Parenting Behaviours and Child Anxiety: A Narrative Synthesis of Experimental Studies and a Longitudinal Analysis of Bidirectional Associations

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Table of Contents

List of Figures

Chapter Two: Systematic Review

List of Tables

Chapter Two: Systematic Review

Chapter Four: Empirical Study

Thesis Portfolio Abstract

Anxiety disorders are the most prevalent form of psychopathology amongst children and adolescents. Anxiety can significantly impair a child's psychosocial development and can increase the risk of enduring anxiety difficulties or other psychiatric issues across the life span. Understanding aetiological factors is therefore important to facilitate the development of early prevention and intervention programmes. An environmental factor that remains of particular interest is parenting, due to the potential malleability of parenting behaviour and attitudes. Several theoretical models of child anxiety have suggested that certain parenting practices play a key role in shaping child anxiety. Multiple parenting behaviours have been examined empirically. Research has predominantly been cross-sectional in nature.

A systematic review synthesised experimental research from twenty studies, examining the relationship between manipulated parenting behaviours and child state anxiety. An empirical study retrospectively analysed secondary data from the Wellcome Trust Neuroscience in Psychiatry Network (NSPN) to examine the prospective bi-directional relationship between perceived parental overcontrol and adolescent social anxiety. This was examined while controlling for baseline measures, depression, sex and index of deprivation. Analysis was conducted using multiple imputation through chained equations and multiple linear regression models.

Findings indicate that manipulated parenting behaviours impact children's anxiety across development, with some behaviours showing effects that persist beyond exposure. These findings suggest that parenting behaviours may be influential in the development of general anxiety in children from infancy to early adolescence. In contrast, the empirical study found no evidence of a bi-directional relationship. This suggests that the influence of parental overcontrol, may be less influential in older adolescents.

Moreover, findings suggest that parental involvement could be useful in the treatment of younger children who experience general anxiety symptoms. However, there is currently little evidence to suggest the utility of including parents in SAD treatment in older adolescents. Instead, findings of the empirical study indicate that treatment should focus on intrapersonal maintenance factors, rather than interpersonal.

CHAPTER ONE

Introduction to the Thesis Portfolio

Word Count: 258

Introduction to the Thesis Portfolio

This thesis portfolio explores the relationship between parenting behaviours and child anxiety and seeks to address two important gaps in the literature. Chapter Two presents a systematic review that examines and synthesises experimental study findings on the relationship between parenting behaviours and child anxiety. Chapter Three introduces relevant literature and research to bridge the review's findings to the empirical study. Chapter Four presents the empirical study, which explored the bi-directional association between perceived parental overcontrol and adolescent social anxiety. Lastly, Chapter Five summarises the main findings of the systematic review and empirical study, evaluates their strengths and limitations, and discusses the theoretical, clinical, and research implications of the findings. Personal reflections on the research process are also documented in the concluding chapter.

Key Terms

For the purposes of this thesis portfolio, *parenting behaviour* can be defined as a spectrum of observable behaviours, including but not limited to parenting styles, practices, involvement, modelling, communication, expression and responsiveness. *Parental overcontrol* is characterised by the extent to which the control exerted by parents' limits or threatens the child's autonomy, both behaviourally and psychologically (Borelli et al., 2015; Grusec & Davidov., 2007). *Child state anxiety* is an acute form of anxiety, distinct from trait anxiety, and is characterised by emotional (e.g., feelings of fear), cognitive (e.g., appraisals of threat) and physiological (e.g., activation of autonomic nervous system), responses to specific situations (Hutchins & Young, 2018). *Social anxiety disorder (SAD)* is characterised by an intense and persistent fear of negative judgement, rejection, or embarrassment within social situations (APA, 2013).

References

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: American Psychiatric Association.

Borelli, J.L., Margolin, G. & Rasmussen, H.F. Parental overcontrol as a mechanism explaining the longitudinal association between parent and child anxiety. *J Child Fam Stud* 24, 1559–1574 (2015). https://doi.org/10.1007/s10826-014-9960-1

Grusec, J. E., & Davidov, M. (2007). Socialization in the family: The roles of parents. In J. E. Grusec & P. D. Hastings (Eds.), Handbook of socialization: Theory and research (pp. 284–308). New York, NY: Guilford Press.

Hutchins, B.E., Young, S.G. (2018). State Anxiety. In: Zeigler-Hill, V., Shackelford, T. (eds) *Encyclopedia of Personality and Individual Differences*. Springer, Cham. https://doi.org/10.1007/978-3-319-28099-8_1919-1

CHAPTER TWO

Systematic Review

A Systematic Review of Experimental Studies Exploring the Association Between Parenting Behaviours and Child Anxiety

Prepared for submission to: Behaviour Research and Therapy

(see Author Guidelines in Appendix A)

A Systematic Review of Experimental Studies Exploring the Association Between Parenting Behaviours and Child Anxiety

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Abstract

Understanding the aetiological factors underlying the development of anxiety in children is important to facilitate the development of early prevention and intervention programmes. Several theoretical models of child anxiety have proposed the role of parenting practices in shaping child anxiety. Existing studies on parenting and child anxiety have predominantly synthesised observational research findings. To date, no existing systematic reviews have synthesised findings from experimental studies. The present systematic review aimed to synthesise experimental study findings on the relationship between parenting behaviours and child anxiety. Initial electronic and manual searches (PsyInfo, MEDLINE, Web of Science) identified a total of 2961 studies. Twenty-one studies did not meet the eligibility criteria and were excluded, and 20 studies were retained for inclusion in our review. Using narrative synthesis, studies were organised and grouped by participant age group and parenting behaviour, with effect sizes reported, where possible, to examine the similarities and differences across studies. Results indicated that various parental behaviours impact child anxiety across development. Parental modelling, social referencing, and the transmission of verbal information impact children's anxiety across development, with some behaviours (e.g., modelling; verbal information) showing effects that persist beyond exposure. Clinical implications and the strengths and limitations of the review were discussed.

Key Words: parenting behaviour, child anxiety, experimental studies, developmental periods

Introduction

Anxiety disorders are the most prevalent form of psychopathology amongst children and adolescents (Beesdo et al., 2009). Epidemiological studies of childhood anxiety reveal that anxiety symptoms have an early onset and occur with increasing frequency as children get older (Degnan et al., 2010; Gouze et al., 2017). Anxiety can significantly impair a child's psychosocial development and can increase the risk of enduring anxiety difficulties or other psychiatric issues across development (Borelli et al., 2015; Bosquet & Egeland, 2006; Feehan et al., 1993). Understanding the aetiological factors underlying the development of anxiety in children is therefore important to facilitate the development of early prevention and intervention programmes. Whilst theoretical models of childhood anxiety propose both biological and environmental factors in disorder aetiology (Dougherty et al., 2013; Gouze et al., 2017), given the early age of onset, the nature of environmental factors is likely to be critical (Wong & Rapee, 2015).

An environmental factor that remains of particular interest is parenting, due to the potential malleability of parenting behaviour and attitudes (Gouze et al., 2017). Several theoretical models of child anxiety have suggested that certain parenting practices play a key role in shaping child anxiety (Chorpita & Barlow, 1998; Hudson and Rapee, 2004; Murrey et al., 2009; Rapee, 2001; Rubin et al., 2009).

According to Bandura's (1986) social learning theory, specific learning experiences have been hypothesised to play a role in the development of child anxiety (King, Hamilton, Ollendick, 1988; Negreiros & Miller, 2014). This has received considerable attention within the parenting literature, which is perhaps unsurprising, given that parents provide the greatest quantity of learning experiences to their children throughout their development (Fisak & Grills-Taquechel, 2007). Rachman (1977) proposed three main pathways by which parents might promote anxiety in their children: through direct conditioning, whereby children directly experience aversive events; observational or vicarious learning, in which children learn through observing others; and the

transmission of verbal information, where children receive fear-relevant information (Field, 2006; Negreiros & Miller, 2014; Rapee et al., 2009).

Research has examined several parenting behaviours, including general rearing behaviours, such as parental overcontrol or autonomy granting, rejection, criticism or hostility, and warmth or support (Drake & Ginsberg, 2012; Gouze et al., 2017; Negreiros & Miller, 2015; McLeod et al., 2007; van der Bruggen et al., 2008), as well as parenting behaviours implicated within models of social learning, such as conditioning, modelling, and the transmission of verbal information (Rachman, 1977). Despite their theoretical underpinnings, few experimental studies have directly manipulated parenting behaviours to understand the causal role of these proposed learning pathways on child anxiety.

Existing studies on parenting and child anxiety have predominantly synthesised observational research findings. They have provided valuable insights into the associations between parenting behaviours and child anxiety; however, they do not establish causality, thus limiting the conclusions that can be drawn (Hudson & Rapee, 2001).

A review of experimental studies could enhance our understanding of how parenting behaviours influence child anxiety (Wood et al., 2003). To our knowledge, no existing systematic reviews to date have synthesised findings from experimental studies examining the effect of manipulating parenting behaviours on child anxiety in children and young people (those aged below 19 years of age (WHO, 2015)).

Parenting behaviour, for the purpose of this review, can be defined as a spectrum of observable behaviours, including but not limited to parenting styles, practices, involvement, modelling, communication, expression and responsiveness. Child anxiety, within the scope of this systematic review, encompasses state anxiety, an acute form of anxiety, distinct from trait anxiety (Hutchins & Young, 2018). State anxiety is characterised by emotional (e.g., feelings of fear), cognitive (e.g., appraisals of threat) and physiological (e.g., activation of autonomic nervous system)

responses to specific situations (Hutchins & Young, 2018). Further identifying influential parenting behaviours, through examining their immediate effects on child anxiety could help to inform anxiety intervention, as targeting specific parenting behaviours may be effective in improving long-term anxiety outcomes (Clayborne et al., 2021).

Using narrative synthesis, this review aimed to examine whether there is 1) experimental evidence that parenting behaviours affect child state anxiety, and 2) what parenting behaviours affect child state anxiety.

Method

This systematic review was pre-registered on PROSPERO (2024: CRD42024528312) and follows the PRISMA guidelines (refer to Appendix B for the PRISMA checklist).

Search Strategy

Studies published from the earliest available records to 26 October 2024 were retrieved from: PsycInfo, MEDLINE, and Web of Science. Parenting behaviour encompasses a spectrum of observable behaviours including but not limited to parenting styles, practices, involvement, modelling, communication, expression, and responsiveness. Moreover, child anxiety, encompasses state anxiety (Hutchins & Young, 2018), measured by self and others report. Other aspects of anxiety, such as anxious beliefs and behaviour, were also considered. The following search terms were used when retrieving studies: *(Child* OR Adol* OR Youth OR Teenage*) AND (Mother OR Maternal OR Father OR Paternal OR Parent*) AND (Experiment* OR Experiment* design OR Experiment* research) AND (Parent* rearing OR Parent* style OR Parent* behav*) AND (Anxi* OR Fear* OR Phobi* OR Panic OR Worr* OR Inhibit* OR Avoid* OR Shy*).* Reference lists of included studies were reviewed to identify additional articles. A full search electronic search strategy is provided in Appendix C.

Selection Criteria

We included studies if they were 1) published in English in peer reviewed journals, 2) included parent-child dyads, with the reported mean age of child participants below 19 years of age, 3) employed an experimental study design that manipulated parenting behaviour and assessed impact on child state anxiety, 4) included a control group or comparison group to permit examination of the effect of the parenting behaviour manipulation on child anxiety. This could be either within or between subject, 5) measured single or multiple constructs of in-session child state anxiety, indexed by self-report (e.g., questionnaires) or other report (including observations). There were no further exclusion criteria.

Figure 1 displays the screening and selection process (Moher et al., 2009). Title and abstracts were examined by ES and 25% were independently reviewed by AH, with an inter-rater reliability of k = 0.72. All full-text articles were assessed independently by ES and AH, with an inter-rater reliability of 0.76. Disagreements were discussed and resolved, or through consultation with research supervisors (KC and EL).

Data Extraction

The first author (ES) extracted the following data from each study: 1) article details (e.g., title, authors, year of publication, country of origin), 2) study design (within or between-subjects, randomisation, setting), 3) sociodemographic information (e.g., sample population, age, sex, ethnicity, marital status, socioeconomic status, education level), 3) parenting behaviour examined, 4) experimental conditions (e.g., *n* per condition), 5) manipulation of parenting behaviours (e.g., control or comparison groups), 6) measurement of child state anxiety (e.g., name/description of measure, index of state anxiety, source, time-points), 7) key findings (e.g., influence of parenting behaviour on child anxiety, *p*-values), and 8) effect size (e.g., nature of effect size: eta squared, partial eta squared, Cohen's d, Pearson's r; qualitative descriptors: small, medium, large).

Qualitative descriptors provided a consistent framework for interpreting the magnitude of observed effects across studies, where reported. Descriptions of effect magnitude in this review were based

upon guidelines outlined by Cohen (1988). These included: Cohen's d: small (*d* = .20), medium (*d* = .50), large (*d* = .80), Pearson's r: small (*r* = .10), medium (*r* = .30), large (r = .50), eta squared (η^2) and partial eta squared (η^2p): small (≤ 0.01), medium (≤0.06), and large (≥ 0.14).

Quality Assessment (Risk of Bias)

Two researchers (ES and AH) independently rated the quality of all included studies, using the Effective Public Health Practice Project (EPHPP) Quality Assessment Tool for Quantitative Studies (EPHPP, 2007). The EPHPP tool was chosen for the present review as it allows for a standardised assessment of study quality across quantitative designs. It evaluates studies based on six criteria: selection bias, study design, confounders, blinding, data collection methods, withdrawals and drop-out. Each criterion is rated on a three-point scale (1 = Strong, 2 = Moderate, 3 = Weak), and an overall study rating is assigned (Strong = no weak ratings, Moderate = one weak rating, Weak = two or more weak ratings). Discrepancies between assessors' quality assessment ratings (3.6%) were recorded and resolved through discussion.

Data Synthesis

A narrative synthesis was employed following guidance outlined by Popay et al. (2006) and was chosen due to the heterogeneity in independent and dependent variables across experimental studies. To synthesise the relationship between parenting behaviour and child anxiety in experimental studies, studies were tabulated to summarise: child and study characteristics, child state anxiety measurement, as well as study quality assessment.

To explore the relationship between parenting behaviours and child anxiety across different developmental periods, studies were organised and grouped by participant age group (e.g., infancy to toddlerhood, early childhood, middle childhood, and middle childhood – early adolescence). Within each age group, studies were further synthesised by parenting behaviour, with effect sizes reported, where possible, to examine the similarities and differences across studies.

Results

Search Results

Initial electronic and manual searches identified 2961 studies. Twenty-one studies did not meet the eligibility criteria and were excluded, and 20 studies were retained for full-text review. See Figure 1 for PRISMA flow-chart.

Sample Characteristics

Table 1 summarises child characteristics. Studies were conducted across four countries: the Netherlands (35%), Australia (25%), the United States (25%), and the United Kingdom (15%). Sample sizes ranged from 24 to 253 (M = 72.50; SD = 53.23). Child participants across studies were between 12 months and 14 years of age. Percentages of female child participants ranged from 42 to 66% (M = 54.0; SD = 6.6). Participants were recruited from the community (n = 8), schools (n = 8), birth records and health services (n = 3), child and adolescent mental health clinics (n = 1), and research databases (n = 1). Nineteen out of the twenty studies included children from non-clinical populations.

Study Characteristics

Table 1 also summarises study characteristics across studies. Studies were conducted in laboratory (n =12), home (n =3), and classroom settings (n = 2). Three studies reported a combination of settings. Most studies were completed within a single session (n = 17), while three studies were conducted across two. Of the twenty studies, ten were with-subject design, and ten were between-subjects. See Table 1 for a breakdown of parenting behaviours manipulated and experimental conditions. Of the included studies, eighteen studies involved a direct manipulation of parenting behaviour, while two studies hypothetically manipulated parenting behaviour within vignettes of ambiguous situations (Bögels et al., 2011; Möller et al., 2014). Across studies, exposure duration of parenting behaviours varied, and where reported, ranged from 30 seconds to 45 minutes (M = 6.8; SD = 11.1). See Appendix D.

Included studies varied considerably in their index of child state anxiety, measurement tools, and sources (See Table 2). Child state anxiety across studies included, measures of fear and fear beliefs (n = 11), anxiety, worry, and emotional distress (n = 7), avoidance and withdrawal behaviours (n = 9), physiological markers of anxiety (n =4), such as heart rate and respiration rate, and cognitive indices (n = 3), such as performance predictions and attentional bias to threat. Furthermore, thirteen studies utilised child self-report measures, eleven coded child anxious behaviours utilising observational assessment methods, and four studies examined physiological markers (e.g., heart rate or respiration rate) or objective measures (e.g., reaction times, task duration, latency to approach). Eight studies assessed multiple indices of child state anxiety and used more than one method of measurement within their study design.

Of the studies that utilised self-report and observational measures of child state anxiety, six studies used standardised psychometric measures (e.g., FBQ; STAIC), two studies used validated observation methods (e.g., Lab-TAB; Touch Box Task), four studies used adapted psychometric measures, eight used adapted observational measures, four used bespoke measures designed by researchers for the purposes of the study, and one study did not report details of assessment standardisation.

Quality assessment

Nine studies were rated as “weak” in quality, nine studies as “moderate”, and two studies as “strong”. Cohen’s Kappa was .84 indicating almost perfect interrater agreement. A detailed quality assessment is shown in Table 3.

Effects of Parental Behaviours on Child State Anxiety across Developmental Periods

Six studies included participants from infancy to toddlerhood (< 3 years), two from early childhood (3-5 years), six from middle childhood (6-12 years), and an additional six included

participants spanning both middle childhood and early adolescence (6-14 years). See Table 4 for a summary of the overall pattern of results.

Infancy to Toddlerhood (<3 years)

Findings from the six studies consistently indicated that parenting behaviours had a significant effect on child anxiety, with effect sizes ranging from medium to large. Two studies did not report effect sizes. Parenting behaviours included modelling (n = 3), encouragement (n = 2), and social referencing signals (n = 1). All six studies utilised observational measures of child anxiety and included indices such as fearfulness (n = 5), avoidance and withdrawal behaviours (e.g., peer social reticence, engagement behaviours) (n = 6), and physiological markers of anxiety (e.g., Respiratory Sinus Arrhythmia; RSA) (n = 1).

Parental Modelling and Social Referencing Signals

Two studies demonstrated that parental modelling of emotional expressions had significant effects on child anxiety in toddlers as young as 15 months old. Gerull and Rapee (2002) and Dubi et al. (2008) found that negative maternal expressions toward novel stimuli increased toddlers' fear and avoidance behaviours to fear-relevant (e.g., rubber snake or spider) and fear-irrelevant stimuli (e.g., rubber mushroom or flower), compared to positive maternal expressions. While effect sizes were not reported, the significant findings evidence that even brief maternal affective cues can influence fear and avoidance behaviours in young children when faced with novelty, with effects persisting for the duration of the experiment (Gerull & Rapee, 2002). Similarly, in a study that examined the role of social referencing signals, De Rosnay et al. (2006) found that indirect maternal social anxiety cues significantly increased infant fearfulness toward a stranger (medium effect; d = .58), further highlighting the influence of parental affective cues on child anxiety.

Positive Modelling and Encouragement as Protective Factors

Egliston and Rapee (2007) found that positive modelling significantly reduced toddlers' emotional distress (large effects; $\eta^2p = .15$ - $\eta^2p = .32$) and increased approach behaviours (medium to large effects; $\eta^2p = .12$ - $\eta^2p = .22$) immediately following exposure to a fear-relevant stimulus (e.g., rubber snake or spider), with effects persisting at 20-minute follow-up, compared to infants that were in the "stimulus-only" group, or the "control" group (free play). The persistence of effects observed are consistent with the lasting effects observed in Gerull and Rapee's (2002) study.

Moreover, encouraging behaviours have also demonstrated large effects in reducing temperamentally shy toddlers' anxious responding. Grady and Karraker (2014) found that verbal encouragement of play significantly reduced social reticence in shy toddlers' during interactions with unfamiliar peers (large effect; $\eta^2 = .15$), whereas warmth alone did not have an effect. In contrast, Grady (2019) found that parental warmth significantly reduced toddler fear (large effect; $\eta^2 = .15$) and increased engagement (large effect; $\eta^2 = .16$), in moderately threatening social contexts, compared to the no-encouragement condition. In addition, both warmth and prompt behaviours showed a trend toward greater suppression of RSA in low-social contexts (large effect; $\eta^2 = .18$).

Early Childhood (3 – 6 years)

Two studies examined the role of parenting behaviours on child anxiety within early childhood. While no effect sizes were reported, findings suggest that parenting behaviours significantly influenced children's self-reported anxious feelings and fear beliefs, but these behaviours did not impact observable anxious behaviour.

The included studies explored control (n = 1) and verbal information (n = 1), and utilised multiple measures of child anxiety including, child-self report (n =2), behavioural observations (n = 2), a visual search task (n = 1), and physiological markers (e.g., heart rate; n = 1). Indices of child anxiety across studies included fearfulness, performance anxiety, avoidance behaviours, fear beliefs, attentional biases, and physiological reactivity.

Verbal Communication and Parental Control

Aktar et al. (2022) found that verbal threat information significantly increased children's self-reported fear beliefs about a stranger, compared to safety information. However, there was no significant difference in observed fear, attentional bias, or heart rate.

Similarly, Thirwall and Creswell (2010) investigated the impact of maternal control during a speech preparation task and found that children exposed to the controlling behaviour reported feeling significantly more scared and predicted poor performance compared to when exposed to autonomy-granting behaviours but showed no significant difference in observed anxious behaviours.

Middle Childhood (6 – 12 years)

Six studies examined the effects of parenting behaviour on child anxiety in middle childhood. Parenting behaviours included modelling (n = 1), social referencing signals (n = 1), verbal information (n = 2), involvement (n = 1), and perfectionistic rearing behaviours (n = 1). Measures of anxiety included self-report (n = 6) and observed anxious behaviours (n = 1). Indices included anxious feelings, cognitions (e.g., fear beliefs), and avoidance behaviours.

Where effect sizes were reported (n = 3), medium to large effects were observed for parental modelling, social referencing signals, and verbal information, whereas parental involvement and perfectionism found no significant effects. Significant and non-significant findings are discussed separately below.

Parental Modelling and Social Referencing

Parental modelling of anxious behaviour and cognitions had large effects on children's self-reported anxiety levels, cognitions, and desired avoidance (Burnstein & Ginsberg, 2010), whereby children endorsed higher anxiety levels (large effects; d = 1.38 – 1.47), anxious cognitions (large effect; d = 2.47), and desired avoidance (large effect; d = .95) when their parent acted anxiously in preparation for a spelling text, compared to the non-anxious condition.

Similarly, Bögels et al (2011) found that children reported significantly greater social anxiety following imagined parental anxiety compared to imagined parental confidence during vignettes of ambiguous social situations (medium effect, d = .60). This suggests that both direct and indirect parenting behaviours can impact children's anxiety.

Verbal Information

Two studies examined the impact of verbal threat information on children's anxiety using novel animals. Remmerswaal et al. (2010) found that verbal threat information significantly increased children's fear beliefs about an imagined novel animal, whereas positive information significantly reduced fear beliefs, after listening to their mothers' narrative (large; $\eta^2 = .66$). In a further study using real novel animals, Remmerswaal, Muris, and Huijing (2013) found that verbal threat information significantly increased children's avoidance behaviours but had no significant effect on self-reported fear beliefs. Notably, no effect sizes were reported for this study, limiting comparability. Moreover, while effects on child anxiety indices varied between studies, the findings further highlight the significant impact of verbal information on child anxiety.

Parental Involvement and Perfectionistic Rearing Behaviour

Parental involvement and perfectionistic rearing behaviour did not influence child anxiety (Mitchell et al., 2013; Creswell, O'Connor, & Brewin, 2008).

Middle Childhood to Early Adolescence (6 – 14 years)

Six studies examined the period spanning middle childhood to early adolescence. Parenting behaviours examined in this age range included modelling (n = 1), social referencing signals (n = 1), control (n = 1), and verbal information (n = 3). Measures of anxiety across the six studies included self-report (n = 5), behavioural observations (n = 2), a visual search task (n = 1), objective measures (e.g., task duration, delay times) (n = 1), and physiological markers (e.g., heart rate, respiration rate)

(n = 2). Indices included anxious feelings, fearfulness, cognitions (e.g., fear beliefs), escape and avoidance behaviours, attentional bias, and physiological reactivity.

Parenting behaviour had strong and significant effects on child anxiety in this age range, with effect sizes ranging from medium (n = 1) to large (n = 5).

Parental Modelling and Social Referencing Signals

Direct and imagined parental modelling of anxious behaviours showed a significant effect on child anxiety. Bunaciu et al. (2014) found that following parental modelling of escape during a panic-relevant biological challenge, 10 –14-year-olds demonstrated a stronger escape response by discontinuing their task significantly sooner than those in the no-escape modelling condition (large effect; r = .70). However, no significant differences were observed in avoidance behaviour, respiration rate, or willingness to undergo a second trial.

Similarly, Möller et al. (2013) extended Bögels et al's (2011) finding that imagined parental anxiety significantly increased children's self-reported social anxiety in both non-social (medium effect; d = 0.62) and social situations (large effect, d = .73). This provides further evidence that parental affective cues, whether directly experienced or imagined, significantly influence children and early adolescents' anxiety.

Parental Control

De Wilde and Rapee (2008) examined the role of controlling behaviours on child anxiety and found that during the delivery of a speech, children whose mothers had been overly controlling during the practice exhibited greater anxiety than children whose mothers had been minimally controlling (large effect; $\eta^2p = 0.34$). However, there were no significant differences between groups in self-reported anxiety. These findings, together with the findings of Thirwall and Creswell (2010) demonstrate the influence of controlling behaviours on child anxiety, despite discrepancies in the measure of anxiety affected.

Verbal Information

Three studies investigated the role of verbal information on children's anxiety and found significant large effects. Two studies examined the transmission of positive and negative information about novel animals on children's cognitive bias (Remmerswaal, Muris, & Huijding, 2016) and fear beliefs (Muris et al., 2010; Remmerswaal, Muris, & Huijding, 2016). Muris et al. (2010) found that children whose parents communicated negative information about the animal reported greater fear beliefs after listening to their parents' narrative, while those who received positive information reported a decrease (large effect; $\eta^2p = 0.45$). Moreover, fear beliefs significantly differed between groups (large effect; $\eta^2p = 0.52$). Remmerswaal, Muris, and Huijding (2016) found that parental training significantly influenced children's fear beliefs (large effect; $\eta^2p = .47$), with negative training increasing fear (large effect; $\eta^2p = .39$) and positive training decreasing fear (large effect; $\eta^2p = .24$). These effects persisted post-training, though with a reduced magnitude (medium-large effects; $\eta^2p = .14$ and $\eta^2p = .12$, respectively). Nimphy et al. (2024) extended Aktar et al. (2022) findings to examine the influence of verbal threat information about strangers on adolescent anxiety. Consistent with Aktar et al. (2022), verbal threat information significantly increased 9 – 14-year-olds but no significant effects were found for fearful behaviours, heart rate, or attentional bias.

Furthermore, these findings demonstrate the power and influence of parents' verbal communication on children's fear beliefs, highlighting how parents' communication, and cognitive biases, can directly impact children's anxiety and fear responses and in some instances, persist over time.

Discussion

The systematic review aimed to review and synthesise experimental study findings on the relationship between parenting behaviours and child anxiety. We identified 20 studies involving young people aged 12 months to 14 years (N = 1450). We found evidence suggesting that various parental behaviours impact child anxiety across development. However, this interpretation should be

taken with caution due to predominant poor-to-low quality rating, the lack of a meta-analysis of effect sizes, and the lack of consideration of publication bias.

Overall, our review findings suggest that brief exposure to certain parental behaviours can influence child anxiety. Some parenting behaviours were found to have a protective effect. Egliston and Rapee (2007) reported reduced fear and increased approach behaviours following exposure to positive modelling, that persisted over time. Further protective effects were observed for encouraging behaviours (Grady & Karraker, 2014; Grady, 2019), and positive verbal information (Muris et al., 2010; Remmerswaal et al., 2010; Remmerswaal, Muris, & Huijing, 2016). This highlights the potential for interventions that promote adaptive parenting behaviours.

Some behaviours can also intensify child anxiety. Parental modelling, specifically negative maternal expressions (Gerull & Rapee, 2002; Dubi et al., 2007), panic-related escape behaviours (Bunaciu et al., 2014), and parental anxious behaviours, both directly observed (de Rosnay et al., 2006), and imagined (Bögels et al., 2011; Möller et al., 2013), were found to have an effect on child anxiety. Verbal threat information (Aktar et al., 2022; Nimphy et al., 2024; Remmerswaal et al., 2010; Remmerswaal, Muris, & Huijing, 2013), and negative information (Muris et al., 2010; Remmerswaal, Muris, & Huijding, 2016), were also found to have an effect. While there were fewer studies, parental control (Thirwall & Creswell, 2010; Wilde & Rapee, 2008), was also found to influence child anxiety.

Our review highlights the specific relevance of modelling, social referencing, and verbal communication to children's anxiety. Modelling and social referencing were found to have significant effects from infancy to early adolescence, with direct and indirect parenting behaviours influencing children's observed (Gerull & Rapee, 2002; Dubi et al., 2008; De Rosnay et al., 2006; Egliston & Rapee. 2007; Bunaciu et al., 2014) and self-reported anxiety (Burnstein & Ginsberg, 2010; Bögels et al., 2011; Möller et al., 2013), and anxious cognitions (Burnstein & Ginsberg, 2010). Similarly, parent's communication of verbal information consistently shaped children's fear beliefs across

developmental periods (Aktar et al., 2022; Muris et al., 2010; Nimphy et al., 2024; Remmerswaal et al., 2010; Remmerswaal et al., 2016). These findings align with Bandura's (1986) Social Learning Theory and Rachman's (1977) three pathways model, which postulates that children learn through conditioning, modelling, or information transmission (Nimphy et al., 2024; Olsson, Nearing, & Phelps 2007; Rachman, 1977).

Notably, our review suggests that the effects of certain parenting behaviours on child anxiety may persist beyond initial exposure, suggesting that behaviours may have lasting effects on children's anxiety in uncertain situations. Three studies that examined the impact of parental modelling (Gerull & Rapee, 2002; Egliston & Rapee, 2007) and verbal information (Remmerswaal, Muris, & Huijding, 2016) found that the observed effects on children's anxiety persisted across the duration of the experiments, across multiple time points (<20 minutes). This has important implications for real world parent-child interactions where children are exposed to repeated or prolonged behaviours.

In contrast to the robust effects observed for modelling, social referencing, and verbal information, few studies examined other parenting behaviours, limiting our ability to draw firm conclusions regarding the influence of control, overinvolvement, and perfectionistic rearing, on child anxiety. Two studies reported increased fearfulness (Thirwall & Creswell, 2010), and observed anxiety (Wilde & Rapee, 2008) when parents acted in a controlling manner, while one study found no effects of increased involvement on child anxiety (Creswell, O'Connor, & Brewin, 2008). Similarly, manipulation of perfectionistic rearing behaviours did not influence child anxiety (Mitchell et al., 2013). Due to the mixed findings, and the limited number of experimental studies exploring these behaviours to date, more experimental research into these behaviours is necessary to understand their influence on child anxiety, if any.

Strengths and Limitations

This review represents the first review that systematically identifies studies that explored the experimental effects of parental behaviours on child anxiety. The use of narrative synthesis allows us

to synthesise findings from studies involving children of a wide age range. Focusing on experimental studies provides insight into what parental behaviours are most relevant in reducing child anxiety.

Nevertheless, there are several limitations to consider. First, most of the included studies are not considered to be of high quality. Second, a meta-analysis on the effect sizes was not performed because combining results from studies with widely varying study designs may lead to inaccurate conclusions. Third, this review does not always consider the cognitive, physiological, and behavioural aspects of anxiety (Aktar et al., 2022; Lang, 2004), because only few studies in this review assessed all components within a single experiment (Aktar et al., 2022; Nimphy et al., 2024). Fourth, unpublished literature was excluded. Future reviews should consider the inclusion of grey literature to ensure its findings are not subject to publication bias. Finally, the review finding may not generalise to non-western cultures. Notably, none of the studies included in this review were from non-western countries. It is possible that the influence of parenting behaviours on child anxiety, differs between individualistic and interdependent cultures. Therefore, we must take this into consideration when interpreting the findings.

Research Implications

More experimental studies are needed. Future research should adopt a multi-measure approach of all constructs when examining the relationship of parenting behaviours and child anxiety, so that the intensity and overlap of separate anxiety indices can be assessed (Aktar et al., 2022). This would allow a more comprehensive understanding of the relationship between parenting behaviours on child anxiety.

Given that emotional behaviour and affective responses are to some degree shaped by culture (Tsai, Levenson, & McCoy, 2006), future research should explore the impact of cultural processes (Egliston & Rapee, 2007), to determine whether effects vary across cultural contexts.

If more studies are published in the future, a meta-analysis of these findings could help determine which parenting behaviours have more consistent or robust effects, as well as the influence of potential moderators.

Clinical Implications

Findings from this review largely support the idea of involving parents in child anxiety interventions. Parenting behaviours have demonstrated significant effects on child anxiety, with consistent effects observed across development for modelling, social referencing signals, and transmission of verbal information. Protective effects have also been observed for positive (Egliston & Rapee, 2007; Muris et al., 2010; Remmerswaal et al., 2010; Remmerswaal, Muris, and Huijing, 2016) and encouraging behaviours (Grady & Karraker, 2014; Grady, 2019). The encouragement of adaptive emotional responding from parents may be influential in the prevention and treatment of child anxiety.

Conclusions

The included studies within this review demonstrate the relationship between parenting behaviours and child anxiety. Importantly, findings suggest that parental modelling, social referencing, and the transmission of verbal information impact children's anxiety across development, with some behaviours (e.g., modelling; verbal information) showing effects that persist beyond exposure. Together, these findings demonstrate the role of parenting behaviours in the development of child anxiety and highlight the potential for interventions that modify specific parenting behaviours.

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Emilie Scowen: Conceptualisation, Methodology, Formal Analysis, Investigation, Data Curation, Writing – Original Draft.

Eleanor Leigh: Conceptualisation, Methodology, Interpretation, Supervision, Writing - Review and Editing.

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Kenny Chiu: Conceptualisation, Methodology, Interpretation, Supervision, Writing - Review and Editing.

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References

Aktar, E., Nimphy, C. A., van Bockstaele, B., & Pérez-Edgar, K. (2022). The social learning of threat and safety in the family: Parent-to-child transmission of social fears via verbal information. *Developmental psychobiology*, *64*(3), e22257. https://doi.org/10.1002/dev.22257

Bandura, A., & National Institute of Mental Health. (1986). *Social foundations of thought and action: A social cognitive theory.* Prentice-Hall, Inc.

Beesdo, K., Knappe, S., & Pine, D. S. (2009). Anxiety and anxiety disorders in children and adolescents: developmental issues and implications for DSM-V. *Psychiatric Clinics of North America,* 32, 483–524. https://doi.org/10.1016/j.psc.2009.06.002

Bögels, S., Stevens, J., & Majdandžić, M. (2011). Parenting and social anxiety: Fathers' versus mothers' influence on their children's anxiety in ambiguous social situations. *Journal of Child Psychology and Psychiatry*, *52*(5), 599-606. https://doi.org/10.1111/j.1469-7610.2010.02345.x

Borelli, J.L., Margolin, G. & Rasmussen, H.F. Parental overcontrol as a mechanism explaining the longitudinal association between parent and child anxiety. *J Child Fam Stud* 24, 1559–1574 (2015). https://doi.org/10.1007/s10826-014-9960-1

Bosquet, M., & Egeland, B. (2006). The development and maintenance of anxiety symptoms from infancy through adolescence in a longitudinal sample. *Development and Psychopathology*, 18, 517–550. https://doi.org/10.1017/s0954579406060275

Bunaciu, L., Leen-Feldner, E. W., Blumenthal, H., Knapp, A. A., Badour, C. L., & Feldner, M. T. (2014). An experimental test of the effects of parental modeling on panic-relevant escape and avoidance among early adolescents. *Behavior therapy*, *45*(4), 517-529. https://doi.org/10.1016/j.beth.2014.02.011

Burstein, M., & Ginsburg, G. S. (2010). The effect of parental modeling of anxious behaviors and cognitions in school-aged children: An experimental pilot study. *Behaviour research and therapy*, *48*(6), 506-515. https://doi.org/10.1016/j.brat.2010.02.006

Chorpita, B. F., & Barlow, D. H. (1998). The development of anxiety: The role of control in the early environment. *Psychological Bulletin, 124*(1), 3–21. https://doi.org/10.1037/0033-2909.124.1.3

Clayborne, Z. M., Kingsbury, M., Sampasa-Kinyaga, H., Sikora, L., Lalande, K. M., & Colman, I. (2021). Parenting practices in childhood and depression, anxiety, and internalizing symptoms in adolescence: a systematic review. *Social psychiatry and psychiatric epidemiology*, *56*, 619-638. https://doi.org/10.1007/s00127-020-01956-z

Cohen, J. 1988. *Statistical Power Analysis for the Behavioral Sciences*. 2nd edition. New York: Academic Press. https://doi.org/10.4324/9780203771587

Creswell, C., O'Connor, T. G., & Brewin, C. R. (2008). The impact of parents' expectations on parenting behaviour: An experimental investigation. *Behavioural and Cognitive Psychotherapy*, *36*(4), 483-490. http://dx.doi.org/10.1017/S1352465808004414

Degnan, K. A., Almas, A. N., & Fox, N. A. (2010). Temperament and the environment in the etiology of childhood anxiety. *Journal of Child Psychology and Psychiatry*, 51, 497– 517. https://doi.org/10.1111/j.1469-7610.2010.02228.x

De Rosnay, M., Cooper, P. J., Tsigaras, N., & Murray, L. (2006). Transmission of social anxiety from mother to infant: An experimental study using a social referencing paradigm. *Behaviour research and therapy*, *44*(8), 1165-1175. https://doi.org/10.1016/j.brat.2005.09.003

De Wilde, A., & Rapee, R. M. (2008). Do controlling maternal behaviours increase state anxiety in children's responses to a social threat? A pilot study. *Journal of Behavior Therapy and Experimental Psychiatry*, *39*(4), 526-537. https://doi.org/10.1016/j.jbtep.2007.10.011

Dougherty, L.R.,Tolep, M.R., Bufferd, S.J., Olino, T.M., Dyson, M., Traditi, J., ... Klein, D.N. (2013). Preschool anxiety disorders: Comprehensive assessment of clinical, demographic, temperamen- tal, familial, and life stress correlates. *Journal of Clinical Child and Adolescent Psychiatry*, 42, 577–589. https://doi.org/10.1080/15374416.2012.759225

Drake, K. L., & Ginsburg, G. S. (2012). Family factors in the development, treatment, and prevention of childhood anxiety disorders. *Clinical child and family psychology review*, *15*, 144-162. https://doi.org/10.1007/s10567-011-0109-0

Dubi, K., Rapee, R. M., Emerton, J. L., & Schniering, C. A. (2008). Maternal modeling and the acquisition of fear and avoidance in toddlers: Influence of stimulus preparedness and child temperament. *Journal of abnormal child psychology*, *36*, 499-512. https://doi.org/10.1007/s10802-007-9195-3

Egliston, K. A., & Rapee, R. M. (2007). Inhibition of fear acquisition in toddlers following positive modelling by their mothers. *Behaviour research and therapy*, *45*(8), 1871-1882. https://doi.org/10.1016/j.brat.2007.02.007

Effective Public Health Practice Project. (2007). *Quality Assessment Tool for Quantitative Studies*. Retrieved Nov 25, 2024, from www. ephpp.ca/tools.html

Feehan, M., McGee, R., & Williams, S. M. (1993). Mental health disorders from age 15 to age 18 years. *Journal of the American Academy of Child and Adolescent Psychiatry*, 32(6), 1118–1126. https://doi.org/10.1097/00004583-199311000-00003

Field A. P. (2006). Is conditioning a useful framework for understanding the development and treatment of phobias?. *Clinical psychology review*, *26*(7), 857–875. https://doi.org/10.1016/j.cpr.2005.05.010

Fisak Jr, B., & Grills-Taquechel, A. E. (2007). Parental modeling, reinforcement, and information transfer: risk factors in the development of child anxiety?. *Clinical child and family psychology review*, *10*(3), 213-231. https://doi.org/10.1007/s10567-007-0020-x

Gerull, F. C., & Rapee, R. M. (2002). Mother knows best: effects of maternal modelling on the acquisition of fear and avoidance behaviour in toddlers. *Behaviour research and therapy*, *40*(3), 279-287. https://doi.org/10.1016/s0005-7967(01)00013-4

Gouze KR, Hopkins J, Bryant FB, Lavigne JV (2017) Parenting and anxiety: bi-directional relations in young children. *J Abnorm Child Psychol* 45:1169–1180. https://doi.org/10.1007/s10802-016-0223-z

Grady, J. S. (2019). Parental gentle encouragement promotes shy toddlers' regulation in social contexts. *Journal of experimental child psychology*, *186*, 83-98. https://doi.org/10.1016/j.jecp.2019.05.008

Grady, J. S., & Karraker, K. (2014). Do maternal warm and encouraging statements reduce shy toddlers' social reticence?. *Infant and Child Development*, *23*(3), 295-303. https://doi.org/10.1002/icd.1850

Hudson, J. L., & Rapee, R. M. (2001). Parent–child interactions and anxiety disorders: An observational study. *Behaviour research and therapy*, *39*(12), 1411-1427. https://doi.org/10.1016/s0005-7967(00)00107-8

Hudson, J. L., & Rapee, R. M. (2004). From anxious temperament to disorder: an etiological model. In R. G. Heimberg, C. L. Turk, & D. S. Mennin (Eds.), *Generalized anxiety disorder: advances in research and practice* (pp. 51-74). The Guilford Press.

Hutchins, B.E., Young, S.G. (2018). State Anxiety. In: Zeigler-Hill, V., Shackelford, T. (eds) *Encyclopedia of Personality and Individual Differences*. Springer, Cham. https://doi.org/10.1007/978-3-319-28099-8_1919-1

King, N. J., Eleonora, G., & Ollendick, T. H. (1998). Etiology of childhood phobias: Current status of Rachman's three pathways theory. *Behaviour Research and Therapy*, 36(3), 297–309. https://doi.org/10.1016/s0005-7967(98)00015-1

Lang, P. J. (2004). Fear reduction and fear behavior: Problems in treating a construct. In *Research in psychotherapy conference, 3rd, May-Jun, 1966, Chicago, IL, US*. American Psychological Association. https://doi.org/10.1037/10546-004

McLeod, B. D., Wood, J. J., & Weisz, J. R. (2007). Examining the association between parenting and childhood anxiety: A meta-analysis. *Clinical psychology review*, *27*(2), 155-172. https://doi.org/10.1016/j.cpr.2006.09.002

Mitchell, J. H., Broeren, S., Newall, C., & Hudson, J. L. (2013). An experimental manipulation of maternal perfectionistic anxious rearing behaviors with anxious and non-anxious children. *Journal of Experimental Child Psychology*, *116*(1), 1-18. https://doi.org/10.1016/j.jecp.2012.12.006

Möller, E. L., Majdandžić, M., Vriends, N., & Bögels, S. M. (2014). Social referencing and child anxiety: The evolutionary based role of fathers' versus mothers' signals. *Journal of Child and Family Studies*, *23*, 1268-1277. https://doi.org/10.1007/s10826-013-9787-1

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *BMJ, 339*, b2535. https://doi.org/10.1371/journal.pmed.1000097

Muris, P., van Zwol, L., Huijding, J., & Mayer, B. (2010). Mom told me scary things about this animal: Parents installing fear beliefs in their children via the verbal information pathway. *Behaviour research and therapy*, *48*(4), 341-346. https://doi.org/10.1016/j.brat.2009.12.001

Murray, L., Creswell, C., & Cooper, P. J. (2009). The development of anxiety disorders in childhood: an integrative review. *Psychological medicine*, *39*(9), 1413–1423. https://doi.org/10.1017/s0033291709005157

Negreiros, J., & Miller, L. D. (2014). The role of parenting in childhood anxiety: Etiological factors and treatment implications. *Clinical Psychology: Science and Practice*, *21*(1), 3.

Nimphy, C. A., Elzinga, B. M., Van der Does, W., Van Bockstaele, B., Pérez-Edgar, K., Westenberg, M., & Aktar, E. (2024). "Nobody Here Likes Her"—The Impact of Parental Verbal Threat Information on Children's Fear of Strangers. *Developmental psychobiology*, *66*(6), e22526. https://doi.org/10.1002/dev.22526

Popay, J., Roberts, H., Sowden, A., Petticrew, M., Arai, L., Rodgers, M., Britten, N., Roen, K., Duffy, S. (2006). *Guidance on the Conduct of Narrative Synthesis in Systematic Reviews*. ESRC Methods Programme. http://dx.doi.org/10.13140/2.1.1018.4643

Rachman, S. (1977). The conditioning theory of fear-acquisition: A critical examination. *Behaviour Research and Therapy, 15*(5), 375–387. https://doi.org/10.1016/0005-7967(77)90041-9

Rapee, R. (2001). The Development of Generalized Anxiety. In M. W. Vasey, & M. R. Dadds (Eds.), *The Developmental Psychopathology of Anxiety* (pp. 481-503). Oxford University Press. https://doi.org/10.1093/med:psych/9780195123630.003.0021

Rapee, R. M., Schniering, C. A., & Hudson, J. L. (2009). Anxiety disorders during childhood and adolescence: origins and treatment. *Annual review of clinical psychology*, *5*, 311–341. https://doi.org/10.1146/annurev.clinpsy.032408.153628

Remmerswaal, D., Muris, P., Mayer, B., & Smeets, G. (2010). "Will a Cuscus bite you, if he shows his teeth?" Inducing a fear-related confirmation bias in children by providing verbal threat information to their mothers. *Journal of Anxiety Disorders*, *24*(5), 540-546. https://doi.org/10.1016/j.janxdis.2010.03.012

Remmerswaal, D., Muris, P., & Huijding, J. (2013). “Watch out for the gerbils, my child!” The role of maternal information on children's fear in an experimental setting using real animals. *Behavior therapy*, *44*(2), 317-324. https://doi.org/10.1016/j.beth.2013.01.001

Remmerswaal, D., Muris, P., & Huijding, J. (2016). Transmission of cognitive bias and fear from parents to children: an experimental study. *Journal of Clinical Child & Adolescent Psychology*, *45*(5), 642-654. https://doi.org/10.1080/15374416.2014.987378

Rubin, K. H., Coplan, R. J., & Bowker, J. C. (2009). Social withdrawal in childhood. *Annual review of psychology*, *60*, 141–171. https://doi.org/10.1146/annurev.psych.60.110707.163642

Thirlwall, K., & Creswell, C. (2010). The impact of maternal control on children’s anxious cognitions, behaviours and affect: An experimental study. *Behaviour Research and Therapy*, *48*(10), 1041-1046. https://doi.org/10.1016/j.brat.2010.05.030

Tsai, J. L., Levenson, R. W., & McCoy, K. (2006). Cultural and temperamental variation in emotional response. *Emotion, 6*(3), 484–497. https://doi.org/10.1037/1528-3542.6.3.484

Van Der Bruggen, C. O., Stams, G. J. J., & Bögels, S. M. (2008). Research review: The relation between child and parent anxiety and parental control: A meta-analytic review. *Journal of child psychology and psychiatry*, *49*(12), 1257-1269. https://doi.org/10.1111/j.1469-7610.2008.01898.x

WHO. (2015). *The global strategy for women’s, children’s, and adolescents’ health (2016–30)*. Retrieved from http://www.who.int/life-course/partners/ global- strategy/ewec-globalstrategyreport-200915.pdf?ua=1.

Wong, Q. J. J., & Rapee, R. M. (2015). The developmental psychopathology of social anxiety and phobia in adolescents. In K. Ranta, A. M. La Greca, L.-J. Garcia-Lopez, & M. Marttunen (Eds.), *Social anxiety and phobia in adolescents: Development, manifestation and intervention*

strategies (pp. 11–37). Springer International Publishing/Springer Nature. https://doi.org/10.1007/978-3-319-16703-9_2

Wood JJ, McLeod BD, Sigman M, Hwang WC, Chu BC. Parenting and childhood anxiety: theory, empirical findings, and future directions. J Child Psychol Psychiatry. 2003 Jan;44(1):134-51. https://doi.org/10.1111/1469-7610.00106

Figure 1.

PRISMA Flowchart

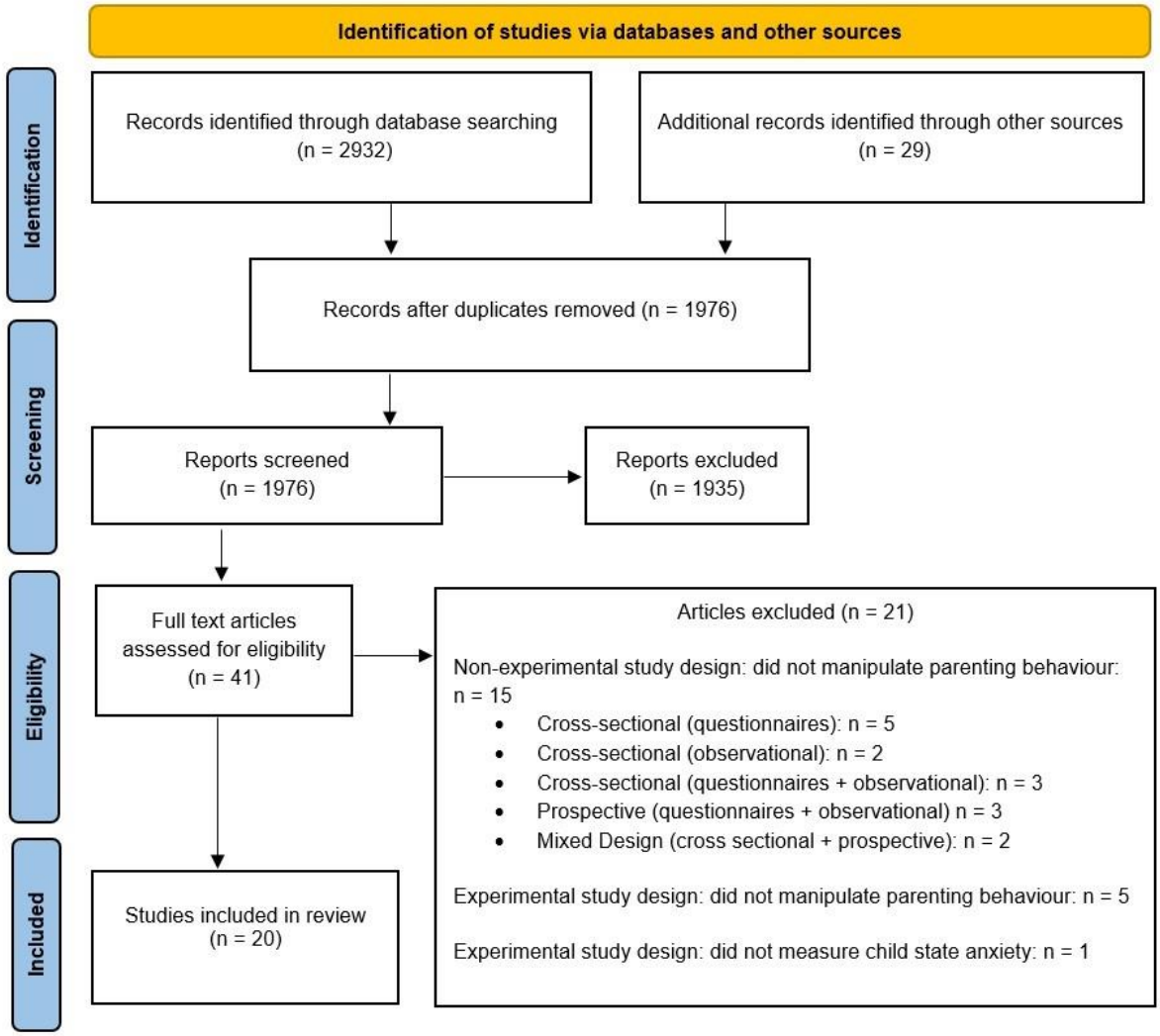

Table 1

Summary of Child and Study Characteristics of Included Studies

Study	Country	Population (Clinical, Non-Clinical)	*N*	Age (M, SD)	% Female	Ethnicity	Age Group	Parenting Behaviour Examined	Conditions	Design
Gerull & Rapee, 2002	Australia	NC	30	15-20 months (M = 17.16, SD = 1.65)	50%	81% Anglo, 6.5% Chin, 6.5% Ger, 3% Irani, 3% S. Afr	I-T	Modelling	Positive Expression vs Negative Expression	W-S
De Rosnay et al., 2006	UK	NC	24	12-14 months (M = 12.8, SD = .76)	50%	NR	I-T	Social Referencing Signals	Socially Anxious vs Non-Anxious	W-S
Egliston & Rapee, 2007	Australia	NC	77	12-21 months (M = 15.9, SD = 2.6)	48%	75% Aus, 9% Asn, 8% Aus/Eur, 3% Aus/Asn, 5% Other	I-T	Modelling	Positive Modelling vs Stimulus-Only vs Control	B-S
Dubi et al., 2008	Australia	NC	71	15-20 months (M= 17.39, SD = 1.83)	62%	73% Anglo, 7% Ital, 6% Asn, 3% Isr, 3% Grk, 8% Oth.Eur.	I-T	Modelling	Positive Expression vs Negative Expression	W-S
Grady & Karraker, 2014	USA	NC	89	20-28 months (M = 24.74, SD = 1.73)	57%	83.1 % Non-Hispanic Cauc.	I-T	Encouragement	Warm vs Encouraging Statements	W-S
Grady, 2019	USA	NC	55	21-24 months (M = 23.32, SD = NR)	60%	37 % White, 19.6% 2+ Races, 7.8% Asn/PI, 7.8% Black, 27.5% Other (mostly Hisp/Lat.)	I-T	Encouragement	Warmth vs Prompt vs Warmth + Prompt vs No-Encouragement Control	B-S

Thirwall & Creswell, 2010	UK	NC	24	4-5 years (M = NR, SD = NR)	58.3%	87% White Brit.	EC	Control	Controlling vs Autonomy-granting	W-S
Aktar et al., 2022	USA	NC	68	4-6 years (M = 5.27, SD = 0.74)	50%	91.18% Cauc.	EC	Verbal Information	Verbal Threat vs Safety Information	W-S
Creswell, O'Connor, Brewin, 2008	UK	NC	52	7-11 years (M = 9.06, SD = 1.06)	42%	NR	MC	Impact of Parental Expectations on levels on Parental Involvement	Positive Expectations vs Negative Expectations	B-S
Burnstein & Ginsberg, 2010	USA	NC	25	8-12 years (M = 9.24, SD = 1.39)	54%	76% Cauc., 16% AA, 4% Asn, 4% Mixed Ethn.	MC	Modelling	Anxious vs Non-Anxious	W-S
Remmerswaal et al., 2010	The Netherlands	NC	52	9-12 years (M = 10.60, SD = 1.00)	52%	>95% Cauc.	MC	Verbal Information	Threat Information vs Positive Information	B-S
Bögels et al., 2011	The Netherlands	NC	143	8 - 12 years (M = 10.4, SD = 1.48)	57%	NR	MC	Social Referencing Signals	Anxious vs Confident	W-S
Mitchell et al., 2013	Australia	C & NC	77	7 - 12 years C: (M = 9.67, SD = 1.37) NC: (M = 9.71, SD = 1.41)	C: 52.4% NC: 48.6%	NR	MC	Perfectionistic Rearing Behaviours	High vs Non-Perfectionistic	B-S
Remmerswaal, Muris, Huijing, 2013	The Netherlands	NC	47	8-12 years (M = 10.55, SD = 0.95)	66%	NR	MC	Verbal Information	Positive Information vs Negative Information	B-S
De Wilde & Rapee, 2008	Australia	NC	26	7-13 years (M = 10.19, SD = 1.79)	42.3%	NR	MC	Control	High vs Low	B-S
Muris et al., 2010	The Netherlands	NC	88	8-13 years (M = 10.28, SD = 1.07)	48%	>80% Dutch descent	MC	Verbal Information	Negative vs Positive vs Ambiguous	B-S

Möller et al., 2013	The Netherlands	NC	E1:129 E2: 124	8-13 years E1: (M = 11.06, SD = 1.04) E2: (M = 10.93, SD = 0.99)	E1: 59% E2: 53%	NR	MC	Social Referencing Signals	Anxious vs Confident	W-S
Bunaciu et al., 2014	USA	NC	50	10-14 years (M = 11.58, SD = 1.21)	56%	86% White, 4% Asn, 4% Biracial, 2% AA, 2% AI/AN, 12% Hisp. /Lat.	MC - EA	Modelling	Escape Modelling vs No Escape Modelling	B-S
Remmerswaal, Muris, Huijing, 2016	The Netherlands	NC	122	8-13 years (M = 10.33, SD = 1.13)	59%	NR	MC - EA	Verbal Information	Negative Training vs Positive Training	B-S
Nimphy et al., 2024	The Netherlands	NC	77	9 - 14 years (M = 11.62, SD = 1.18)	55%	NR	MC - EA	Verbal Information	Threat Information vs Safety Information	W-S

Notes. AA = African American; AI/AN = American Indian/Alaskan Native; Anglo = Anglo-Saxon; Asn = Asian; Asn/PI = Asian American/Pacific Islander; Aus = Australian; Aus/Asn = Australian/Asian; Aus/Eur = Australian/European; B-S = Between Subjects; C = Clinical; Cauc. = Caucasian; Chin = Chinese; E1 = Experiment 1; E2 = Experiment 2; EC = Early Childhood (3-6 years); Ger = German; Grk = Greek; Hisp./Lat. = Hispanic or Latino; I-T = Infancy to Toddlerhood (< 3 years); Irani = Iranian; Isr = Israeli; Ital = Italian; MC = Middle Childhood (6-12 years); MC-EA = Middle Childhood to Early Adolescence (6-14 years); Mixed Ethn. = Mixed Ethnicity; NC = Non-Clinical; NR = Not Reported; Non-Hispanic Cauc. = Non-Hispanic Caucasian; Oth.Eur. = Other European; S.Afr = South African; White Brit. = White British

Table 2

Summary of Child State Anxiety Measurement and Source

Study	Age Group	Parenting Behaviour	Child State Anxiety		
			Source	Measure	Time-Points
Gerull & Rapee, 2002	I-T	Modelling	OR	Emotional response rated on a 5-point scale (−2 fear, 0 neutral, +2 positive); Behavioural response rated from −2 (avoidance) to +2 (approach).	Across all experimental trials (modelling, 1-min delay, 10-min delay)
de Rosnay et al., 2006	I-T	Social Referencing Signals	OR	Infant looks toward the mother's face were counted. Three dimensions of affect: fearfulness (e.g., tense posture, crying), avoidance (e.g., turning away, pushing), and positive emotional tone (e.g., smiling, laughter).	Across all experimental conditions
Egliston & Rapee, 2007	I-T	Modelling	OR	Emotional response was rated on a single 5-point scale ranging from -2 (very negative) to +2 (very positive). Behavioural response was rated on a single 5-point scale ranging from -2 (full retreat) to +2 (full approach).	All 5 experimental trials (baseline, pre-exposure, observational conditioning, post-test, follow-up)
Dubi et al., 2008	I-T	Modelling	OR	Emotional response was rated from −2 (fearful) to +2 (positive affect), and behavioural response was rated from −2 (avoidance) to +2 (approach).	Across all experimental trials (baseline, observational conditioning, follow-up)
Grady & Karraker, 2014	I-T	Encouragement	OR	Peer social reticence (e.g., onlook during play, contact with mother, anxious behaviours such as thumb-sucking) was coded using the TPOS.	10 second epochs during baseline and post manipulation periods
Grady, 2019	I-T	Encouragement	OR; PM (RSA)	Fear and engagement behaviours coded using Lab-TAB definitions. Fear: intensity of body and facial fear, freezing, contact seeking, and overall shyness. Engagement: intensity of approach, withdrawal, and overall boldness. RSA Regulation: cardiac activity (Actiheart) recorded.	Fear and engagement behaviours measured in 10-second epochs during specific Lab-TAB episodes (stranger approach, clown, and puppet episodes).

Thirwall & Creswell, 2010	EC	Control	OR; Child-SR	Inhibition and anxiety-related behaviours (e.g., fidgeting, hiding face, seeking parental help) were coded using a 12-item coding scheme. Adapted KFQ (Performance Scale: performance predictions; Feelings Scale: child fearfulness)	Feelings Scale: 1. Pre-Manipulation 2. After preparation period Performance scale: 1. After preparation period
Aktar et al., 2022	EC	Verbal Information	OR; Child-SR; PM (HR); OM (RT)	Fear and avoidances behaviours observed using coding protocol and scores averaged into an observed child fear composite score; adapted FBQ (fear beliefs); HR measured via 7-lead ECG; VST assessing child attentional bias to strangers.	Fear and avoidance behaviours: observed throughout social interaction task (from stranger entry to exit) SR fear beliefs: post-manipulation. HR: baseline - end of social task Attention bias: RT's throughout VST
Creswell, O'Connor, Brewin, 2008	MC	Involvement	Child-SR	Three 11-point Likert scales measuring child's perceived difficulty, worry, and upset (0 = not at all, 10 = very).	Children rated their perceived difficulty, worry, and upset immediately after completing the 10-minute task.
Burnstein & Ginsberg, 2010	MC	Modelling	Child-SR	STAIC (state anxiety), C-FAT (anxious feelings and cognitions)	After parent manipulation in both conditions (anxious vs. non-anxious).
Remmerswaal et al., 2010	MC	Verbal Information	Child-SR	FBQ (fear beliefs)	Pre-and-Post Manipulation
Bögels et al., 2011	MC	Social Referencing Signals	Child-SR	State Social Anxiety: Rated on a 1-5 scale from "very safe" to "very afraid" and from "very confident" to "very shy."	After each vignette (n = 12)
Mitchell et al., 2013	MC	Perfectionistic Rearing Behaviours	Child-SR	SUDS (task related anxiety)	Pre-post phase 1-3 of Figure Copy Task
Remmerswaal, Muris, Huijing, 2013	MC	Parental Verbal Information	OR; Child-SR	Touch Box Task (avoidance); FBQ (fear beliefs)	Behavioural avoidance: after exposure to parental information; FBQ: before and after exposure to parental information
de Wilde & Rapee, 2008	MC-EA	Control	OR; Child-SR	Scales adapted from SPRS, using categories from the BASA; modified STAIC A-State	SPRS/BASA: during 2-min story presentation; Modified STAIC A-

					State: baseline & following 2-minute presentation
Muris et al., 2010	MC-EA	Verbal Information	Child-SR	FBQ (fear beliefs)	Pre-and-post manipulation
Möller et al., 2013	MC-EA	Social Referencing Signals	Child-SR	Likert Scale: Children rated their feelings from 1 (very safe) to 5 (very afraid)	After each vignette (n = 8)
Bunaciu et al., 2014	MC-EA	Modelling	OM (Task duration, Delay Time); PM (RR)	Task Duration (escape behaviours); Delay Time (avoidance); Respiration Rate monitored using RSP100C amplifier and BioNomadix transducer.	Task duration, delay time and respiration rate: during VH task
Remmerswaal, Muris, Huijing, 2016	MC-EA	Verbal Information	Child-SR	FBQ (fear beliefs)	Before and after each Information Search Task
Nimphy et al., 2024	MC-EA	Verbal Information	OR; Child-SR; PM (HR); OM (RT)	OR Anxiety: facial, bodily, and vocal/verbal expressions of fear; OR Avoidance: adolescent's tendency to avoid the stranger during a social interaction task; Modified version of the FBQ (fear beliefs); HR measured via VU Ambulatory Monitoring System; Attention Bias measured by reaction times within a Visual Search Task	Observed anxiety and avoidance: from the first word spoken by the stranger to when the stranger thanked the adolescent; Fear beliefs: post social tasks; HR: recorded continuously during the social tasks; Attention Bias: during Visual Search Task.

Notes. BASA = Behavioural Assessment of Speech Anxiety; C-FAT = Child-Focused Assessment of Test Anxiety; Child-SR = Child Self-Report; EC = Early Childhood (3-6 years); ECG = Electrocardiogram; FBQ = Fear Beliefs Questionnaire; HR = Heart Rate; I-T = Infancy to Toddlerhood (< 3 years); KFQ = Koala Fear Questionnaire; MC = Middle Childhood (6-12 years); MC-EA = Middle Childhood to Early Adolescence (6-14 years); OM = Objective Measure; OR = Observer Rated; PM = Physiological Measure; RR = Respiration Rate; RSA = Respiratory Sinus Arrythmia; RT = Reaction Time; SPRS = Social Performance Rating Scale; STAIC = State Trait Anxiety Inventory for Children; SUDS = Subjective Units of Distress; TPOS = Toddler Play Observation Scale; VH = Voluntary Hyperventilation; VST = Visual Search Task.

Table 3.

Quality Assessment Ratings

Authors	Selection Bias	Study Design	Confounders	Blinding	Data Collection	Withdrawal and Dropout	Global Rating
Aktar et al. (2022)	Moderate	Moderate	Weak	Moderate	Strong	Moderate	Moderate
Bögels et al. (2011)	Moderate	Moderate	Weak	Weak	Strong	Weak	Weak
Bunaciu et al. (2014)	Moderate	Moderate	Strong	Weak	Strong	Weak	Weak
Burnstein & Ginsberg (2010)	Weak	Moderate	Strong	Moderate	Strong	Strong	Moderate
Creswell et al. (2008)	Moderate	Moderate	Strong	Strong	Strong	Weak	Moderate
De Rosnay et al. (2006)	Moderate	Moderate	Weak	Moderate	Strong	Weak	Weak
De Wilde & Rapee (2008)	Moderate	Moderate	Strong	Moderate	Strong	Weak	Moderate
Dubi et al. (2007)	Moderate	Moderate	Strong	Weak	Strong	Strong	Moderate
Egliston & Rapee (2008)	Moderate	Moderate	Strong	Moderate	Weak	Strong	Moderate
Gerull & Rapee (2002)	Moderate	Moderate	Weak	Weak	Weak	Strong	Weak
Grady (2019)	Moderate	Moderate	Weak	Moderate	Strong	Strong	Moderate
Grady & Karraker (2014)	Moderate	Strong	Weak	Weak	Strong	Strong	Weak
Mitchell et al. (2013)	Moderate	Moderate	Strong	Moderate	Strong	Strong	Strong
Möller et al. (2013)	Weak	Moderate	Weak	Weak	Strong	Strong	Weak
Muris et al. (2010)	Weak	Moderate	Strong	Moderate	Strong	Strong	Moderate
Nimphy et al. (2024)	Moderate	Moderate	Weak	Moderate	Strong	Moderate	Moderate
Remmerswaal et al. (2010)	Weak	Moderate	Strong	Weak	Strong	Weak	Weak
Remmerswaal et al. (2013)	Weak	Moderate	Strong	Weak	Strong	Weak	Weak
Remmerswaal et al. (2016)	Weak	Moderate	Strong	Weak	Strong	Weak	Weak
Thirwall & Creswell (2010)	Moderate	Moderate	Strong	Moderate	Strong	Strong	Strong

Table 4.

Summary of Overall Pattern of Results

Parenting Behaviour	Study Design	Age Group	Studies Showing an Effect	Studies Not Showing an Effect
Modelling	B-S	I-T	Egliston & Rapee, 2007	None
		EC	-	-
		MC	-	-
		MC-EA	Bunaciu et al., 2014	None
	W-S	I-T	Gerull & Rapee, 2002; Dubi et al., 2008	None
		EC	-	-
		MC	Burnstein & Ginsberg, 2008	None
		MC-EA	-	-
Social Referencing	B-S	I-T	-	-
		EC	-	-
		MC	-	-
		MC-EA	-	-
	W-S	I-T	De Rosnay et al., 2006	None
		EC	-	-
		MC	Bögels et al., 2011	None
		MC-EA	Möller et al., 2013	None
Verbal Information	B-S	I-T	-	-
		EC	-	-
		MC	Remmerswaal et al., 2010; Remmerswaal, Muris, Huijing, 2013	None
		MC-EA	Muris et al., 2010; Remmerswaal, Muris, Huijing et al, 2016	None
	W-S	I-T	-	-
		EC	Aktar et al., 2022	None
		MC	-	-
		MC-EA	Nimphy et al., 2024	None
Encouragement	B-S	I-T	Grady, 2019	None
		EC	-	-
		MC	-	-
		MC-EA	-	-
	W-S	I-T	Grady & Karraker, 2014	None
		EC	-	-
		MC	-	-
		MC-EA	-	-
Control	B-S	I-T	-	-
		EC	-	-

		MC	-	-
		MC-EA	De Wilde & Rapee, 2008	None
	W-S	I-T	-	
		EC	Thirwall & Creswell, 2010	None
		MC	-	-
		MC-EA	-	-
Involvement	B-S	I-T	-	-
		EC	-	-
		MC	None	Creswell, O'Connor, Brewin, 2008
		MC-EA	-	-
	W-S	I-T	-	-
		EC	-	-
		MC	-	-
		MC-EA	-	-
Perfectionism	B-S	I-T	-	-
		EC	-	-
		MC	None	Mitchell et al., 2013
		MC-EA	-	-
	W-S	I-T	-	-
		EC	-	-
		MC	-	-
		MC-EA	-	-

Notes. B-S = Between-Subjects; EC = Early Childhood (3-6 years); I-T = Infancy to Toddlerhood (< 3 years); MC = Middle Childhood (6-12 years); MC-EA = Middle Childhood to Early Adolescence (6 years-14 years); W-S = Within-Subjects

CHAPTER THREE

Bridging Chapter

Word Count: 473

Bridging Chapter

The systematic review in Chapter 2 synthesised experimental research that examined the relationship between manipulated parenting behaviours and child state anxiety. Review findings suggest that various parental behaviours impact child anxiety across development. Specifically, parenting behaviours such as parental modelling, social referencing, and the transmission of verbal information appear to impact children's anxiety across development, with some behaviours (e.g., modelling; verbal information) showing effects that persist beyond exposure.

Within the wider empirical literature, a further parenting behaviour that has been identified to play an important role in children's anxiety is parental control (McLeod et al., 2007; Van der Bruggen et al., 2008). This can be characterised by the extent to which the control exerted by parent's limits or threatens the child's autonomy, both behaviourally and psychologically (Borelli et al., 2015; Grusec & Davidov., 2007).

Several reviews and meta-analyses have documented a moderately consistent association between parental overcontrol and child anxiety symptoms (Drake & Ginsburg., 2012; Negreiros & Miller., 2014; Norton & Abbott., 2017; McLeod et al., 2007; Rapee, 1997). To date, most of the research has been cross-sectional in nature (Bynion et al., 2017; Francis & Manley., 2022; Mcleod et al., 2017; Van der Bruggen et al., 2008; Verhoeven et al., 2012). Few longitudinal studies have been conducted demonstrating these relations empirically (Lewis-Morrarty et al., 2012; Miller et al., 2018; Parrigon & Kerns, 2016), with limited research investigating specific anxiety presentations.

The role of parental overcontrol in adolescent social anxiety

Studies that have explored the unique contributions of parental control on different anxiety presentations is less established than the general anxiety literature, particularly within the adolescent period. Several studies have established an association between parental control and youth anxiety. However, research on these associations within the context of social anxiety disorder

(SAD) is less extensive. This has resulted in a limited understanding of the nuanced dynamics of SAD across developmental trajectories.

SAD typically emerges during early adolescence and is the most common anxiety disorder within this developmental period (Fehm et al., 2005). It is therefore crucial that research continues to explore how parental overcontrol may contribute to the development and maintenance of SAD during this pivotal developmental stage. Yet, the adolescent literature remains limited.

In addition, as with the child and general anxiety literature, less is known about the direction of the relationship. Many developmental psychologists propose the bidirectionality of parent-child effects (Bell., 1968; Sameroff & MacKenzie., 2003), however few studies have been designed to capture this proposed relationship (Gouze et al., 2017).

More research is needed to further establish the association and direction of the relationship for SAD. The empirical paper in the following chapter aims to address this gap by exploring the prospective, bi-directional relationship between perceived parental overcontrol and social anxiety in adolescents aged 14-16 years, using survey data from a large observational study conducted in the UK.

References

Bell, R. Q. (1968). A reinterpretation of the direction of effects in studies of socialization. *Psychological Review*, 75, 81–95. https://doi.org/10.1037/h0025583

Borelli, J.L., Margolin, G. & Rasmussen, H.F. Parental overcontrol as a mechanism explaining the longitudinal association between parent and child anxiety. *J Child Fam Stud* 24, 1559–1574 (2015). http://dx.doi.org/10.1007/s10826-014-9960-1

Bynion, T. M., Blumenthal, H., Bilsky, S. A., Cloutier, R. M., & Leen-Feldner, E. W. (2017). Dimensions of parenting among mothers and fathers in relation to social anxiety among female adolescents. *Journal of adolescence*, *60*, 11-15. https://doi.org/10.1016/j.adolescence.2017.07.004

Drake, L. K., & Ginsburg, G. S. (2012). Family factors in the development, treatment, and prevention of childhood anxiety disorders. *Clinical Child and Family Psychology Review*, 15, 144–162. https://doi.org/10.1007/s10567-011-0109-0

Fehm, L., Pelissolo, A., Furmark, T., & Wittchen, H.-U. (2005). Size and burden of social phobia in Europe. *European Neuropsychopharmacology, 15*(4), 453–462. https://doi.org/10.1016/j.euroneuro.2005.04.002

Francis, S. E., & Manley, S. (2022). Parental beliefs about anxiety as a mediator of parental Overcontrol and adolescent anxiety. *Journal of Child and Family Studies*, *31*(10), 2885-2902. https://doi.org/10.1007/s10826-022-02378-y

Gouze KR, Hopkins J, Bryant FB, Lavigne JV (2017) Parenting and anxiety: bi-directional relations in young children. *J Abnorm Child Psychol* 45:1169–1180. https://doi.org/10.1007/s10802-016-0223-z

Grusec, J. E., & Davidov, M. (2007). Socialization in the family: The roles of parents. In J. E. Grusec & P. D. Hastings (Eds.), Handbook of socialization: *Theory and research* (pp. 284–308). New

York, NY: Guilford Press.

Lewis-Morrarty, E., Degnan, K. A., Chronis-Tuscano, A., Rubin, K. H., Cheah, C. S., Pine, D. S., ... & Fox, N. A. (2012). Maternal over-control moderates the association between early childhood behavioral inhibition and adolescent social anxiety symptoms. *Journal of abnormal child psychology*, *40*(8), 1363-1373. https://doi.org/10.1007/s10802-012-9663-2

McLeod, B. D., Wood, J. J., & Weisz, J. R. (2007). Examining the association between parenting and childhood anxiety: a meta-analysis. *Clinical Psychology Review*, 27, 155–172. https://doi.org/10.1016/j.cpr.2006.09.002

Miller, K. F., Borelli, J. L., & Margolin, G. (2018). Parent–child attunement moderates the prospective link between parental overcontrol and adolescent adjustment. *Family process*, *57*(3), 679-693. https://doi.org/10.1111/famp.12330

Negreiros, J., & Miller, L. D. (2014). The role of parenting in childhood anxiety: etiological factors and treatment implications. *Clinical Psychology: Science and Practice, 21*, 3– 17. https://doi.org/10.1111/cpsp.12060

Norton, A. R., & Abbott, M. J. (2017). Bridging the gap between aetiological and maintaining factors in social anxiety disorder: The impact of socially traumatic experiences on beliefs, imagery and symptomatology. *Clinical Psychology & Psychotherapy*, *24*(3), 747-765. https://doi.org/10.1002/cpp.2044

Parrigon, K. L. S., & Kerns, K. A. (2016). Family processes in child anxiety: the long-term impact of fathers and mothers. *Journal of Abnormal Child Psychology,* 44, 1253– 1266. https://doi.org/10.1007/s10802-015-0118-4

Rapee, R. M. (1997). Potential role of childrearing practices in the development of anxiety and depression. *Clinical Psychology Review*, 17, 47–67. https://doi.org/10.1016/S0272-7358(96)00040-2

Sameroff, A. J., & MacKenzie, M. J. (2003). Research strategies for capturing transactional models of development: the limits of the possible. *Development and Psychopathology*, 15, 613–640. https://doi.org/10.1017/s0954579403000312

Van der Bruggen, C. O., Stams, G. J. J. M., & Bogels, S. M. (2008). Research review: The relation between child and parent anxiety and parental control: a meta-analytic review. *Journal of Child Psychology and Psychiatry*, 49, 1257–1269. https://doi.org/10.1111/j.1469-7610.2008.01898.x

Verhoeven, M., Bögels, S., & Bruggen, C. (2012). Unique roles of mothering and fathering in child anxiety: Moderation by child's age and gender. *Journal of Child & Family Studies*, 21(2), 331–343. https://doi.org/10.1007/s10826-011-9483-y

CHAPTER FOUR:

Empirical Manuscript

The Bidirectional Relationship Between Perceived Parental Over-Control and Social Anxiety in Adolescents

Prepared for submission to: JCPP Advances

(see Author Guidelines in Appendix B)

The Bidirectional Relationship Between Perceived Parental Over-Control and Social Anxiety in Adolescents

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Abstract

Background: Social anxiety disorder (SAD) typically emerges within early adolescence and is the most common anxiety disorder within this developmental period. Parenting behaviours, such as overcontrol, have been found to be associated with anxiety, however its association with social anxiety in adolescents has received limited attention. The present study aimed to explore the bi-directional relationship between perceived parental overcontrol and social anxiety in adolescents.

Methods: Self-report data measuring social anxiety symptoms and perceived parental control at baseline and one-year follow-up were analysed from a sample of 486 participants aged 14-16 years, recruited from the UK. Multiple linear regression models were used to examine the relationships across time-points.

Results: The findings revealed a prospective correlation between adolescent social anxiety and perceived parental overcontrol. However, neither were found to predict one another after controlling for confounders.

Conclusions: While the present study findings did not support a bi-directional relationship between perceived parental overcontrol and adolescent social anxiety, there is a need for future research to employ robust methodologies and multi-informant approaches to better understand these complex relationships and inform targeted interventions.

Key Words: adolescent social anxiety, bi-directional relationship, parental overcontrol, parenting behaviours

Introduction

Social Anxiety Disorder (SAD) is characterised by an intense and persistent fear of negative judgement, rejection, or embarrassment within social situations (APA, 2013). SAD typically emerges within early adolescence and is the most common anxiety disorder within this developmental period (Fehm et al., 2005). Parental overcontrol is characterised by the extent to which the control exerted by parent's limits or threatens the child's autonomy, both behaviourally and psychologically (Borelli et al., 2015; Grusec & Davidov., 2007). Although parental overcontrol has been found to be associated with anxiety (Drake & Ginsburg., 2012; Negreiros & Miller., 2014; Norton & Abbott., 2017; McLeod et al., 2007; Rapee, 1997, Van der Bruggen et al., 2008), its association with social anxiety in adolescents has received limited attention.

Adolescence is a period of multiple changes and transitions, including puberty, peer relationships, parent-child relationships, as well as cognitive abilities (Graber et al., 2018). Parenting behaviours are thought to be sensitively calibrated at different developmental periods to ensure optimal psychological growth (Gouze et al., 2017). While some level of control can ensure young people are looked after and safe, a high level of parental overcontrol can be unwanted or unhelpful when adolescents have a desire for increased autonomy (Borelli et al., 2015; Steinberg & Silverberg, 1986; Wray-Lake et al., 2010). According to contemporary theoretical models (Spence & Rapee, 2016; Wong & Rapee, 2016), parenting behaviours such as overcontrol are important predictors in the development of social anxiety symptoms in adolescents (Scaini et al., 2018). High levels of parental control may enhance adolescent social anxiety by increasing their perception of threat, diminishing their confidence in confronting anxiety provoking situations and ability to develop essential coping skills (Gao et al., 2022; Zhou et al., 2024).

Conversely, adolescent's expression of social anxiety may promote parental overcontrol behaviours. It is possible that for some parents, they may respond to their adolescents' social anxiety by becoming overly involved in regulating how their child should engage in social activities.

Alternatively, as young people develop a desire for autonomy from early to mid-adolescence, they may place more weight on peer relationships than they do family relationships. As a result, parental overcontrol may have an attenuated impact on adolescents' anxiety.

Transactional models of socialisation postulates that the relationship between the parent and child can be bi-directional (Sameroff & MacKenzie, 2003). Several longitudinal studies have been conducted to examine the bidirectional relationship between adolescent social anxiety and parental overcontrol behaviours. Loukas (2009) examined the temporal associations between perceived maternal control and early adolescent (aged 10-14 years) social anxiety across a one-year period in a U.S sample. They found adolescent social anxiety predicted decreases in perceived maternal control one year later, but not vice versa. Similarly, a four-year longitudinal study of Belgian adolescents (mean age 13.4 years) (Nelemans et al., 2020) found that following periods of increased social anxiety symptoms, mothers reported lower parental control. However, unlike the effects observed in Loukas (2009), no longitudinal associations were found between adolescent social anxiety symptoms and perceived parental overcontrol. Recognising the importance of exploring both maternal and paternal parenting behaviours, Gao et al. (2022) examined the reciprocal relationship between overcontrol and adolescent social anxiety (mean age 10.5 years) in a three-year longitudinal study in China. They found that perceived maternal overcontrol was associated with increased social anxiety in adolescent females, and social anxiety predicted perceived paternal overcontrol one-year later. However, no bi-directional associations were observed. In contrast, Zhou et al. (2024) found that perceived parental overcontrol predicted adolescent social anxiety, via self-concept clarity, and vice versa, within a two-year longitudinal study of Chinese adolescents (Zhou et al., 2024). The evidence is therefore mixed and limited. The differences in findings may reflect methodological differences between studies, such as analysis, study design, or participant demographics and characteristics. They might also reflect cultural differences in how parents respond to their adolescents' distress and how these responses influence social anxiety.

Several limitations are noted. Previous studies have not consistently controlled for confounders, such as index of multiple deprivation and depressive symptoms, both of which may influence the relationship between parental overcontrol and adolescent social anxiety. For example, family socioeconomic status (SES) is significantly related to adolescent social anxiety (Cheng et al., 2015; Demir et al., 2013; Neppl et al., 2015), and depression and anxiety often co-occur (Stein et al., 2001; Jacobson & Newman, 2017). To enable a comprehensive understanding of the relationship between parental overcontrol and adolescent social anxiety, consideration of such factors is important in future research. Another limitation is that none of these studies were conducted in a UK adolescent sample. This could limit our understanding of how generalisable previous findings are to the UK population.

This study aimed to build on the existing literature by exploring the bi-directional relationship between perceived parental overcontrol and social anxiety in adolescents aged 14-16 years, using survey data from a large observational study conducted in the UK. In line with transactional models of socialisation (Sameroff & MacKenzie, 2003), we hypothesised that baseline perceived parental overcontrol would explain the variances of one-year social anxiety symptoms, after controlling for baseline social anxiety symptoms, depression, age, sex, and index of multiple deprivation (imd) (Hypothesis 1). In addition, we hypothesised that baseline social anxiety symptoms would explain the variances of one-year perceived parental overcontrol, after controlling for baseline perceived parental overcontrol, depression, age, sex, and imd (Hypothesis 2).

Method

Participants and Procedure

The present study utilised data shared by the Wellcome Trust Neuroscience in Psychiatry Network (NSPN) (Kiddle et al., 2018). Ethical approval was obtained from the Cambridge East Research Ethics Committee (Reference: REC12/EE/0250), permitting researchers to use their fully anonymous data for further research.

The NSPN initiatives recruited a general population sample of 2000 participants, with equal numbers of male and females, across five age groups. Participants aged 14-24 were recruited between 2012-2017 from the Cambridgeshire and Greater London area through expression of interest forms, via general practitioners, schools, further education colleges, and purposive advertisement. Parental consent was obtained for participants under the age of 18.

An estimated 30,923 expression of interest forms were distributed, of which 4170 (13.5%) were returned. In total, 3726 participants were sent a home questionnaire pack, which was designed to assess participants' mental health and behaviours, including their experiences of depressive symptoms, social anxiety symptoms, and perceived parental style. This was completed by 2402 participants, which marked the baseline (T1) of the NSPN 2400 cohort.

Questionnaires that measured parental style were completed at two time points and assessed participants' experiences during their first 16 years of life. The present sample consisted of 486 participants aged 14-16, who reported data on social anxiety symptoms and perceived parental style at baseline (T1), and at one-year follow-up (T2) (N = 414).

Measures

Sociodemographic Information: Sociodemographic information includes ethnicity, country of birth, parental education, age, and sex. In addition, Index of Multiple Deprivation (imd), was calculated for each participant based upon the participants' postcodes. The imd is an official measure of relative deprivation for small areas in England (of around 1500 citizens, defined as a Lower-layer Super Output Areas [LSOA]) and gives an indicative measure of individual deprivation based on postcode of participants' addresses. There were 32842 LSOA's in England in 2010. Imd ranks areas from the most deprived (low rank) to the least deprived (high rank), with a higher rank indicating lower levels of deprivation.

Social anxiety symptoms: Social anxiety symptoms were measured with the Schizotypal Personality Questionnaire (SPQ: Rain., 1991). The SPQ is a 74-item scale designed to measure the nine symptoms of schizotypal features. The Excessive Social Anxiety (ESA) subscale (items 2, 11, 20, 29, 38, 46, 54, 71) was used as a measure of adolescent social anxiety. It has been shown to load highly on the social anxiety factor and correlated highly with other social anxiety measures (Cicero et al., 2015). The ESA subscale consists of eight items. Example items include *"I sometimes avoid going to places where there will be many people because I will get anxious", "I get anxious when I have to make polite conversation"*, *"I feel very uncomfortable in social situations involving unfamiliar people"* (Rain., 1991). Responses on the SPQ are a yes or no endorsement, with higher scores indicating greater social anxiety levels. The SPQ's four-factor structure, which includes social anxiety as one of its components, has been shown to be valid in an adolescent sample (Fonseca-Pedrero et al., 2009). Cronbach's alphas for the ESA subscale at T1-T2 were 0.81 and 0.85, respectively.

Depressive symptoms: The Short Mood and Feelings Questionnaire (SMFQ) (Angold et al., 1995), is a self-report questionnaire designed to assess depressive symptoms in youth, aged 6-17 years. Items include *"I felt I was no good anymore"* and *"I didn't enjoy anything at all"*. The SMFQ consists of 13-items, scored on a scale from 0-2 (0 = "Not True"; 1 = "Sometimes"; 2 = "True"). Total scores range from 0 to 26, with a higher score indicating more severe symptomatology. Cronbach's alphas for the SMFQ at T1–T2 were 0.88, and 0.91, respectively.

Measure of perceived parenting style: The Measure of Parenting Style (MOPS: Parker et al., 1997) was used to assess participant's perception of maternal and paternal parenting style. The MOPS is a 30-item self-report scale that measures dysfunctional parenting practices, including parental overcontrol. This scale consists of 4 statements which are repeated for the individual's mother and father separately. Participants rated how true each item was of their mother and then their father within their first 16 years of life. Items include *"overprotective of me"*, *"over controlling of me"*, *"sought to make me feel guilty"*, and *"critical of me".* Ratings were on a 4-point scale from

"Not true at all" to "Extremely True". A composite score of perceived parental overcontrol was calculated by taking an average of the perceived maternal and paternal total score. In all scales, the higher the score, the higher the level of perceived overcontrol. The MOPS has demonstrated excellent reliability and convergent validity with other measures of parenting style, such as the Parental Bonding Instrument (Parker et al., 1997). Cronbach's alphas for the MOPS overcontrol subscale were 0.75, and 0.74, respectively.

Data Analysis

Participants with missing data at both time points were retained in the study, and missing data were addressed using appropriate methods to ensure that all available data were included in the analysis.

R Studio (R Core Team, 2020) was employed to perform the intended analyses. Distribution of data was assessed, and the percentages of missing data were analysed. Little's MCAR test (1998) was conducted to examine if the data was missing completely at random (MCAR). Variables with the highest percentages of missing data were one-year perceived parental overcontrol (12.8%) and one-year social anxiety symptoms (11.1%). Analysis revealed that Little's MCAR test was significant, X^2 = 571, *df* = 202 $p < .001$, indicating that the dataset did not meet MCAR criterion. Linear regression analyses showed that baseline participant age (T1) was a significant predictor of missing data for one-year perceived parental overcontrol (T2) (*p = .019)* and baseline social anxiety (T1) was a significant predictor of missing data for one-year social anxiety (T2) (*p = .024).* This suggests that data may be missing at random (MAR). We employed multiple imputation through chained equations to address the issue of data missingness and its patterns, which was performed using the *mice* package (van Buuren & Groothuis-Oudshoorn, 2011). Convergence of the data was assessed by analysing the means and standard deviations of the imputed variables. Multiple linear regression analyses were conducted to test Hypothesis 1 and 2, utilising the '*lm( )*' function from the *stats* package (R Core

Team, 2021). The results obtained from the imputed data are presented here, whereas complete case analysis findings are reported in Table S3.

Results

Descriptive Statistics and Bivariate Correlations

The sample consisted of 486 participants at baseline (T1), of which 54.1% (n = 263) were female (see Table S1 in Supporting Information). The mean age at baseline was M = 15.06 (SD = 0.58), and the imd scores ranged from 1 to 54. At one-year follow-up (T2) 85% (n = 414) of those that completed measures at baseline returned repeated measures with 54.1% (n = 224) of the follow-up participants identifying as female. The mean age at follow-up was M = 16.32 (SD = 0.85).

Pearson correlation analyses were performed on the imputed datasets (see Table S2), considering both demographic variables (age, sex, imd) and outcome variables (depression; social anxiety, perceived parental overcontrol). Significant associations were found between demographic variables (age, imd) and the primary outcomes of interest (social anxiety, perceived parental overcontrol) across T1 and T2. Notably, a statistically significant correlation was found between baseline perceived parental overcontrol (T1) and one-year social anxiety (T2), $r(486) = .14$, $p < .01$, 95% CI [.12, .16], and between baseline social anxiety (T1) and one-year perceived parental overcontrol (T2), $r(486) = .21$, $p < .01$, 95% CI [.19, .23]. A moderate significant correlation was found between baseline depression (T1) and both baseline social anxiety (T1), $r(486) = .41$, $p < .01$, 95% CI [.39, .42], and one-year social anxiety (T2), $r(486) = .36$, $p < .01$, 95% CI [.34, .37]. In addition, one-year depression (T2) was significantly correlated with one-year social anxiety (T2), $r(486) = .47$, $p < .01$, 95% CI [.46, .48]. Moderate correlations were found between baseline perceived parental overcontrol (T1) and both baseline depression (T1), $r(486) = .44$, $p < .01$, 95% CI [.42, .45], and one-year depression (T2), $r(486) = .30$, $p < .01$, 95% CI [.28, .31]. Similarly, a moderate correlation was observed between one-year perceived parental overcontrol (T2) and both baseline depression (T1), $r(486) = .34$, $p < .01$, 95% CI [.33, .36], and one-year depression (T2) $r(486) = .33$, $p < .01$, 95% CI [.31,

.34]. To understand the relationship between social anxiety and perceived parental overcontrol, depressive symptoms, age, imd, and sex were controlled for in subsequent analyses.

Hypothesis 1: Baseline perceived parental overcontrol (T1) would explain variances of one-year social anxiety (T2), controlling for baseline social anxiety symptoms, age, sex, imd, and depressive symptoms

A multiple linear regression was conducted to examine if baseline perceived parental overcontrol (T1) explained variances of one-year social anxiety symptoms (T2), while baseline social anxiety symptoms, age, sex, imd, and depressive symptoms were controlled for. The overall model was significant, $F(6, 479) = 64.44$, $p < .001$, and explained approximately 45% of the variance in one-year social anxiety symptoms, $R^2 = .45$. We found that baseline perceived parental overcontrol (T1) did not significantly explain the variances of one-year social anxiety symptoms (T2), $\beta = -0.02$, $p = .62$. Moreover, participant sex significantly explained the variances of one-year social anxiety symptoms (T2), $\beta = 0.18$, $p = .02$, specifically, being male was associated with higher levels of one-year social anxiety (T2), compared to being female. Furthermore, baseline depression (T1) significantly explained the variances of one-year social anxiety symptoms (T2), $\beta = 0.11$, $p = .04$, with higher levels of baseline depression (T1) being associated with higher levels of one-year social anxiety (T2). No further significant effects were observed in the model.

To further explore the relationships between perceived parental overcontrol (T1) and one-year social anxiety (T2), we conducted an additional exploratory analysis and removed baseline depression (T1) as a covariate within the regression model. By removing baseline depression (T1), we aimed to isolate the unique contribution of perceived parental overcontrol in explaining variances of one-year social anxiety symptoms (T2). Within the exploratory analysis, the overall model remained significant, $F(5, 480) = 75.11$, $p < .001$, and explained approximately 44% of the variance in one-year social anxiety symptoms, $R^2 = .44$. We found that the removal of baseline depression (T1) did not change the relationship between baseline perceived parental overcontrol (T1) and one-year social

anxiety symptoms (T2), β = 0.01, p = .75. However, a stronger, more significant relationship was observed between participant sex and one-year social anxiety symptoms (T2), β = 0.22, p = .005, further supporting the finding that being male was associated with higher levels of one-year social anxiety symptoms (T2), than being female.

Hypothesis 2: Baseline social anxiety (T1) would explain variances of one-year perceived parental overcontrol (T2), controlling for baseline perceived parental overcontrol, age, sex, imd, and depressive symptoms

A multiple linear regression analysis was performed to assess whether baseline social anxiety (T1) explained variances of one-year perceived parental overcontrol (T2), while controlling for baseline perceived parental overcontrol, age, sex, imd, and depressive symptoms. The overall model was significant, $F(6, 479) = 68.81$, $p < .001$, and explained approximately 46% of the variance in one-year perceived parental overcontrol, $R^2 = .46$. We found that baseline social anxiety (T1) did not significantly explain the variances of one-year perceived parental overcontrol (T2), β = 0.07, p = .09. No further significant effects were observed in the model.

To further examine the relationship between baseline social anxiety (T1) and one-year perceived parental overcontrol (T2), we conducted an exploratory analysis to remove baseline depression (T1) as covariate within the regression model to assess the unique contribution of baseline social anxiety (T1 in explaining variances of one-year perceived parental overcontrol (T2). Within the exploratory analysis, the overall model remained significant, $F(5,480) = 81.78$, $p < .001$, and explained approximately 46% of the variance in one-year perceived parental overcontrol, $R^2 = .46$. We found that after removing baseline depression (T2) from the model, baseline social anxiety (T1) significantly explained the variances of one-year perceived parental overcontrol (T2), β = 0.09, p = .02. No further significant effects were observed in the model.

Discussion

This study examined the prospective, bi-directional relationship between perceived parental overcontrol and adolescent social anxiety in a large UK sample of adolescents aged 14–16-year-olds. We hypothesised that there will be significant bidirectional associations between perceived parental overcontrol and adolescent social anxiety, while controlling for baseline measures of the two variables, depression, age, sex, and index of deprivation. However, the study showed that, although social anxiety and perceived parental overcontrol were correlated to each other prospectively, they did not predict each other after controlling for various confounders, which contradicts transactional models of socialisation (Sameroff & MacKenzie, 2003).

The lack of bidirectional effect in regression analyses is consistent with findings from a study of Belgian adolescents by Nelemans et al. (2020). The present study shares several similarities with Nelemans et al. (2020), including similar design, participant demographics and follow-up period. Given the similarities between studies and the consistent lack of bi-directional effects observed when utilising both multiple linear regression models, and the more sophisticated RI-CLPM, which distinguishes between stable traits and dynamic changes over time at the within-person level (Hamaker et al., 2015; Zhou et al., 2024), it is possible that the lack of significant bi-directional effects in both studies could indicate a genuine absence of bi-directional associations in older adolescents.

Our findings contrast to the findings of Zhou et al. (2024), who reported that perceived parental overcontrol and adolescent social anxiety mutually and positively predicted each other over time. The differences in findings could be related methodological differences between studies. Notably, participants in the present study were older at baseline (mean age =15.06) compared to those in Zhou et al. (2024) (mean age = 10.91). It is possible that the bi-directional association observed by Zhou et al. (2024), captures a different developmental period, encompassing early adolescence, compared to the present study. Adolescents during this pivotal stage of development, may be more susceptible to the effects of parental overcontrol compared to older adolescents (e.g.,

14-16 years), who may have developed greater social independence and a more stable sense of self (Zhou et al., 2024). Differences in findings may also reflect cultural differences between individualistic and interdependent cultures. For example, parental overcontrol may have a stronger association in interdependent cultures, where there are expectations to conform to societal norms.

Despite having a non-significant effect in multiple linear regressions, we observed a significant positive correlation between baseline social anxiety and perceived parental overcontrol at one year (r = .21), suggesting that adolescents who reported higher levels of social anxiety at baseline reported increased parental over-control at one-year follow-up (hypothesis one). A significant, but weaker association was also found for baseline perceived parental overcontrol and adolescent social anxiety at one-year follow-up (r = .14) (hypothesis two). Although the prospective association does not imply causation. More research is needed to examine whether adolescent social anxiety influences parental overcontrol, in a controlled experimental setting.

Our analyses also revealed that sex significantly explained the variance of one-year social anxiety, with males reporting higher social anxiety at one-year, compared to females. While adolescent girls have consistently been found to report higher anxiety symptoms in the cross-sectional literature (Hale et al., 2008; McLaughlin & King, 2015; Ohannessian et al. 2017; Olatunji & Cole, 2009; Stapinski et al., 2015; Van Oort et al., 2009), gender differences in specific anxiety trajectories, such as SAD, remains unclear, with much of the research focused on trajectories beginning at early adolescence (Ohannessian et al. 2017). Perhaps the specific age group of our sample (14-16 years), captures a developmental period where social anxiety trajectories manifest differently across genders.

Strengths and Limitations

The present study has a number of strengths. Utilising data from a large observational UK study resulted in having a large dataset where there was sufficient statistical power to test the hypothesised effects. Missing data in the prospective dataset was handled appropriately using the

necessary missing data management methods. Nonetheless, this study has several limitations. First, the use of the Excessive Social Anxiety (ESA) subscale from the Schizotypal Personality Questionnaire (SPQ) as a measure of adolescent social anxiety. While the ESA subscale demonstrates content validity and has been shown to correlate with other established measures of social anxiety (Cicero et al., 2015), its sensitivity and specificity for measuring social anxiety symptoms in adolescents has not been thoroughly examined. Second, parental overcontrol was a self-report measure of perceived parental overcontrol. This reflected adolescents subjective experience of parental overcontrol, rather than actual parenting behaviour, measured via parent-report or observation. Therefore, we cannot be certain that the parenting behaviour reported by adolescents accurately captures parenting behaviour, or if adolescent perception is a product of negative cognitive biases (Clark & Wells, 1995; Creswell & O'Connor, 2011; Spence & Rapee, 2016; Wong & Rapee, 2015, 2016). This limits our ability to generalise our findings to objective parenting practices. Future research should include multi-informant methods, to provide a more comprehensive and actionable understanding of the relationship between parenting and adolescent social anxiety, which is critical for tailoring effective interventions. Thirdly, the present study used a composite score of parental behaviour rather than exploring the effects of maternal and paternal behaviour. In addition, we did not explore possible gender-specific pathways for adolescent social anxiety. Future research should examine the role of these variables. Fourth, the present study did not use a cross-lagged panel model to examine the dynamic, reciprocal nature of the associations between parental overcontrol and adolescent social anxiety. Incorporating this model would have provided a more robust understanding of the relationship between these variables. Future research should utilise such design methodology to gain a more comprehensive understanding of the dynamic and transactional relationship between parental overcontrol and adolescent social anxiety. Fifth, the use of self-report measures in the present study, may have inflated the strength of the observed associations due to shared-method variance. Finally, we cannot infer causation from observational data. Thus, further longitudinal and experimental studies are necessary.

Clinical Implications

Previous research has highlighted the importance of interventions that focus on parent-child interactions, such as parenting skills to reinforce positive coping and autonomy, which are important ingredients to successful SAD treatment (American Academy of Child and Adolescent Psychiatry, 2007). However, the present study suggests rather than incorporating parents into adolescent SAD interventions, it may be more efficient to target intrapersonal maintenance factors of social anxiety , such as negative social cognitions, safety behaviours, self-focused attention, and post-event processing using evidence-based interventions such as Cognitive Therapy (Chiu et al., 2021; Ingul, Atune, Nordahhl, 2013; Leigh & Clark, 2016; Melfsen et al., 2011).

Conclusion

In sum, while the present study findings did not support a bi-directional relationship between perceived parental overcontrol and adolescent social anxiety, there is a need for future research to employ robust methodologies and multi-informant approaches to better understand these complex relationships and inform targeted interventions.

Author Contributions

Emilie Scowen: Conceptualisation, Methodology, Formal Analysis, Investigation, Data Curation, Interpretation, Writing- Original Draft

Eleanor Leigh: Conceptualisation, Methodology, Supervision, Interpretation, Writing – Review and Editing

Richard Meiser-Steidman: Conceptualisation, Methodology, Supervision, Interpretation, Writing – Review and Editing

Kenny Chiu: Conceptualisation, Methodology, Data Curation, Formal Analysis, Methodology, Supervision, Writing – Review and Editing

References

American Academy of Child and Adolescent Psychiatry (2007). AACAP official action; practice parameter for the assessment and treatment of children and adolescents with anxiety disorders. *J Am Ac Child Adolesc Psychiatry* 46:267–283. https://doi.org/10.1097/00004583-199710001-00006

American Psychiatric Association (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Arlington, VA: American Psychiatric Association. https://doi/book/10.1176/appi.books.9780890425596

Bell, R. Q. (1968). A reinterpretation of the direction of effects in studies of socialization. Psychological Review, 75, 81–95. https://doi.org/10.1037/h0025583

Bo¨gels, S. M., & Brechman-Toussaint, M. L. (2006). Family issues in child anxiety: Attachment, family functioning, parental rearing and beliefs. *Clinical Psychology Review*, 26(7), 834–856. doi:10.1016/j.cpr.2005.08.001. https://doi.org/10.1016/j.cpr.2005.08.001

Borelli, J.L., Margolin, G. & Rasmussen, H.F. Parental overcontrol as a mechanism explaining the longitudinal association between parent and child anxiety. *J Child Fam Stud* 24, 1559–1574 (2015). https://doi.org/10.1007/s10826-014-9960-1

Chiu, K., Clark, D. M., & Leigh, E. (2021). Cognitive predictors of adolescent social anxiety. *Behaviour Research and Therapy*, *137*, 103801. https://doi.org/10.1016/j.brat.2020.103801

Cicero, D. C., Krieg, A., Becker, T. M., & Kerns, J. G. (2016). Evidence for the discriminant validity of the Revised Social Anhedonia Scale from social anxiety. *Assessment*, *23*(5), 544-556. https://doi.org/10.1177/1073191115590851

Clark, D. M., & Wells, A. (1995). A cognitive model of social phobia. In R. Heimberg, M. Liebowitz, D. A. Hope, & F. R. Schneier (Eds.), Social phobia: Diagnosis, assessment and treatment (pp. 69–93). New York, NY: Guilford.

Creswell, C., & O'Connor, T. G. (2011). Interpretation bias and anxiety in childhood: Stability, specificity and longitudinal associations. Behavioural and Cognitive Psychotherapy, 39, 191–204. https://doi.org/10.1017/S1352465810000494

Drake, L. K., & Ginsburg, G. S. (2012). Family factors in the development, treatment, and prevention of childhood anxiety disorders. *Clinical Child and Family Psychology Review*, 15, 144–162. https://doi.org/10.1007/s10567-011-0109-0

Fehm, L., Pelissolo, A., Furmark, T., & Wittchen, H.-U. (2005). Size and burden of social phobia in Europe. *European Neuropsychopharmacology, 15*(4), 453–462. https://doi.org/10.1016/j.euroneuro.2005.04.002

Fu, W., Zhang, W., Dong, Y., & Chen, G. (2024). Parental control and adolescent social anxiety: A focus on emotional regulation strategies and socioeconomic influences in China. *British Journal of Developmental Psychology*. https://doi.org/10.1111/bjdp.12525

Gao, D., Liu, J., Xu, L., Mesman, J., & van Geel, M. (2022). Early adolescent social anxiety: differential associations for fathers' and mothers' psychologically controlling and autonomy-supportive parenting. *Journal of Youth and Adolescence*, 51, 1858–1871. https://doi.org/10.1007/s10964-022-01636-y

Gouze KR, Hopkins J, Bryant FB, Lavigne JV (2017) Parenting and anxiety: bi-directional relations in young children. *J Abnorm Child Psychol* 45:1169–1180. https://doi.org/10.1007/s10802-016-0223-z

Graber, J. A., Brooks-Gunn, J., & Petersen, A. C. (Eds.). (2018). *Transitions through adolescence: Interpersonal domains and context*. Psychology Press. https://doi.org/10.4324/9781315789286

Grusec, J. E., & Davidov, M. (2007). Socialization in the family: The roles of parents. In J. E. Grusec & P. D. Hastings (Eds.), Handbook of socialization: Theory and research (pp. 284–308). New York, NY: Guilford Press.

Ingul, J. M., Aune, T., & Nordahl, H. M. (2013). A randomized controlled trial of individual cognitive therapy, group cognitive behaviour therapy and attentional placebo for adolescent social phobia. *Psychotherapy and Psychosomatics, 83*(1), 54–61. https://doi.org/10.1159/000354672

Jacobson, N. C., & Newman, M. G. (2017). Anxiety and depression as bidirectional risk factors for one another: A meta-analysis of longitudinal studies. *Psychological bulletin*, *143*(11), 1155. https://doi.org/10.1037/bul0000111

Kiddle, B., Inkster, B., Prabhu, G., Moutoussis, M., Whitaker, K. J., Bullmore, E. T., Dolan, R. J., Fonagy, P., Goodyer, I. M., & Jones, P. B. (2018). Cohort Profile: The NSPN 2400 Cohort: a developmental sample supporting the Wellcome Trust NeuroScience in Psychiatry Network. *International journal of epidemiology*, *47*(1), 18–19g. https://doi.org/10.1093/ije/dyx117

Leigh, E., & Clark, D. M. (2016). Cognitive therapy for social anxiety disorder in adolescents: A development case series. *Behavioural and Cognitive Psychotherapy, 44* (1), 1–17. https://doi.org/10.1017/S1352465815000715

Loukas, A. (2009). Examining temporal associations between perceived maternal psychological control and early adolescent internalizing problems. *Journal of abnormal child psychology*, *37*, 1113-1122. https://doi.org/10.1007/s10802-009-9335-z

McLaughlin KA, King K. Developmental trajectories of anxiety and depression in early adolescence. Journal of abnormal child psychology. 2015; 43(2):311–323. https://doi.org/10.1007/s10802-014-9898-1

McLeod, B. D., Wood, J. J., & Weisz, J. R. (2007). Examining the asso- ciation between parenting and childhood anxiety: a meta-analysis. *Clinical Psychology Review*, 27, 155–172. https://doi.org/10.1016/j.cpr.2006.09.002

Melfsen, S., Kühnemund, M., Schwieger, J., Warnke, A., Stadler, C., Poustka, F., et al. (2011). Cognitive behavioral therapy of socially phobic children focusing on cognition: A randomised wait-list control study. *Child and Adolescent Psychiatry and Mental Health, 5*(1), 5. https://doi.org/10.1186/1753-2000-5-5

Negreiros, J., & Miller, L. D. (2014). The role of parenting in childhood anxiety: etiological factors and treatment implications. *Clinical Psychology: Science and Practice*, 21, 3– 17.

Nelemans, S. A., Keijsers, L., Colpin, H., van Leeuwen, K., Bijttebier, P., Verschueren, K., & Goossens, L. (2020). Transactional links between social anxiety symptoms and parenting across adolescence: Between-and within-person associations. *Child Development*, 91(3), 814–828. https://doi.org/10.1111/cdev.13236

Norton, A. R., & Abbott, M. J. (2017). Bridging the gap between aetiological and maintaining factors in social anxiety disorder: The impact of socially traumatic experiences on beliefs, imagery and symptomatology. *Clinical Psychology & Psychotherapy*, *24*(3), 747-765. https://doi.org/10.1002/cpp.2044

Ohannessian, C. M., Milan, S., & Vannucci, A. (2017). Gender differences in anxiety trajectories from middle to late adolescence. *Journal of youth and adolescence*, *46*, 826-839. https://doi.org/10.1007/s10964-016-0619-7

Olatunji BO, Cole DA. The longitudinal structure of general and specific anxiety dimensions in children: Testing a latent trait–state–occasion model. *Psychological Assessment*. 2009; 21(3):412. https://doi.org/10.1037/a0016206

Parker, G., Roussos, J., Hadzi Pavlovic, D., Mitchell, P., Wilhelm, K., & Austin, M.P. (1997). The development of a refined measure of dysfunctional parenting and assessment of its relevance in patients with affective disorders. *Psychological Medicine*, 27, 1193-1203. https://doi.org/10.1017/s003329179700545x

Rapee, R. M. (1997). Potential role of childrearing practices in the development of anxiety and depression. *Clinical Psychology Review,* 17, 47–67. https://doi.org/10.1016/S0272-7358(96)00040-2

Sameroff, A. J., & MacKenzie, M. J. (2003). Research strategies for capturing transactional models of development: the limits of the possible. *Development and Psychopathology*, 15, 613–640. https://doi.org/10.1017/S0954579403000312

Scaini, S., Palmieri, S., & Caputi, M. (2018). The relationship between parenting and internalizing problems in childhood. In L. Bene- detto & M. Ingrassia (Eds.), *Parenting-Empirical Advances and Intervention Resources.* (pp. 85-100). Loredana Benedetto and Massimo Ingrassia, IntechOpen. http://dx.doi.org/10.5772/intechopen.73540

Spence, S. H., & Rapee, R. M. (2016). The etiology of social anxiety disorder: An evidence-based model. *Behaviour Research and Therapy*, 86, 50–67. https://doi.org/10.1016/j.brat.2016.06.007

Steinberg, L., & Silverberg, S. B. (1986). The vicissitudes of autonomy in early adolescence. Child Development, 57(4), 841–851. https://doi.org/10.2307/1130361

Stein, M. B., Fuetsch, M., Müller, N., Höfler, M., Lieb, R., & Wittchen, H. U. (2001). Social anxiety disorder and the risk of depression: a prospective community study of adolescents and young adults. *Archives of general psychiatry*, *58*(3), 251-256. https://doi.org/10.1001/archpsyc.58.3.251

Van der Bruggen, C. O., Stams, G. J. J. M., & Bogels, S. M. (2008). Research review: The relation between child and parent anxiety and parental control: a meta-analytic review. *Journal of Child Psychology and Psychiatry*, 49, 1257–1269. https://doi.org/10.1111/j.1469-7610.2008.01898.x

Van Oort F, Greaves-Lord K, Verhulst F, Ormel J, Huizink A. The developmental course of anxiety symptoms during adolescence: the TRAILS study. *Journal of Child Psychology and Psychiatry.* 2009; 50(10):1209–1217. https://doi.org/10.1111/j.1469-7610.2009.02092.x

Wong, Q. J. J., & Rapee, R. M. (2015). The developmental psychopathology of social anxiety and phobia in adolescents. In K. Ranta, A. M. La Greca, L. J. Garcia- Lopez, & M. Marttunen (Eds.), Social anxiety and phobia in adolescents: Development, manifestation and intervention strategies (pp. 11–37). New York, NY: Springer. https://doi.org/10.1007/978-3-319-16703-9_2

Wong, Q. J., & Rapee, R. M. (2016). The aetiology and maintenance of social anxiety disorder: A synthesis of complementary theoretical models and formulation of a new integrated model. Journal of Affective Disorders, 203, 84–100. https://doi.org/10.1016/j.jad.2016.05.069

Wray-Lake, L., Crouter, A. C., & McHale, S. M. (2010). Developmental patterns in decision-making autonomy across middle childhood and adolescence: European American parents perspectives. *Child Development*, 81(2), 636–651. https://doi.org/10.1111/j.1467-8624.2009.01420.x

Zhou, J., Zou, F., & Gong, X. (2024). The Reciprocal Relations between Parental Psychological Control and Social Anxiety and the Mediating Role of Self-Concept Clarity Among Chinese Early Adolescents. *Journal of Youth and Adolescence*, 1-15. https://doi.org/10.1007/s10964-024-02015-5

Table S1.

Sample Characteristics and Descriptive Statistics for Main Variables

	Baseline (T1)	1-year visit (T2)
Characteristics	*n*	*n*
Total Participants (N)	486	414
Sex		
Female	263	224
Male	223	190
Ethnicity		
White	381	322
Asian/Asian British	38	26
Black/African/Caribbean/Black British	17	11
Mixed/multiple ethnic groups	39	35
Other ethnic groups	4	4
Decline to state	1	1
Did not report	6	5
	Mean (SD)	Mean (SD)
Age	15.06 (0.58)	16.32 (0.85)
Main Variables	Mean (SD)	Mean (SD)
Perceived Parental Over-Control	2.42 (2.09)	2.33 (1.99)
Social Anxiety Symptoms	3.86 (2.53)	3.45 (2.69)
Depressive Symptoms	6.38 (5.00)	6.36 (5.57)

Note: Perceived Parental Control = MOPS over-control subscale; Social anxiety symptoms = SPQ Excessive Social Anxiety (ESA) subscale; Depressive symptoms = SMFQ.

Table S2.

Correlational Matrix of the Imputed Data (N = 486)

Variable	*M*	*SD*	1	2	3	4	5	6	7	8
1. imd	12.97	11.29								
2. Age T1	15.06	0.58	.08**							
3. Age T2	16.32	0.85	.02**	.73**						
4. Depression T1	6.38	5.00	.15**	.13**	.08**					
5. Depression T2	6.36	5.57	.02**	.09**	.09**	.52**				
6. Social Anxiety T1	3.86	2.53	.04**	.11**	- .01	.41**	.31**			
7. Social Anxiety T2	3.45	2.69	-.00	.13**	-.00	.36**	.47**	.65**		
8. Perceived Parental Overcontrol T1	2.42	2.09	.15**	.10**	.08**	.44**	.30**	.20**	.14**	
9. Perceived Parental Overcontrol T2	2.33	1.99	.10**	.04**	.08**	.34**	.33**	.21**	.20**	.67**

Note. M and *SD* are used to represent mean and standard deviation, respectively. * indicates $p < .05$. ** indicates $p < .01$.

Table S3.

Results of Complete Case Analyses (n = 320)

Hypothesis 1	Multiple linear regression was conducted to examine if baseline perceived parental overcontrol (T1) was a significant predictor of one-year social anxiety symptoms (T2), while controlling for baseline social anxiety symptoms, age, sex, imd, and depressive symptoms. The overall model was significant, $F(6, 313) = 41$, $p < .001$, and explained approximately 44% of the variance in one-year social anxiety symptoms, $R^2 = .44$. We found that baseline perceived parental overcontrol (T1) did not significantly predict one-year social anxiety symptoms (T2), $\beta = -0.002$, $p = .96$. However, sex ($\beta = 0.25$, $p = .004$) and baseline depression (T1) ($\beta = 0.10$, $p = .046$) were significant predictors, suggesting that both variables explained a proportion of the variance for one-year social anxiety symptoms (T2).
Hypothesis 2	Multiple linear regression analysis was conducted to examine if baseline social anxiety (T1) was a significant predictor of one-year perceived parental overcontrol (T2), while baseline perceived parental control, age, sex, imd, and depressive symptoms were controlled for. The overall model was significant, $F(6, 313) = 48.19$, $p < .001$, and explained approximately 48% of the variance in one-year perceived parental overcontrol, $R^2 = .48$. Results suggested that baseline social anxiety (T1) was a not a significant predictor of one-year perceived parental overcontrol (T2), $\beta = 0.08$, $p = .063$, although this finding is approaching statistical significance. Sex of the participant was also found to be a significant predictor, $\beta = -0.18$, $p = .04$, indicating that being female is associated with higher levels of one-year perceived parental overcontrol (T2), compared to being a male.

CHAPTER FIVE

Discussion and Critical Evaluation

Word Count: 2343

General Discussion and Critical Evaluation

The final chapter of this thesis portfolio summarises the main findings of the systematic review and empirical study, evaluates their strengths and limitations, and discusses the theoretical, clinical, and research implications of the findings. Personal reflections on the research process are also included.

Main Findings

Systematic Review

The systematic review presented within this portfolio synthesised experimental research that examined the relationship between manipulated parenting behaviours and child state anxiety. Findings indicated that certain parenting behaviours influenced child anxiety, with modelling, social referencing, and verbal information demonstrating consistent effects from infancy to early adolescence, with some behaviours showing effects that persist beyond exposure. Protective effects were observed following exposure to positive modelling, encouragement, and verbal information. While other behaviours, such as the modelling of negative expressions, anxious behaviours, parental control, and verbal threat information were found to exacerbate anxiety.

Empirical Study

The empirical study examined the prospective, bi-directional relationship between perceived parental overcontrol and adolescent social anxiety in a large UK sample of adolescents aged 14-16 years, while controlling for baseline measures, depression, age, sex, and index of deprivation. Findings revealed that although adolescent social anxiety and perceived parental overcontrol were prospectively correlated, they did not predict each other after controlling for confounders.

Strengths and Limitations

Systematic Review

Strengths

The systematic review was registered on PROSPERO, an international register of systematic reviews. Registration increased transparency, reduced bias, and helped to prevent unwanted duplication (Pieper & Rombey, 2022). This systematic review is the first to systematically identify studies that examined the experimental effects of parenting behaviours on child anxiety. Examining the relationship across a wide age range of children enabled a comprehensive overview of how various parenting behaviours influence child anxiety across development. This was a strength of using narrative synthesis. Moreover, exploring the causal influence of parenting behaviours on child anxiety provided insights into which parenting behaviours are most relevant in reducing child anxiety. These strengths highlight the importance of such research in contributing to the development of effective, evidence-based interventions.

Limitations

Most of the studies included within the review were not considered to be of high quality. This may limit the reliability and generalisability of our findings. In addition, a meta-analysis could not be performed due to the heterogeneity of variables across studies. This limits our ability to quantify the overall strength of the relationship or assess whether there are differential effects between parenting behaviours. Moreover, none of the studies included in this review were from non-western countries. Given that emotional behaviour and affective responses are to some degree shaped by culture (Tsai, Levenson, & McCoy, 2006), it is possible that the influence of parenting behaviours differs between cultures. Therefore, this must be taken this into consideration when interpreting the findings.

Empirical Study

Strengths

A key strength of the empirical study was its access to a large, representative sample of UK adolescents aged 14-16 years, through utilising secondary data from the Wellcome Trust

Neuroscience in Psychiatry Network (NSPN) (Kiddle et al., 2018). The research team therefore had access to rich data, which was likely unattainable through primary data collection. This was a significant strength of the empirical study, as access to such data provided sufficient statistical power to test hypothesised effects. To date, there has been limited research investigating the longitudinal relationship between parental overcontrol and adolescent social anxiety within this specific age group. The empirical study therefore examines a period of adolescence that is underrepresented within the literature. A further strength is the use of longitudinal data to examine the relationship over time. This addresses an important research gap, as much of the research to date has been cross-sectional. The examination of the bidirectionality of effects is also a notable strength. Research to date has typically focused on parent-child effects and assumed a unidirectional relationship, with few studies designed to capture this proposed bi-directional relationship (Gouze et al., 2017). The design of the empirical study therefore makes a significant contribution to the parenting literature.

Limitations

Although the strengths outlined highlight the study's importance in advancing both theoretical understanding and clinical applications in adolescent mental health, the empirical study has several limitations. Due to the use of secondary data from the NSPN initiative, the research team had no control over the selection of measures, or who completed them. While the Excessive Social Anxiety (ESA) subscale from the Schizotypal Personality Questionnaire (SPQ) demonstrates content validity and has been shown to correlate with other established measures of social anxiety (Cicero et al., 2015), its sensitivity and specificity for measuring social anxiety in adolescents has not been thoroughly examined. Moreover, parental overcontrol reflected adolescents subjective experience, rather than actual parenting behaviour. This limits our ability to generalise our findings to objective parenting behaviours, as we cannot be certain whether perceptions are influenced by negative cognitive biases (Clark & Wells, 1995; Creswell & O'Connor, 2011; Spence & Rapee, 2016; Wong &

Rapee, 2015, 2016). Perception of parental overcontrol may be equally as important (Fu et al., 2024), however further multi-informant research is necessary.

Notably, the empirical study did not use a cross-lagged panel model (CLPM) to examine the dynamic, reciprocal nature of the associations between parental overcontrol and adolescent social anxiety. Incorporating this model would have provided a more robust understanding of the relationship between these variables, through its ability to distinguish between stable traits and dynamic changes over time (Hamaker et al., 2015). This would have been consistent with the existing bi-directional literature examining the relationship between parental overcontrol and adolescent social anxiety (Gao et al., 2022; Loukas, 2009; Nelemans et al., 2020; Zhou et al., 2024). While the analysis plan was to conduct an exploratory analysis of bi-directional associations using a CLPM, due to limited time and resource constraints, this was not actioned. This therefore limited our ability to fully explore the nature of the associations.

Finally, we cannot infer causation from observational data. This is an important limitation of the study. While longitudinal observations allow us to explore associations over time, and overcome the limitations of cross-sectional designs, they do not imply causality. Therefore, further longitudinal and experimental studies are necessary.

Implications

Theoretical Implications

The work contained within this thesis portfolio contributes to our understanding of the complex relationship between parenting behaviours and the development of anxiety in children and adolescents.

The systematic review findings align with Bandura's (1986) Social Learning Theory, whereby children learn through the observation and imitation of others. Review findings demonstrate the significant influence of parenting behaviours on children's anxiety, with modelling, social referencing,

and verbal information demonstrating consistent effects from infancy to early adolescence. Protective effects were observed following exposure to positive modelling, encouragement, and verbal information. While other behaviours, such as the modelling of negative expressions, anxious behaviours, and verbal threat information were found to exacerbate anxiety. These findings demonstrate the influence of specific learning experiences, as outlined by Bandura (1986), in the development of child anxiety.

Review findings also align with Rachman's (1977) three pathways model, which proposed three main pathways by which parents might promote anxiety in their children: through direct conditioning, whereby children directly experience aversive events; observational or vicarious learning, in which children learn through observing others; and the transmission of verbal information, where children receive fear-relevant information (Field, 2006; Negreiros & Miller, 2014; Rapee et al., 2009). Findings indicated that direct and indirect parenting behaviours influenced child anxiety via all three of the proposed pathways. Thus, demonstrating how parenting behaviours might influence and maintain child anxiety.

Furthermore, findings from the empirical study highlight the complexity of the relationship between parental overcontrol and adolescent social anxiety. Findings contrast with theoretical models, such as the transactional model of socialisation (Sameroff & Mackenzie, 2003), which proposes a bi-directional relationship between parents and their children. The absence of bi-directional associations in the empirical study challenges the assumptions of this model, and contrasts with previous research findings such as those of Zhou et al. (2024), who that found parental overcontrol and adolescent social anxiety mutually and positively predicted each other over time, in a sample of early adolescents (mean age: 10:91). Age of the adolescent may therefore be an important factor in the strength and nature of this relationship. As young people develop greater social independence and a stable self of self, parenting behaviours such as overcontrol, may have an attenuated influence over time. These findings emphasise the need for theoretical models to

consider how multiple changes and transitions across adolescence, may influence the relationship between parental overcontrol and adolescent social anxiety. Due to the limited bi-directional research and mixed findings, further research is necessary.

Clinical Implications

Both the systematic review and empirical study findings have important clinical implications for the treatment of both child anxiety and adolescent social anxiety.

Findings from the systematic review largely support the idea of involving parents in child anxiety interventions. Parenting behaviours significantly influenced child anxiety outcomes, with consistent effects observed from infancy to early adolescence for modelling, social referencing signals, and transmission of verbal information. The observation of protective effects for positive and encouraging parent behaviours, indicates that the encouragement of adaptive emotional responding from parents may be influential in the prevention and treatment of anxiety in younger children, spanning infancy to early adolescence.

However, the role of parental involvement in the treatment of adolescent social anxiety is not evidenced in the empirical study. Although social anxiety and perceived parental overcontrol were correlated to each other prospectively, they did not predict each other after controlling for various confounders. This suggests that the influence of parental overcontrol, may be less influential in older adolescents. Therefore, it might not be effective or useful to incorporate parents into social anxiety interventions within this age group. Instead, it may be more efficient to target intrapersonal maintenance factors of social anxiety disorder (SAD), such as negative social cognitions, safety behaviours, self-focused attention, and post-event processing, using evidence-based interventions such as Cognitive Therapy (Chiu et al., 2021; Ingul, Atune, Nordahhl, 2013; Leigh & Clark, 2016; Melfsen et al., 2011).

Moreover, while findings suggest that parental involvement could be useful in the treatment of younger children who experience general anxiety symptoms, there is currently little evidence to

suggest the utility of including parents in SAD treatment in older adolescents. Instead, findings of the empirical study indicate that treatment should focus on intrapersonal maintenance factors, rather than interpersonal.

Research Implications

Considering the limited experimental literature examining the causal relationship between parenting behaviours and child anxiety, more experimental studies are needed to further establish causal effects. To date, few studies have considered the cognitive, physiological, and behavioural aspects of anxiety (Aktar et al., 2022; Lang, 2004). Future research should adopt a multi-measure approach so that the intensity and overlap of separate anxiety indices can be assessed (Aktar et al., 2022). This would allow a more comprehensive understanding of the relationship. Furthermore, a meta-analysis could help determine which parenting behaviours have more consistent or robust effects. This could have important clinical implications in the development of effective, evidence-based treatments.

Given the null findings of the empirical study, there is a need for future research to employ robust methodologies to examine the prospective association between parental overcontrol and social anxiety over time, across developmental periods. The strength and the nature of the association, if any, may vary according to the age of the child. Advanced statistical methods such as cross-lagged panel models would provide a more robust understanding of the proposed bi-directional relationship, through its ability to distinguish between stable traits and dynamic changes over time (Hamaker et al., 2015). Bi-directional research examining the relationship between parental overcontrol and social anxiety in children and young people is currently lacking. Further research would provide a comprehensive understanding of the relationship and would contribute to the development of more targeted and developmentally appropriate interventions. In addition, future research should adopt a multi-informant approach, capturing both child and parent reports of

parenting behaviour. This would enhance the validity and generalisability of the findings. In addition, experimental research could further our understanding through the examination of causal effects.

Reflections on the Research Process

Conducting and synthesising the research within this thesis portfolio has been a challenging but rewarding process. Delving into academic research and collaborating with researchers at the forefront of their field has not only deepened my understanding of the research process but has also instilled a greater respect and appreciation of the rigour and complexity of the work carried out. As an individual that thrives off certainty and the desire to get things "right", the process of developing the skills and knowledge required for conducting high quality research, meant also nurturing my patience. Particularly when learning new statistical software, such as R Studio, and how to conduct a rigorous systematic review. As I progressed through the research process, I came to learn that uncertainty in the field of research is something to lean into, as it drives curiosity, critical thinking, and adaptability. This is something I hope to carry forward in my professional career, as a newly qualified clinical psychologist.

Conclusion

In conclusion, the findings within this thesis portfolio examined the complex relationship between parenting behaviours and child anxiety and addressed two important gaps in the parenting and child anxiety literature.

The systematic review is the first review to systematically identify studies that examined the experimental effects of parenting behaviours on child anxiety and demonstrates the relationship between parenting behaviours and child anxiety. Findings from the review indicated that modelling, social referencing, and the transmission of verbal information, impact children's anxiety across development, with some behaviours (e.g., modelling; verbal information) showing effects that persist beyond exposure. Together, these findings demonstrate the role of parenting behaviours in the

development of child anxiety and highlight the potential for interventions that modify specific parenting behaviours.

The empirical study's findings did not support a bi-directional relationship between perceived parental overcontrol and adolescent social anxiety, which contrasts with the transactional model of socialisation (Sameroff & MacKenzie, 2003). There is a need for future research to employ robust methodologies and multi-informant approaches to better understand these complex relationships across development and to inform targeted, age-appropriate interventions.

References

Aktar, E., Nimphy, C. A., van Bockstaele, B., & Pérez-Edgar, K. (2022). The social learning of threat and safety in the family: Parent-to-child transmission of social fears via verbal information. *Developmental psychobiology*, *64*(3), e22257. https://doi.org/10.1002/dev.22257

Bandura, A., & National Inst of Mental Health. (1986). *Social foundations of thought and action: A social cognitive theory.* Prentice-Hall, Inc.

Chiu, K., Clark, D. M., & Leigh, E. (2021). Cognitive predictors of adolescent social anxiety. *Behaviour Research and Therapy*, *137*, 103801. https://doi.org/10.1016/j.brat.2020.103801

Cicero, D. C., Krieg, A., Becker, T. M., & Kerns, J. G. (2016). Evidence for the discriminant validity of the Revised Social Anhedonia Scale from social anxiety. *Assessment*, *23*(5), 544-556. https://doi.org/10.1177/1073191115590851

Clark, D. M., & Wells, A. (1995). A cognitive model of social phobia. In R. Heimberg, M. Liebowitz, D. A. Hope, & F. R. Schneier (Eds.), Social phobia: Diagnosis, assessment and treatment (pp. 69–93). New York, NY: Guilford.

Creswell, C., & O'Connor, T. G. (2011). Interpretation bias and anxiety in childhood: Stability, specificity and longitudinal associations. *Behavioural and Cognitive Psychotherapy*, 39, 191–204. https://doi.org/10.1017/S1352465810000494

Field A. P. (2006). Is conditioning a useful framework for understanding the development and treatment of phobias?. *Clinical psychology review*, *26*(7), 857–875. https://doi.org/10.1016/j.cpr.2005.05.010

Fu, W., Zhang, W., Dong, Y., & Chen, G. (2024). Parental control and adolescent social anxiety: A focus on emotional regulation strategies and socioeconomic influences in China. *British Journal of Developmental Psychology*. https://doi.org/10.1111/bjdp.12525

Gao, D., Liu, J., Xu, L., Mesman, J., & van Geel, M. (2022). Early adolescent social anxiety: differential associations for fathers' and mothers' psychologically controlling and autonomy-supportive parenting. *Journal of Youth and Adolescence*, 51, 1858–1871. https://doi.org/10.1007/s10964-022-01636-y

Gouze KR, Hopkins J, Bryant FB, Lavigne JV (2017) Parenting and anxiety: bi-directional relations in young children. *J Abnorm Child Psychol* 45:1169–1180. https://doi.org/10.1007/s10802-016-0223-z

Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. P. P. (2015). A critique of the cross-lagged panel model. Psychological Methods, 20, 102–116. https://doi.org/10.1037/a0038889

Ingul, J. M., Aune, T., & Nordahl, H. M. (2013). A randomized controlled trial of individual cognitive therapy, group cognitive behaviour therapy and attentional placebo for adolescent social phobia. *Psychotherapy and Psychosomatics, 83*(1), 54–61. https://doi.org/10.1159/000354672

Kiddle, B., Inkster, B., Prabhu, G., Moutoussis, M., Whitaker, K. J., Bullmore, E. T., Dolan, R. J., Fonagy, P., Goodyer, I. M., & Jones, P. B. (2018). Cohort Profile: The NSPN 2400 Cohort: a developmental sample supporting the Wellcome Trust NeuroScience in Psychiatry Network. *International journal of epidemiology*, *47*(1), 18–19g. https://doi.org/10.1093/ije/dyx117

Lang, P. J. (2004). Fear reduction and fear behavior: Problems in treating a construct. In *Research in psychotherapy conference, 3rd, May-Jun, 1966, Chicago, IL, US*. American Psychological Association. https://doi.org/10.1037/10546-004

Leigh, E., & Clark, D. M. (2016). Cognitive therapy for social anxiety disorder in adolescents: A development case series. *Behavioural and Cognitive Psychotherapy, 44* (1), 1–17. https://doi.org/10.1017/S1352465815000715

Loukas, A. (2009). Examining temporal associations between perceived maternal psychological control and early adolescent internalizing problems. *Journal of abnormal child psychology*, *37*, 1113-1122. https://doi.org/10.1007/s10802-009-9335-z

Melfsen, S., Kühnemund, M., Schwieger, J., Warnke, A., Stadler, C., Poustka, F., et al. (2011). Cognitive behavioral therapy of socially phobic children focusing on cognition: A randomised wait-list control study. *Child and Adolescent Psychiatry and Mental Health, 5*(1), 5. https://doi.org/10.1186/1753-2000-5-5

Negreiros, J., & Miller, L. D. (2014). The role of parenting in childhood anxiety: Etiological factors and treatment implications. *Clinical Psychology: Science and Practice*, *21*(1), 3.

Nelemans, S. A., Keijsers, L., Colpin, H., van Leeuwen, K., Bijttebier, P., Verschueren, K., & Goossens, L. (2020). Transactional links between social anxiety symptoms and parenting across adolescence: Between-and within-person associations. *Child Development*, 91(3), 814–828. https://doi.org/10.1111/cdev.13236

Pieper, D., & Rombey, T. (2022). Where to prospectively register a systematic review. *Systematic reviews*, *11*(1), 8. https://doi.org/10.1186/s13643-021-01877-1

Rachman, S. (1977). The conditioning theory of fear-acquisition: A critical examination. *Behaviour Research and Therapy, 15*(5), 375–387. https://doi.org/10.1016/0005-7967(77)90041-9

Rapee, R. M., Schniering, C. A., & Hudson, J. L. (2009). Anxiety disorders during childhood and adolescence: origins and treatment. *Annual review of clinical psychology*, *5*, 311–341. https://doi.org/10.1146/annurev.clinpsy.032408.153628

Sameroff, A. J., & MacKenzie, M. J. (2003). Research strategies for capturing transactional models of development: the limits of the possible. *Development and Psychopathology*, 15, 613–640. https://doi.org/10.1017/S0954579403000312

Spence, S. H., & Rapee, R. M. (2016). The etiology of social anxiety disorder: An evidence-based model. *Behaviour Research and Therapy*, 86, 50–67. https://doi.org/10.1016/j.brat.2016.06.007

Tsai, J. L., Levenson, R. W., & McCoy, K. (2006). Cultural and temperamental variation in emotional response. *Emotion, 6*(3), 484–497. https://doi.org/10.1037/1528-3542.6.3.484

Wong, Q. J. J., & Rapee, R. M. (2015). The developmental psychopathology of social anxiety and phobia in adolescents. In K. Ranta, A. M. La Greca, L. J. Garcia- Lopez, & M. Marttunen (Eds.), Social anxiety and phobia in adolescents: Development, manifestation and intervention strategies (pp. 11–37). New York, NY: Springer. https://doi.org/10.1007/978-3-319-16703-9_2

Wong, Q. J., & Rapee, R. M. (2016). The aetiology and maintenance of social anxiety disorder: A synthesis of complementary theoretical models and formulation of a new integrated model. Journal of Affective Disorders, 203, 84–100. https://doi.org/10.1016/j.jad.2016.05.069

Zhou, J., Zou, F., & Gong, X. (2024). The Reciprocal Relations between Parental Psychological Control and Social Anxiety and the Mediating Role of Self-Concept Clarity Among Chinese Early Adolescents. *Journal of Youth and Adolescence*, 1-15. https://doi.org/10.1007/s10964-024-02015-5

APPENDIX A

Author Guidelines for Behaviour Research and Therapy

About the journal

Aims and scope

An International Multi-Disciplinary JournalThe major focus of *Behaviour Research and Therapy* is an experimental psychopathology approach to understanding emotional and behavioral disorders and their prevention and treatment, using cognitive, behavioral, and psychophysiological (including neural) methods and models. This includes laboratory-based experimental studies with healthy, at risk and subclinical individuals that inform clinical application as well as studies with clinically severe samples. The following types of submissions are encouraged: theoretical reviews of mechanisms that contribute to psychopathology and that offer new treatment targets; tests of novel, mechanistically focused psychological interventions, especially ones that include theory-driven or experimentally-derived predictors, moderators and mediators; and innovations in dissemination and implementation of evidence-based practices into clinical practice in psychology and associated fields, especially those that target underlying mechanisms or focus on novel approaches to treatment delivery. In addition to traditional psychological disorders, the scope of the journal includes behavioural medicine (e.g., chronic pain). The journal will consider manuscripts dealing primarily with measurement and psychometric analyses if relevant to the primary focus of the journal (e.g., transdiagnostic mechanisms).

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newborn. In reality, sex categorizations include people who are intersex/have differences of sex development (DSD).

- Gender generally refers to socially constructed roles, behaviors and identities of women, men and gender-diverse people that occur in a historical and cultural context and may vary across societies and over time. Gender influences how people view themselves and each other, how they behave and interact and how power is distributed in society.

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Manuscripts must also include a statement that the privacy rights of human subjects have been observed and that informed consent was obtained for experimentation with human subjects.

This journal will not accept manuscripts that contain data derived from unethically sourced organs or tissue, including from executed prisoners or prisoners of conscience, consistent with recommendations by Global Rights Compliance on Mitigating Human Rights Risks in Transplantation Medicine. For all studies that use human organs or tissues, sufficient evidence must be provided that these were procured in line with WHO Guiding Principles on Human Cell, Tissue and Organ Transplantation. For clinical studies, a statement of informed consent having been obtained from a patient or their nominated representative, paired with ethical approval for the study from a suitable institution, as required by the policies of the journal, may be considered sufficient evidence, but the journal reserves the right to request additional evidence in cases where it feels this is not sufficient. The source of the organs or tissues used in clinical research must be transparent and traceable. If your manuscript describes organ transplantation you must additionally declare within the manuscript that:

- autonomous consent free from coercion was obtained from the donor(s) or their next of kin.
- organs and/or tissues were not sourced from executed prisoners or prisoners of conscience.

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All animal experiments should comply with ARRIVE (Animal Research: Reporting of In Vivo Experiments) guidelines.

Studies should be carried out in accordance with Guidance on the operation of the Animals (Scientific Procedures) Act 1986 and associated guidelines, EU Directive 2010/63 for the protection of animals used for scientific purposes or the NIH (National Research Council) Guide for the Care and Use of Laboratory Animals (PDF) or those of an equivalent internationally recognized body.

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We encourage you to view example graphical abstracts and read about the benefits of including them.

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The reference list should be arranged alphabetically and then chronologically. More than one reference from the same author(s) in the same year must be identified by the letters 'a', 'b', 'c', etc., placed after the year of publication.

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Van der Geer, J., Handgraaf, T., & Lupton, R. A. (2022). The art of writing a scientific article. *Heliyon, 19,* Article e00205. https://doi.org/10.1016/j.heliyon.2022.e00205.

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Reference to a dataset:

Oguro, M., Imahiro, S., Saito, S., & Nakashizuka, T. (2015). *Mortality data for Japanese oak wilt disease and surrounding forest compositions [dataset]*. Mendeley Data, v1. https://doi.org/10.17632/xwj98nb39r.1.

Reference to a conference paper or poster presentation:

Engle, E.K., Cash, T.F., & Jarry, J.L. (2019, November). The Body Image Behaviours Inventory-3: Development and validation of the Body Image Compulsive Actions and Body Image Avoidance Scales. Poster session presentation at the meeting of the Association for Behavioural and Cognitive Therapies, New York, NY.

Reference to software:

Coon, E., Berndt, M., Jan, A., Svyatsky, D., Atchley, A., Kikinzon, E., Harp, D., Manzini, G., Shelef, E., Lipnikov, K., Garimella, R., Xu, C., Moulton, D., Karra, S., Painter, S., Jafarov, E., & Molins, S.

(2020). *Advanced Terrestrial Simulator (ATS) (Version 0.88) [Computer software].* Zenodo. https://doi.org/10.5281/zenodo.3727209.

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- When will my article be published?

APPENDIX B

PRISMA Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	12
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	14
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	16
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	17
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	16
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	116
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	17
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	17
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	17
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	18
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	17-18

Section and Topic	Item #	Checklist item	Location where item is reported
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	18
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	18
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	18
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	19
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	41
Study characteristics	17	Cite each included study and present its characteristics.	19; 42
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	18; 48
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	20-26
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	20-26
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis	

Section and Topic	Item #	Checklist item	Location where item is reported
		assessed.	
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	26-30
	23b	Discuss any limitations of the evidence included in the review.	28-29
	23c	Discuss any limitations of the review processes used.	29
	23d	Discuss implications of the results for practice, policy, and future research.	29-30
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	16
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	
Competing interests	26	Declare any competing interests of review authors.	
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	

APPENDIX C

Electronic Search Strategy

Search Terms:

Child* OR adol* OR youth OR teenage*

AND

Mother OR maternal OR father OR paternal OR parent*

AND

Experiment* OR experiment* design OR experiment* research

AND

Parent* rearing OR parent* style OR parent* behav*

AND

Anxi* OR fear* OR phobi* OR panic OR worr* OR inhibit* OR avoid* OR shy*

Search Strategy (PsycInfo & MEDLINE):

Limiters: English language, peer reviewed.

S1. Child* (any field)

S2. Adol* (any field)

S3. Youth (any field)

S4. Teenage* (any field)

S5. Mother (any field)

S6. Maternal (any field)

S7. Father (any field)

S8. Paternal (any field)

S9. Parent* (any field)

S10. Experiment* (any field)

S11. Experiment* design (any field)

S12. Experiment* research (any field)

S13. Parent* rearing (any field)

S14. Parent* style (any field)

S15. Parent* behav* (any field)

S16. Anxi* (any field)

S17. Fear* (any field)

S18. Phobi* (any field)

S19. Panic (any field)

S20. Worr* (any field)

S21. Inhibit* (any field)

S22. Avoid* (any field)

S23. Shy* (any field)

S24. S1 OR S2 OR S3 OR S4

S25. S5 OR S6 OR S7 OR S8 OR S9

S26. S24 AND S25

S27. S10 OR S11 OR S12

S28. S13 OR S14 OR S15

S29. S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23

S30. S26 AND S27 AND S28 AND S29

Search Strategy for Web of Science:

Limiters: English language, peer reviewed.

S1. Child* (all)

S2. Adol* (all)

S3. Youth (all)

S4. Teenage* (all)

S5. Mother (all)

S6. Maternal (all)

S7. Father (all)

S8. Paternal (all)

S9. Parent* (all)

S10. Experiment* (all)

S11. Experiment* design (all)

S12. Experiment* research (all)

S13. Parent* rearing (all)

S14. Parent* style (all)

S15. Parent* behav* (all)

S16. Anxi* (all)

S17. Fear* (all)

S18. Phobi* (all)

S19. Panic (all)

S20. Worr* (all)

S21. Inhibit* (all)

S22. Avoid* (all)

S23. Shy* (all)

S24. S1 OR S2 OR S3 OR S4

S25. S5 OR S6 OR S7 OR S8 OR S9

S26. S24 AND S25

S27. S10 OR S11 OR S12

S28. S13 OR S14 OR S15

S29. S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23

S30. S26 AND S27 AND S28 AND S29

APPENDIX D

Systematic Review Paper Supplementary Table 1

Table S1.

Summary of Manipulation Exposure and Duration

Study	Exposure to Parenting Behaviour	Exposure Duration
Gerull & Rapee, 2002	Children were presented with two fear-eliciting toys (a rubber snake and spider) paired with different maternal emotional expressions (positive or negative).	1-min per condition
de Rosnay et al., 2006	Two strangers, interacted with the mother and infant in two episodes: (1) the stranger conversed with the mother (socially anxious vs non-anxious), and (2) the stranger engaged the infant.	Episode 1: 90 secs Episode 2: 60 secs
Egliston & Rapee, 2007	Infants engaged in free play or were exposed to fear-relevant stimuli (a toy spider and toy snake), in one of three conditions (positive modelling; stimulus-only; control).	60 secs
Dubi et al., 2008	Toddlers were exposed to both fear-relevant (toy snake, spider) and fear-irrelevant (toy flower, mushroom) stimuli, paired with different maternal emotional expressions (positive vs negative).	30 secs per stimulus
Grady & Karraker, 2014	Shy toddler–mother dyads were paired with two non-shy dyads for a 25-minute play session. During manipulation periods, mothers of shy children were prompted to make warm or encouraging statements.	5 mins per condition

Grady, 2019	Parents provided specific encouragement behaviours according to experimental condition during four Lab-TAB episodes designed to elicit social fear: moderate-threat context (interactions with a stranger), low-threat context (puppet, clown).	4 mins per episode
Thirwall & Creswell, 2010	Mothers engaged in controlling and autonomy-granting behaviours, during the preparation of two speech tasks, where children had to talk about 'people in my family' and 'a fun day out'.	10-mins per condition
Aktar et al., 2022	Parents provided verbal information about two strangers ("judges") (threatening/safe). Following manipulation, children completed: social interaction tasks with both strangers, and a Visual Search Task, in which the strangers' pictures appeared as stimuli.	NR
Creswell, O'Connor, Brewin, 2008	Parents were instructed to explain a difficult anagram task to their child to help in any way deemed appropriate. Instructions provided varied according to assigned condition, to examine the impact of the instruction on parent's level of involvement.	10 mins
Burnstein & Ginsberg, 2010	Parents were trained to model anxious and non-anxious behaviours during preparation for two spelling tests.	2 mins per condition
Remmerswaal et al., 2010	Mothers received threat or positive information about the animal and described four open-ended vignettes to their children.	NR
Bögels et al., 2011	Children were presented with 12 short stories involving ambiguous social situations, in which the child's mother or father reacted in an anxious or confident manner.	NR
Mitchell et al., 2013	Mothers were instructed to implement perfectionistic rearing behaviours or non-perfectionistic rearing behaviours during a Figure Copy Task.	1-min
Remmerswaal, Muris, Huijing, 2013	Mothers were shown a wooden box that contained a novel animal. They received positive or negative information about the animals and were instructed to prepare their child for a behavioural approach task (Touch Box Task) in any way they liked.	2-mins

De Wilde & Rapee, 2008	Children were told to develop a story and had 5 minutes to prepare. Parents were instructed to assert high or low control during the preparation of the task, according to allocated condition.	5-mins
Muris et al., 2010	Parents were shown a picture and presented with positive, negative, or ambiguous information about a novel animal. They were then instructed to describe four confrontational vignettes to their children about the animal.	NR
Möller et al., 2013	Children were presented with 8 scripts, where their mother or father reacted anxiously or confidently. In Experiment 1: included non-social situations; Experiment 2: included social.	45-min classroom activity
Bunaciu et al., 2014	Parents and adolescents completed a Voluntary Hyperventilation (VH) task. One group of parents discontinued the VH after 15 seconds (escape modelling), while the other completed a 3-minute VH (no-escape modelling). After observing their parent, adolescents then completed the VH. < 3 mins.	< 3-mins
Remmerswaal, Muris, Huijing, 2016	Mothers instructed children to ask for corresponding positive or negative information during an Information Search Task, based on allocated condition.	NR
Nimphy et al., 2024	Parents provided verbal information about two strangers (kind/liked, unkind/disliked) during the preparation phase for a series of social tasks and a Visual Search Task.	10-mins

Notes. NR = Not Reported; Lab-TAB = Laboratory Temperament Assessment Battery.

Appendix E

Systematic Review Paper Supplementary Table 2

Table S1.

Summary of Parenting Behaviour, Conditions, and Key Findings

Study, Location	Age Group	Parenting Behaviour & Conditions	Relevant Findings	
			Child State Anxiety Outcomes (*p*-values)	**Effect Sizes**
Gerull & Rapee, 2002	Infancy - Toddlerhood	Modelling: Positive Expression vs Negative Expression	A significant main effect of maternal facial expression was found, with toddlers' exhibiting greater fear and avoidance following negative maternal expressions compared to positive expressions (*p's <.001)*. Fear responses to negative expressions remained stable over time (modelling trial, 1-minute delay, 10-minute delay) (p <.001).	NR
de Rosnay et al., 2006	Infancy - Toddlerhood	Social Referencing Signals: Socially Anxious vs Non-Anxious	Infants were significantly more fearful in the socially anxious condition than in the non-anxious condition (p < 0.05).	d = .58 (medium)

Egliston & Rapee, 2007	Infancy -Toddlerhood	Parental Modelling: Positive Modelling vs Stimulus-Only vs Control	A main effect of group (p = .002). Group x trial interaction effect (p < .001. At post-test, toddlers in the positive modelling group displayed less distress than those in the control (p < .001), and stimulus-only groups (p = .005), and these differences persisted at a 20-minute follow-up (p = .002, p .005, respectively). For behavioural responses, no significant main effects were found for group (p = .09). Significant group x trial interaction (p = .001). At post-test, toddlers in the positive modelling group exhibited greater approach behaviours than those in the control group (p = .007) and stimulus-only group (p = .015), with these differences persisting at a 20-minute follow-up (p = .001, p = .002, respectively.	Emotional Response: Main Effect: η^2p = .16 (large) Group x Trial Interaction: η^2p = .13 (medium) Post-Test: Positive Modelling vs Control: η^2p = .32 (large) Positive Modelling vs Stimulus-Only: η^2p = .15 (large) Follow-up: Positive Modelling vs Control: η^2p = .18 (large)

	Positive Modelling vs Stimulus-Only: η^2p = .15 (large) Behavioural Response: Group x Trial Interaction: η^2p = .124 (medium) Post-test: Positive Modelling vs. Control: η^2p = .14 (large) Positive Modelling vs. Stimulus-only: η^2p = .12 (medium) Follow-up: Positive Modelling vs. Control: η^2p = .22 (large)

				Positive Modelling vs. Stimulus-Only: η^2p = .17 (large)
Dubi et al., 2008	Infancy - Toddlerhood	Parental Modelling: Positive Expression vs Negative Expression	Significant main effect of maternal emotional expression, with greater fear (p < .01) and avoidance (p < 0.05) shown following negative maternal expressions compared to positive expressions.	NR
Grady & Karraker, 2014	Infancy - Toddlerhood	Parental Verbal Communication: Warm vs Encouraging statements	Significant intervention main effect (p = .01). Shy children showed less reticence after encouragement manipulation compared to baseline; no significant change following warm manipulation.	Intervention Main Effect: η^2p = .15 (large)
Grady, 2019	Infancy - Toddlerhood	Parental Encouragement: Warmth vs Prompt vs Warmth plus Prompt vs Control	Significant main effect of parent encouragement on fear (p < .05) and engagement (p = .04) in the moderate-threat context only (p < .05). Less fear was observed in the warmth condition than control (p = .02), prompt (p = .05), and warmth plus prompt (p = .02). Greater engagement was observed in the warmth condition than control (p = .02), and warmth plus prompt (p = .01).	Fear: moderate-threat: η^2 = .15 (large) Engagement: moderate-threat: η^2 = .16 (large) RSA: low-threat: η^2 = .18 (large)

			A trend in low-threat context ($p < .10$), with warmth plus prompt showing greater RSA suppression than control ($p = .02$).	
Thirwall & Creswell, 2010	Early Childhood	Parental Control: Control vs Autonomy-granting	Children predicted that they would do less well before giving a speech in the controlling condition compared to the autonomy- granting condition ($p = .002$). Children reported feeling more scared after the preparation period in the controlling condition ($p = .004$). Main effect of condition on observed child anxiety approached significance ($p = .09$).	NR
Aktar et al., 2022	Early Childhood	Parental Verbal Information: Threat vs Safety Information	Self-reported fear beliefs significantly differed between threat (M = 3.88, SD = 0.84) and safety (M = 2.23, SD = 1.00) paired strangers ($p < .001$). No significant differences in observed fear ($p = .675$), attention bias ($p = .133$), or heart rate ($p = .530$).	NR
Creswell, O'Connor, Brewin, 2008	Middle Childhood	Parental Expectations: Positive Expectations vs Negative Expectations	Parents given negative expectations of how their child would find the task were rated as significantly more involved generally ($p = .04$) and displayed more involved posture	NR

		Measurement of Parenting Behaviour: Parental Involvement (Low/High)	(p = .05) than parents given positive expectations. Children's self-reported difficulty, worry and distress immediately after the task and observed negative emotions did not differ according to experimental group (no p-value reported).	
Burnstein & Ginsberg, 2010	Middle Childhood	Parental Modelling: Anxious Test Condition vs Non-Anxious Test Condition	Significant main effect for condition where children reported higher levels of anxiety, anxious feelings, anxious cognitions, and desired avoidance, in the anxious relative to the non-anxious condition (p's <.001).	Levels of Anxiety: d = 1.38 (large) Anxious Feelings: d = 1.47 (large) Anxious Cognitions: d = 2.47 (large) Desired Avoidance: d = 0.95 (large)
Remmerswaal et al., 2010	Middle Childhood	Parental Verbal Information: Threat Information vs Positive Information	Significant interaction between group (threat vs. positive) and occasion (pre- vs. post-test) for children's fear beliefs (p < .001). Post hoc tests revealed that scores were comparable at pre-test, but significantly differed after listening to their mothers' narratives (p < .001). Fear belief	Group x Occasion Interaction: η^2p = .58 (large) Post-test differences:

			scores increased in the threat information group (p <.001) and decreased in the positive (p <.001).	η^2p = .66 (large)
Bögels et al., 2011	Middle Childhood	Parental Social Referencing Signal: Anxious vs Confident	A main effect for type of parental behaviour was found (p < .001), in the direction that children responded with more social anxiety when they imagined their parents acting anxiously than confident.	Main Effect: d = 0.60 (medium)
Mitchell et al., 2013	Middle Childhood	Perfectionistic Rearing Behaviours: High Levels of Perfectionistic Rearing vs Non-Perfectionistic Rearing	Significant main effect of time (p < .05). Overall, children were more anxious at the beginning of Figure Copy Task 1 (pre-manipulation) than at the beginning of Figure Copy Task 3 (post-manipulation). No other significant effects were found.	NR
Remmerswaal, Muris, Huijing, 2013)	Middle Childhood	Parental Verbal Information: Positive vs Negative	Latency times revealed a significant main effect of condition, (p <.05). Children in the negative information condition took longer to place their hand in the Touch Box, compared to children in the positive information condition. No significant change in fear levels between groups (negative vs. positive	NR

			information) from pre- to post-test (p = .30).	
De Wilde & Rapee, 2008	Middle Childhood - Early Adolescence	Parental Control: High Involvement vs Low Involvement	Children whose mothers were in the high control condition showed significantly higher levels of situational anxiety than children whose mothers were in the low control condition (p = .03). Follow-up univariate tests on each aspect of situational anxiety separately, showed a significant effect of group on the observational measure of state anxiety (p = .01), but no significant effect of group for self-reported state anxiety (p = .12).	Overall Latent Construct: η^2p = 0.36 (large) Observed Anxiety: η^2p = 0.34 (large)
Muris et al., 2010	Middle Childhood - Early Adolescence	Parental Verbal Information: Negative, Positive, Ambiguous	Significant interaction between groups (negative, positive, ambiguous) and occasions (pre-test vs. post-test) (p < .001). No difference in fear beliefs at pre-test; significant divergence post-test after listening to parents' narratives (p < .001). Children in the negative information group showed an increase in fear beliefs, while those in the positive group showed a decrease (p's < .001). Fear beliefs in the ambiguous group remained unchanged (p = 1.00).	Groups × Occasions Interaction: η^2p = 0.45 (large) Pre-Post-Test Fear Beliefs Divergence: η^2p = 0.52 (large)

Möller et al., 2013	Middle Childhood - Early Adolescence	Parental Social Referencing Signal: Anxious vs Confident	In both experiments, a main effect for type of signal (anxious vs confident) occurred, for Experiment 1 (non-social) and for Experiment 2 (social) (*p's* <.001). Post-hoc t-tests indicated that children responded with more anxiety to scripts in which their parent gave an anxious signal compared to scripts in which their parent gave a confident signal.	Experiment 1: *d* = 0.62 (medium) Experiment 2: *d* = 0.73 (large)
Bunaciu et al., 2014	Middle Childhood - Early Adolescence	Parental Modelling: Escape Modelling vs No-Escape Modelling	Significant differences were observed for task duration (*p* <.001), where adolescents in the escape modelling group discontinued the VH sooner than adolescents in the no-escape modelling group. No significant group differences emerged in terms of delay time before initiating the VH or respiration rate (*p's* >.05).	Escape Response: *r* = .70 (large)
Remmerswaal, Muris, Huijing, 2016	Middle Childhood - Early Adolescence	Parental Verbal Information: Negative Search Strategy vs Positive Search Strategy	A significant condition x occasion interaction (p < .001), indicating that parental training influenced fear beliefs across multiple assessment points.	Condition × Occasion Interaction across IST Conditions: η^2p = .47 (large)
			Immediate effects: children in the negative condition showed increased fear beliefs (*p* < .001), while children in the positive condition decreased fear beliefs (*p* < .001).	Condition × Occasion Interaction: Immediate Effects: η^2p = .32 (large)

			Results also indicated lasting effects on fear beliefs after working independently (p < .001), with increased fear beliefs in the negative condition, and decreased fear beliefs in the positive ($p's$ < .01).	Negative Parental Training: η^2p = .39 (large) Positive Parental Training: η^2p = .24 (large) Condition × Occasion Interaction: Post-Training Effects: η^2p = .13 (medium) Negative Parental Training: η^2p = .14 (large) Positive Parental Training: η^2p = .12 (medium)
Nimphy et al., 2024	Middle Childhood - Early Adolescence	Parental Verbal Information: Threat Information vs Safety information	Adolescents reported significantly higher fear beliefs for the strangers paired with threat than for the strangers paired with the safety message (p < .001). No significant difference in observed fear or	Child Fear Beliefs: η^2 = 0.28 (large)

		avoidant reactions, HR, or attentional bias between conditions (*p's* >.05).

Appendix F

Author Guidelines for JCPP Advances

Author Guidelines

Sections

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- Main body: formatted as introduction, materials and methods, results, discussion, conclusion;
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- Tables (each table complete with title and footnotes);
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	evidences, or can lead to, change.			

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