talk will not be delivered adequately. The adolescent will clearly be reluctant to do the talk and likely to appear uncomfortable for most of the time.
7	The adolescent's anxiety is pervasive and strong for most of or the entire talk. The adolescent does not appear confident or relaxed at any point.		The adolescent will show clear signs of distress. The adolescent may be quiet for most of the talk, which may be ≤ 10 seconds in duration.

NB. 1. In the context where the adolescent is fidgeting, but does not show other symptoms of anxiety, then code '2' in anxiety.

In the context where the adolescent rarely looks away from their notes, but does not show any other symptoms of anxiety, then code '2' in anxiety

NB. 2. There will be some variability in the length of each anticipation phase across the videos (i.e. the time before the adolescent begins their speech). To ensure that each video is consistently coded for 60 seconds (x3 20 seconds) count back 60 seconds from when the adolescent is instructed to begin their talk. For example, if the adolescent begins their talk at 00:01:10 then start coding the anticipation phase at 00:00:10. This will need to be logged in the video scoring sheet next to 'Start time'.

If any of the above guidance is unclear, please ask for further clarification

Appendix 16: Correlation Matrix of Relationships between Dependent Variables

Measure			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Heart rate																													
	1	Pre-test before																											
	2	Pre-test after	.661**																										
	3	Immediate post-test before	.381**	.384**																									
	4	Immediate post-test after	.432**	.446**	.638**																								
	5	1-week follow-up before	.444**	.275*	.569**	.567**																							
	6	1-week follow-up after	.274*	.295**	.385**	.516**	.626**																						
SUDS	7	Pre-test before	-0.11	-0.18	-0.01	-0.19	-0.01	-0.15																					
	8	Pre-test after	0.05	0.03	.268*	0.00	0.13	-0.01	.333**																				
	9	Immediate post-test before	0.06	0.04	-0.05	0.12	0.04	0.01	.348**	.291**																			
	10	Immediate post-test after	-0.06	-0.02	0.09	0.09	0.12	0.01	.255*	.507**	.574**																		
	11	1-week follow-up before	0.12	0.01	-0.04	0.08	0.08	0.02	.339**	.296**	.542**	.414**																	
	12	1-week follow-up after	0.10	.286**	0.17	0.13	0.08	0.06	0.19	.543**	.435**	.585**	.482**																
Observer ratings	13	GB Pre-test before	0.00	0.15	0.20	0.08	0.01	0.19	0.05	0.18	-0.01	0.08	-0.01	0.16															
	14	BM Pre-test before	0.02	0.05	-0.05	0.09	0.07	0.08	0.09	0.00	0.01	-0.08	-0.04	-0.10	-0.01														
	15	GB Pre-test during	0.16	.221*	.266*	.342**	0.17	.317**	-0.02	0.19	0.00	0.13	0.09	0.10	.456**	0.03													

Measure		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
16	BM Pre-test during	0.08	0.01	0.02	-0.02	0.00	0.00	-0.11	0.05	0.02	0.00	0.07	-0.02	-0.13	.223*	0.09												
17	SP Pre-test during	-0.14	-0.18	-0.07	-0.11	-0.01	-0.02	0.16	0.14	-0.11	-0.15	-0.03	-0.19	-0.03	.253*	0.08	0.21											
18	GB Immediate post-test before	-0.17	-0.02	0.00	-0.05	-0.07	-0.01	0.07	-0.05	0.08	0.01	-0.09	0.07	0.08	0.21	-0.08	0.02	-0.08										
19	BM Immediate post-test before	.287**	0.12	0.01	0.08	0.10	0.16	-0.10	-0.11	0.00	-0.10	0.06	-0.12	0.05	0.14	.246*	.265*	0.01	-0.19									
20	GB Immediate post-test during	0.01	0.16	0.12	0.08	0.06	0.09	-0.02	0.03	0.11	0.17	0.08	0.09	0.18	0.14	0.15	-0.17	-0.13	.311**	0.00								
21	BM Immediate post-test during	0.12	0.11	0.02	0.01	-0.01	0.09	-0.11	-0.02	0.11	0.14	0.19	0.06	.227*	0.11	0.17	.232*	-0.06	0.01	.571**	.232*							
22	SP Immediate post-test during	0.03	0.14	0.15	0.20	0.00	0.11	-0.02	0.06	0.13	0.15	0.04	0.13	0.02	.221*	0.17	.264*	.281*	0.11	.254*	0.19	.351**						
23	GB 1-week follow up before	-.247*	-0.07	0.05	-0.16	-0.12	-0.05	0.07	-0.03	0.01	-0.09	-0.12	0.02	0.19	0.09	0.01	-0.08	-0.07	.294**	0.07	.222*	0.15	0.16					
24	BM 1-week follow up before	0.05	0.17	0.01	0.12	0.03	0.11	-0.01	-0.16	0.06	-0.06	-0.07	-0.01	-0.17	.296**	-0.06	0.11	-0.16	0.07	.264*	0.04	0.09	0.08	0.05				
25	GB 1-week follow up during	0.02	-0.04	0.08	0.09	0.05	0.01	-0.01	0.19	0.08	0.06	-0.02	-0.02	.224*	0.18	.395**	-0.15	0.10	0.05	0.14	.331**	0.08	0.11	.403**	-0.08			
26	BM 1-week follow up during	0.00	0.09	-0.08	0.01	-0.20	-0.15	0.10	-0.09	0.08	0.07	0.00	0.03	0.00	0.09	-0.08	0.08	0.08	0.12	0.17	0.08	.238*	.274*	0.01	.379**	-0.18		
27	SP 1-week follow up during	-0.06	0.00	-0.05	-0.05	-0.07	0.06	0.04	0.01	0.10	-0.06	0.16	0.04	0.04	.231*	-0.04	0.21	.420**	0.16	0.06	.219*	0.20	.373**	0.13	0.10	0.04	.364**	

Note. GB = General behaviour, BM = Body movement, SP = Speech related performance anxiety, * $p < .05$, ** $p < .01$.