Cognitive processes associated with Generalized Anxiety Disorder in children and adolescents

Robert Watts

Doctorate in Clinical Psychology

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Abstract

Rationale: Cognitive processes and models that inform psychological treatment for children and adolescents with Generalized Anxiety Disorder (GAD) are based on research with adults. A systematic review of the cognitive processes associated with GAD in children and adolescents was conducted in order to consider the relevance of such processes to the development of GAD in this age group. The empirical study aimed to clarify the influence of a cognitive conceptual model, the intolerance of uncertainty model, on GAD symptoms in children and adolescents, and the moderating influence of gender and age on these relationships.

Method: The literature was systematically searched and additional sources sought for research relating to cognitive processes associated with GAD symptoms in children and adolescents. In the empirical study 326 young people, aged 11–15 years, completed self-report measures relating to GAD symptoms and cognitive variables of the intolerance of uncertainty model.

Results: Sixteen papers met inclusion criteria for the systematic review. Cognitive processes associated with GAD included attention bias, perceptual bias of external threat and familial relationships, perception of internal resources, anxiety sensitivity and maladaptive coping strategies. In the empirical study, intolerance of uncertainty and negative problem orientation were found to be predictive of GAD symptoms; positive beliefs about worry and cognitive avoidance were found to be less important in the prediction of such symptoms. Age and gender did not demonstrate significant moderating effects on key relationships in this model.
Conclusion: A diverse range of cognitive processes were highlighted as relevant to the possible development and maintenance of GAD in children and adolescents. Negatively biased perceptions and tolerance of uncertainty are processes that could be targeted in psychological interventions. From the empirical study, intolerance of uncertainty and negative problem orientation were the components of the intolerance of uncertainty model that appear most applicable to treatment of GAD in 11-15 year olds.
D. Clin. Psychol. Declaration of own work

This sheet must be filled in (each box ticked to show that the condition has been met), signed and dated, and included with all assignments - work will not be marked unless this is done.

Name: Robert Watts

Assessed work: Case Conceptualisation Research proposal
Case Study SSRP Essay Question Paper Thesis
(please circle/delete as applicable)

Title of work: Cognitive processes associated with Generalized Anxiety Disorder in children and adolescents

I confirm that all this work is my own except where indicated, and that I have:

- Read and understood the Plagiarism Rules and Regulations
- Composed and undertaken the work myself
- Clearly referenced/listed all sources as appropriate
- Referenced and put in inverted commas any quoted text of more than three words (from books, web, etc)
- Given the sources of all pictures, data etc. that are not my own
- Not made undue use of essay(s) of any other student(s) either past or present (or where used, this has been referenced appropriately)
- Not sought or used the help of any external professional agencies for the work (or where used, this has been referenced appropriately)
- Not submitted the work for any other degree or professional qualification except as specified
- Acknowledged in appropriate places any help that I have received from others (e.g. fellow students, technicians, statisticians, external sources)
- Complied with other plagiarism criteria specified in the Programme Handbook
- I understand that any false claim for this work will be penalised in accordance with the University regulations
  - (For R2 & Thesis) Received ethical approval from the University of Edinburgh, School of Health
  - OR
  - (For R2 & Thesis) Received ethical approval from an approved external body and registered this application and confirmation of approval with the University of Edinburgh’s School of Health’s ethical committee

Signature

Date 04.08.19
Acknowledgements

I wish to thank the head teachers of the participating schools for allowing me to recruit from them, as well as the teachers who let me use their lesson time for the data collection. I wish to thank the pupils who took part for giving up their time in school to complete a fairly long questionnaire. I wish to thank Nuno Ferreira and Jill Cossar for steering me through the murky waters of the various stages of thesis. I would like to thank Melanie Platten for taking the time to read and give feedback on the thesis. Finally, and most importantly I would like to thank my family for allowing me the opportunity to live and work away from them for the past three years. To my fabulous wife, Sarah, who has kept the home fires burning and the children upright and breathing without any support: an amazing accomplishment. You are totally amazing! To our three children, Henry, Beatrice and Reuben: two of whom have never known me not to be working towards this Doctorate. It’s been a long time coming, but I am very glad to finally say that Daddy’s coming home now.
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Word count: 15,229 (excluding full reference list and appendices)
1. Overview of Thesis

This thesis follows the portfolio format and the following information provides a summary of the main chapters.

Chapter two provides an overall abstract for the thesis that incorporates the systematic review and empirical paper. Chapter three presents a systematic review of the research literature regarding cognitive processes associated with Generalized Anxiety Disorder in children and adolescents. Chapter four presents an empirical paper that investigates the applicability of the intolerance of uncertainty model to Generalized Anxiety Disorder symptoms in young people. Both articles are written for publication in the Journal of Adolescence (see Appendix 1 for author guidelines).

Chapter five provides a full reference list. The appendices section at the end allows readers to access extra information regarding the research process.
2. Thesis Abstract

Rationale: Cognitive processes and models that inform psychological treatment for children and adolescents with Generalized Anxiety Disorder (GAD) are based on research with adults. A systematic review of the cognitive processes associated with GAD in children and adolescents was conducted in order to consider the relevance of such processes to the development of GAD in this age group. The empirical study aimed to clarify the influence of a cognitive conceptual model, the intolerance of uncertainty model, on GAD symptoms in children and adolescents, and the moderating influence of gender and age on these relationships.

Method: The literature was systematically searched and additional sources sought for research relating to cognitive processes associated with GAD symptoms in children and adolescents. In the empirical study 326 young people, aged 11-15 years, completed self-report measures relating to GAD symptoms and cognitive variables of the intolerance of uncertainty model.

Results: Sixteen papers met inclusion criteria for the systematic review. Cognitive processes associated with GAD included attention bias, perceptual bias of external threat and familial relationships, perception of internal resources, anxiety sensitivity and maladaptive coping strategies. In the empirical study, intolerance of uncertainty and negative problem orientation were found to be predictive of GAD symptoms; positive beliefs about worry and cognitive avoidance were found to be less important.
in the prediction of such symptoms. Age and gender did not demonstrate significant moderating effects on key relationships in this model.

**Conclusion:** A diverse range of cognitive processes were highlighted as relevant to the possible development and maintenance of GAD in children and adolescents. Negatively biased perceptions and tolerance of uncertainty are processes that could be targeted in psychological interventions. From the empirical study, intolerance of uncertainty and negative problem orientation were the components of the intolerance of uncertainty model that appear most applicable to treatment of GAD in 11-15 year olds.

Abstract

Cognitive processes and models that could inform psychological treatment for children and adolescents with Generalized Anxiety Disorder (GAD) are based on research with adults. This review was conducted to examine the cognitive processes associated with GAD in children and adolescents in order to consider the relevance of such processes to the development of GAD in this age group. Medline, PsychINFO, Cinahl and Embase were searched up until December 2014; this was complemented by hand-searching the Journal of Adolescence and Journal of Abnormal Child Psychology, searching reference lists of included papers and contacting authors of included papers. Sixteen papers were included in this review. The methodological quality of included papers was found to be adequate. Cognitive processes associated with GAD included attention bias, perceptual bias of external threat and familial relationships, perception of internal resources, intolerance of uncertainty, anxiety sensitivity and maladaptive coping strategies.
Introduction

Anxiety disorders are some of the most common psychological difficulties experienced by children and adolescents (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Rapee, Schniering, & Hudson, 2009). Such disorders impact upon family functioning (Ezpeleta, Keeler, Alaatin, Costello, & Angold, 2001) as well as affecting relationships with peers and school functioning (Essau, Conradt, & Petermann, 2000). Childhood anxiety predicts a range of mental health problems in adolescence (Bittner et al., 2007; Bruckl et al., 2007) and in adulthood (Bittner et al., 2004; Campbell, Brown, & Grisham, 2003), yet research into childhood anxiety lags behind research into anxiety in adults. This is true particularly in relation to specific anxiety disorders, as analysis of anxiety disorders in children are often grouped together due to relatively low numbers of participants. One of the most common anxiety disorders in childhood is Generalized Anxiety Disorder (GAD), with prevalence rates among children and adolescents reported at around 2% (Carr, 2006).

Cognitive-behavioural therapy has demonstrated effectiveness in the treatment of anxiety disorders, such as GAD, in children and adolescents (James, Soler, & Weatherall, 2009); however, its efficacy may be improved through research into the specific cognitive processes that underlie this disorder.

The main symptoms of GAD involve a tendency to worry excessively and uncontrollably about a number of events or activities such that it disrupts the person’s everyday functioning (APA, 2000). Research with adults highlights a number of cognitive correlates of worry which may contribute to the development and maintenance of GAD. These include attentional bias towards threat (Bradley, Mogg, White, Groom, & de Bono, 1999), beliefs of negative outcomes being more
likely (Vasey & Borkovec, 1992), positive beliefs about worry (Dugas, Gagnon, Ladouceur, & Freeston, 1998), low levels of problem-solving confidence (Ladouceur, Blais, Freeston, & Dugas, 1998) and intolerance of uncertainty (Dugas et al., 1998). Factors such as these have contributed to the development of cognitive models of GAD for adults, such as the intolerance of uncertainty model (Dugas et al., 1998) and the metacognitive model (Wells, 1995). These models have been developed and tested with adults, but may not be as relevant to children and adolescents due to cognitive processing differences associated with the different developmental stages of these two age groups.

Childhood onset of GAD symptoms has been shown to be associated with a childhood history of fears, internalizing problems, inhibited or avoidant behaviour, developmental, academic, and social-interactional difficulties (Beesdo, Pine, Lieb, & Wittchen, 2010; Hoehn-Saric, Hazlett, & McLeod, 1993; Moffit et al., 2007). The relative importance of factors associated with GAD in childhood is difficult to determine with certainty from studies such as this because they rely on retrospective self-report in adulthood, which may be unreliable due to difficulties in recalling significant memories from childhood. Studies investigating cognitive processes associated with GAD in children and adolescents are increasing, but tend to focus on single specific processes. It is important that data from such studies are reviewed to give an indication of the range and type of processes that could be considered as influencing anxious presentations in this age group.

This paper aims to systematically review cognitive factors associated with GAD in children and adolescents; this will inform assessment, cognitive-behavioural
interventions and the potential development of age-group specific cognitive models of GAD, for application with this population.

Methods

This systematic review followed guidance laid out in the Centre for Reviews and Dissemination guidance for undertaking systematic reviews in health care (CRD, 2009).

Inclusion and exclusion criteria

Design

Three study designs were included in this review: cohort (longitudinal) studies, cross-sectional studies and experimental studies. Single case or small-N (less than 15) studies were excluded due to the limited generalizability possible from such studies.

Population

Participants of included studies were in the age range of four years to 19 years. Longitudinal studies spanning childhood and adulthood were excluded if the data for four to 19 year olds could not be extracted. Included studies were made up of male and female participants; single sex sample population studies were excluded as gender has been shown to be associated with GAD in adults (Wittchen, Zhao, Kessler, & Eaton, 1994), with females being twice as likely to experience GAD as
males. Studies recruiting sample participants with comorbid conditions (e.g., physical health, substance abuse) and those exposed to environmental trauma (e.g., earthquake, hurricane) were excluded to ensure that results obtained were relevant to the general population.

**Variables measured**

Included studies assessed participants for symptoms relating to generalised anxiety and cognitive processes; for example, attentional and perceptual bias.

**Outcome**

Included studies aimed to find an association between generalized anxiety symptoms and cognitive processes or included data that allowed the calculation of an association between these variables. Studies that only aimed to find associations between generalized anxiety symptoms and physical markers, such as cortisol levels, specific genes or particular patterns of brain activity were excluded.

**Literature search strategies**

The literature search, which was conducted in December 2014, was restricted to studies published in peer-reviewed journals in English. The following electronic databases were searched: Medline, PsychINFO, Cinalhl and Embase. No publication date limits were applied. Due to differences in key terms for individual databases alternative search terms were used as required: Medline, PsychINFO and Embase were searched using the terms (Generalized Anxiety Disorder) AND (Risk Factors OR Associat* OR Correlat* OR Predict* OR Relation*) AND (Child OR...
Adolescent). CINahl was searched using the search terms (Generalized Anxiety Disorder) AND (Child OR Adolescent). Additional sources were identified during December 2014 by hand searching reference lists of included studies. The Journal of Adolescence and the Journal of Abnormal Child Psychology were hand searched for the period December 2008-December 2014. To reduce publication bias the authors of the initially included studies were contacted to enquire if they were aware of any published or unpublished material likely to meet inclusion criteria for this review.

Quality assessment

The methodological strength of included studies was assessed using a checklist of nine items that were developed *a priori*. These items were selected on the basis of providing an assessment of the risk of bias. Each criterion for each study was scored in accordance with the following ratings: well-covered - no risk of bias; adequately addressed - unclear risk of bias; poorly addressed, not addressed or not reported - high risk of bias. See Appendix 2 for detailed description of quality criteria. The quality of nine papers was assessed by an independent rater using these quality criteria. Inter-rater agreement was adequate (kappa = 0.65). Quality criteria that were rated differently by the two raters were discussed and the scores amended by the main researcher as required.

Results

The search strategy yielded 1900 potentially relevant papers (Figure 1). The title of each paper was read, if it appeared likely to meet inclusion criteria the abstract was read to confirm this. This strategy resulted in 84 potentially relevant papers. Once
duplicates between databases were removed, a total of 43 relevant papers remained. These were read in full, following which 27 papers were deemed not to meet inclusion criteria.

Hand-searching references of the remaining 14 papers yielded 68 potentially relevant papers, of which one met the inclusion criteria; one further paper was identified through hand-search of the two specified journals. Correspondence with lead authors of the 16 identified papers yielded responses from seven authors; a total of twenty-one papers were suggested as relevant, however no further papers that met inclusion criteria were identified. A final total of 16 papers were included in the review. The included papers were seven cross-sectional studies, four longitudinal studies and five experimental studies. The majority of the studies were conducted in the USA and the Netherlands.

Figure 1: Flowchart of included studies
Quality of included publications

Table 1 presents an assessment of the quality of individual studies, which gives an indication of the risk of bias. Notably, response/attrition rates were not reported or calculable in eight papers. Diagnosis of GAD was made by reliable and valid semi-structured interview in five papers. Two papers reported that GAD was diagnosed by experienced clinicians (Dalgleish et al., 2003; Taghavi, Dalgleish, Moradi, Neshat-Doost, & Yule, 2003); however, it was not made clear whether structured assessment tools were used. One further paper (Monk et al., 2006) reported GAD was diagnosed by experienced clinicians who had been shown to have good inter-clinician reliability (kappa>0.75) when making diagnoses, but the use of structured assessment tools were not indicated. GAD symptoms were rated via self-report using reliable and valid measures in eight papers. Power was not considered *a priori* in any paper. Overall risk of bias in included studies was deemed to be adequate; overall risk of bias for each criterion is illustrated in Figure 2.
Figure 2: Methodological quality of included studies

The study characteristics and results from each study are summarized in Table 2. In this section the results have been divided into general themes to make them more accessible.

**Attentional and memory bias in relation to GAD symptoms**

Attentional bias towards threat-related words (Dalgleish et al., 2003) and towards angry faces (Roy et al., 2008; Waters, Bradley, & Mogg, 2014) in children displaying GAD symptoms can be contrasted with either no bias or bias away from these stimuli in control or other diagnostic groups on dot probe tasks. However, GAD-diagnosed adolescents have also been found to orientate away from angry faces on the dot probe task in contrast to healthy controls (Monk et al., 2006). Taghavi et al. (2003) found a GAD-diagnosed group took significantly longer to...
respond to threat and depression-related words than the control group in a modified Stroop task, while Dalgleish et al. (2003) found that their GAD-diagnosed group did not significantly differ from that of depressed PTSD and control groups in performance on the modified Stroop task. Dalgleish et al. found their GAD-diagnosed group did not demonstrate a memory bias for negative words in relation to controls.

Perception of external threat in relation to GAD symptoms

Cannon and Weems (2010) reported anxiety-disordered children and adolescents who scored significantly higher than controls on the GAD subscale of an anxiety measure, also scored significantly higher than the control group on a measure of negative cognitive errors, which indicated greater interpretative bias towards a negative outcome of a hypothetical situation. Read, Kendall and Comer (2013) showed that intolerance of uncertainty scores were associated with principal anxiety diagnosis, with children diagnosed with GAD reporting higher intolerance of uncertainty scores than children diagnosed with separation anxiety disorder/social phobia. Adolescent self-reported GAD symptoms were cross-sectionally and longitudinally associated with perceived maternal criticism (Nelemans, Hale III, Branje, Hawk, & Meeus, 2014), with adolescent GAD symptoms predicting higher levels of adolescent perceived criticism in the subsequent year. Adolescent perceived criticism subsequently predicted higher levels of maternal criticism in the following year. Similarly, Wijsbroek, Hale III, Raaijmakers and Meeus (2011) reported a unidirectional pattern of adolescent GAD symptoms predicting perceived parental psychological control in subsequent years and van Eijk, Branje, Hale III and Meeus
Table 1: Assessment of the methodological quality of individual studies

<table>
<thead>
<tr>
<th>Papers</th>
<th>Aim</th>
<th>Inclusion/exclusion</th>
<th>Representative</th>
<th>Response/attrition rate</th>
<th>GAD measure</th>
<th>Cognitive factor measure</th>
<th>Power</th>
<th>Statistical analysis</th>
<th>Generalizability</th>
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<tbody>
<tr>
<td>Cannon &amp; Weems (2010)</td>
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<td>Legerstee et al. (2011)</td>
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<td>McLaughlin et al. (2007)</td>
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++ = low risk of bias – unclear risk of bias - high risk of bias
<table>
<thead>
<tr>
<th>Study, Country</th>
<th>Design</th>
<th>Title/Research Q</th>
<th>Age range (years)</th>
<th>Gender (% female)</th>
<th>Sample</th>
<th>N</th>
<th>GAD measure</th>
<th>Cognitive process measure</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannon &amp; Weems (2010), USA</td>
<td>Cross-sectional</td>
<td>Cognitive biases in childhood anxiety disorders</td>
<td>7-17</td>
<td>54</td>
<td>Clinical: mental health clinics and schools; Control: from a previous study.</td>
<td>72 (Anxious=24; Control=48)</td>
<td>Anxiety Disorders Interview Schedule for DSM-IV (ADIS); Child and Parent versions; Revised Child Anxiety and Depression Scale (RCADS)</td>
<td>Children's Negative Cognitive Error Questionnaire (CNCEQ); Anxiety Control Questionnaire-Child (ACQ-C)</td>
<td>Anxiety-disordered group (scoring higher than controls on RCADS-GAD subscale) scored higher on CNCEQ than controls ((t_{38}) = 2.62, p &lt; 0.05). Anxiety-disordered group scored lower than controls on ACQ-C ((t_{38}) = -3.80, p &lt; 0.001)</td>
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<tr>
<td>Dalgleish et al (2003), UK</td>
<td>Experimental</td>
<td>Patterns of processing bias for emotional information across clinical disorders</td>
<td>7-18</td>
<td>53</td>
<td>Clinical: inpatient and outpatient departments; Control: local schools.</td>
<td>90 (GAD=24; Depressed=19; PTSD=24; Control=23)</td>
<td>Clinical interview by Mental Health Team; Revised Children's Manifest Anxiety Scale (RCMAS)</td>
<td>Attentional dot probe task (words); Modified Stroop task, memory task.</td>
<td>Dot probe GAD group absolute attentional bias for threat ((t_{38}) = 2.19, p &lt; 0.05). No significant effects in Stroop or memory tasks.</td>
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<tr>
<td>Fraia et al (2010), USA</td>
<td>Cross-sectional</td>
<td>Relations among perceived control over anxiety-related events, worry and GAD</td>
<td>10-17</td>
<td>43</td>
<td>Recruited from general community</td>
<td>140 (GAD=17)</td>
<td>ADIS-Child Version; RCADS</td>
<td>ACQ - Child Short Form</td>
<td>Perceived control over anxiety-related events significantly lower in GAD-diagnosed group ((F_{1,19}) = 24.10, p &lt; 0.001)</td>
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<tr>
<td>Lee et al (2013), Canada</td>
<td>Cross-sectional</td>
<td>Effects of age and subtype on emotional regulation in children with anxiety disorders</td>
<td>6-11</td>
<td>53</td>
<td>Clinical: outpatient anxiety clinic, Control community</td>
<td>122 (GAD=48; Other anxiety disorders=15; Control=59)</td>
<td>ADIS</td>
<td>Mood Assessment via animated characters</td>
<td>GAD group comparable with control group in terms of ability to recognize specific types of emotion.</td>
</tr>
<tr>
<td>Legerstee et al (2011), Netherlands</td>
<td>Cross-sectional</td>
<td>Cognitive coping in anxiety-disordered adolescents</td>
<td>12-16</td>
<td>52</td>
<td>Clinical: outpatient Psychiatry; Control: local schools</td>
<td>529 (Anxious=179; of whom GAD=87; Control=370)</td>
<td>ADIS</td>
<td>Cognitive Emotion Regulation Questionnaire</td>
<td>GAD group scored significantly higher than social phobic group on rumination (13% of variance attributable to rumination). GAD participants tended to score higher on other maladaptive strategies.</td>
</tr>
<tr>
<td>Mathews et al (2014), USA</td>
<td>Cross-sectional</td>
<td>Specificity of emotion regulation difficulties related to anxiety in early adolescence</td>
<td>11-14</td>
<td>50</td>
<td>Local schools and announcements in local newspapers</td>
<td>90</td>
<td>Screen for anxiety-related emotional disorders (SCARED)</td>
<td>Difficulties in Emotion Regulation Scale</td>
<td>GAD symptoms associated with non-acceptance of emotions ((r = 0.33, p &lt; 0.01)) and negative self-evaluation of ability to manage emotion ((r = 0.28, p &lt; 0.01)). These relationships were not significant once social anxiety symptoms were controlled for.</td>
</tr>
<tr>
<td>Study, Country</td>
<td>Design</td>
<td>Title/Research Q</td>
<td>Age range (years)</td>
<td>Gender (% female)</td>
<td>Sample</td>
<td>N</td>
<td>GAD measure</td>
<td>Cognitive process measure</td>
<td>Findings</td>
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<tr>
<td>McLaughlin et al. (2007), Canada</td>
<td>Cross-sectional</td>
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<td>7-15</td>
<td>53</td>
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<td>349</td>
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<td>Childhood Anxiety Sensitivity Index (CASI)</td>
<td>GAD associated with CASI total and all its subscales (r = 0.68, p&lt;0.001).</td>
</tr>
<tr>
<td>Monk et al. (2006), USA</td>
<td>Experimental</td>
<td>Attentional bias in response to angry faces in adolescents with GAD</td>
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<td>48</td>
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<td>33</td>
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<tr>
<td>Muris et al. (2001), Netherlands</td>
<td>Longitudinal</td>
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<td>SCAS</td>
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</tr>
<tr>
<td>Nelenmans et al. (2014), Netherlands</td>
<td>Longitudinal</td>
<td>Maternal criticism and adolescent GAD symptoms</td>
<td>Mean = 13</td>
<td>43</td>
<td>Secondary school students, part of RADAR project</td>
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<td>Dutch version of the SCARED</td>
<td>Dutch version of the Level of Expressed Emotions scale</td>
<td>Adolescent GAD symptoms associated with perceived maternal criticism in present and subsequent years (r = 0.09 to 0.24).</td>
</tr>
<tr>
<td>Read et al. (2013), USA</td>
<td>Cross-sectional</td>
<td>IUSC - discriminating principal anxiety diagnosis</td>
<td>7-17</td>
<td>48</td>
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<td>86</td>
<td>ADIS: Child and Parent versions.</td>
<td>Intolerance of Uncertainty Scale for Children</td>
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<tr>
<td>Ros et al. (2008), USA</td>
<td>Experimental</td>
<td>Attention bias toward threat in paediatric anxiety disorders</td>
<td>9-18</td>
<td>48</td>
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<td>Attentional dot probe task (faces)</td>
<td>Significantly greater threat bias scores in anxious group relative to controls (b = 2.98, p&lt;0.003).</td>
</tr>
<tr>
<td>Taghavi et al. (2003), UK</td>
<td>Experimental</td>
<td>Selective processing of negative emotional information in young people with GAD</td>
<td>Mean = 13.4*</td>
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<td>38</td>
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<td>Modified Stroop Task</td>
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<tr>
<td>Van Dyck et al. (2012), Netherlands</td>
<td>Longitudinal</td>
<td>Longitudinal associations between perceived parent-adolescent attachment and GAD symptoms</td>
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<td>52</td>
<td>High school students</td>
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<td>SCARED</td>
<td>Inventory of Peer and Parent Attachment</td>
<td>GAD symptoms predicted perceived lower quality of attachment relationships with parents 1-2 years later (b = -0.06 to -0.09).</td>
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<tr>
<td>Study, Country</td>
<td>Design</td>
<td>Title/Research Q</td>
<td>Age range (years)</td>
<td>Gender (% female)</td>
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<td>Waters et al. (2014), Australia</td>
<td>Experimental</td>
<td>Biased attention to threat in paediatric anxiety disorders</td>
<td>5-13</td>
<td>52</td>
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<td>435 (GAD=75)</td>
<td>ADIS: Parent version.</td>
<td>Attentional dot probe task (faces)</td>
<td>GAD group displayed significant bias towards threat compared with neural faces ($t_{(434)}=3.89, p&lt;0.001$).</td>
</tr>
<tr>
<td>Wijbroek et al. (2011), Netherlands</td>
<td>Longitudinal</td>
<td>Direction of effects between perceived parental control and GAD symptoms</td>
<td>12-19</td>
<td>52</td>
<td>High school students</td>
<td>1313</td>
<td>SCARED</td>
<td>Children's Reports of Parental Behaviour Inventory</td>
<td>GAD symptoms associated with perceived parental psychological control in present and 1-2 years later ($r=0.07$ to $0.20, p&lt;0.05$).</td>
</tr>
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</table>
(2012) reported a unidirectional pattern of adolescents’ GAD symptoms predicting poorer perceived mother-adolescent attachment relationship quality in subsequent years.

**Perception of internal resources, and responses to anxiety symptoms, in relation to GAD symptoms**

Cannon and Weems (2010), and Frala, Leen-Feldner, Blumenthal and Barreto (2010) reported increased GAD symptoms were associated with lower perceived control of reactions associated with anxiety-related events. Mathews, Kerns and Ciesla (2014) reported negative self-evaluation of ability to manage emotion and non-acceptance of emotions was shown to initially be correlated with GAD; however, once social anxiety symptoms were controlled for these relationships ceased to be statistically significant, suggesting these emotional regulation difficulties are common across GAD and social anxiety. Two studies reported strong associations between GAD and anxiety sensitivity in children (McLaughlin, Stewart, & Taylor, 2007; Muris, Schmidt, Merckelbach, & Schouten, 2001). Anxiety sensitivity involves fear of anxiety-related sensations (e.g. increased heart rate) because the person believes that such sensations can result in negative consequences. Other subscales of the anxiety measure used (separation anxiety disorder, social phobia, panic/agoraphobia and obsessive compulsive disorder) were also highly correlated with anxiety sensitivity.

**Cognitive coping and emotion recognition in relation to GAD symptoms**

Assessing cognitive coping strategies of adolescents, Legerstee, Garnefski, Verhulst and Utens (2011) reported participants diagnosed with ‘pure’ GAD (N=21) were compared with participants diagnosed with ‘pure’ social phobia (N=26). GAD-
diagnosed adolescents scored significantly higher on rumination strategies, but also there was a non-significant trend of this group scoring higher for self-blame and catastrophizing. Finally, Lee et al. (2010) found children with anxiety disorders, including GAD, performed comparably to healthy controls in identifying self-emotions.

**Discussion**

In this systematic review, 16 papers were identified that reported on the relationship between cognitive processes and generalized anxiety disorder symptoms in children and adolescents. The six themes identified in the results section will be used as a basis for discussing the cognitive processes that have been shown to relate to GAD symptoms.

**Attentional and memory bias in relation to GAD symptoms**

One study found that GAD-diagnosed participants did not display a memory bias for negative words above that of a control group, suggesting that this type of cognitive process does not relate to GAD symptoms.

Attentional bias towards threat-related material, as measured by the emotional Stroop task, produced mixed findings from two separate studies, with threat-related interference being reported in one study but not the other. This inconsistency has also been noted in traumatized children and adolescent populations (Freeman & Beck, 2000; Moradi, Taghavi, Neshat-Doost, Yule, & Dalgleish, 1999). Criticisms of the emotional Stroop paradigm argue that delayed responses to emotionally relevant material may be related to negative affect induced by the material or effortful
avoidance of the material (Algom, Chajut, & Lev, 2004; de Ruiter & Brosschot, 1994). With alternative processes such as these acting on this task it is not likely to be an accurate measure of attentional bias; this may explain the mixed results found.

Three papers reported a significant relationship between GAD symptoms and attentional bias towards threat-related material (Dalgleish et al., 2003; Roy et al., 2008; Waters et al., 2014). Monk et al. (2006) reported that adolescents diagnosed with GAD orientated away from threat-related material; however, as this study took place during functional resonance imaging of the participants it is likely the testing environment may have confounded this result. The results of the first three papers demonstrate a robust effect; although their conclusions may be limited by small numbers of participants and potential reliability issues regarding GAD diagnoses in the study by Dalgleish et al. (2003), as there was no evidence a valid and reliable assessment process was used. These studies, however, are consistent with the findings of Bar-Haim, Dominique, Pergamin, Bakermans-Kranenburg and van Ijzendoorn (2007), who in a meta-analysis of threat-related attentional bias in anxious individuals that included children, found an overall effect of orientation towards threat-related material. Threat-related material appears to evoke a significant response in individuals with GAD symptoms relative to their non-anxious counterparts. The attentional system of these anxious individuals is best regarded as abnormally sensitive to threat-related stimuli and these individuals exhibit a tendency to direct their attention toward threatening information during early, automatic stages of processing. With overly sensitive orientation to threat taking place at a preattentive stage of cognitive processing it is suggested that individuals with GAD symptoms will respond to every day, benign events as if they are threatening (Bar-
Haim et al., 2007). This may require a state of hypervigilance to potential threat. Hypervigilance seems likely to maintain a perceptual bias; whereby anticipated external events and relationships with significant others may be perceived as threatening to the self.

**Perception of external threat in relation to GAD symptoms**

Accordingly, Cannon and Weems (2010) demonstrated that GAD symptoms correlate with prediction of a negative outcome on a hypothetical situation, suggesting a negative bias in perception of future events. If future events tend to be judged as potentially threatening in individuals experiencing GAD symptoms it seems likely that where the outcome of such events is uncertain there will be a greater tendency to worry. As this was self-reported data on GAD symptoms, and other anxiety disorder symptoms were not reported, it is unclear whether such a bias is GAD-specific. The view that it may be GAD-specific, however, fits with the results of Read et al. (2013), who reported that comparative to other anxiety disorders, intolerance of uncertainty is higher in children and adolescents meeting criteria for GAD. These results are consistent with other studies examining the relationship between worry and intolerance of uncertainty in adolescents (Dugas, Laugeson, & Bukowski, 2012; Laugeson, Dugas, & Bukowski, 2003) and demonstrate the potential applicability of the intolerance of uncertainty concept (Dugas et al., 1998) to this age group.

In addition to a negative judgement bias of future outcome, GAD symptoms have been shown be associated with a negatively biased interpretation of present relationships. Three longitudinal studies demonstrate small but significant
associations between GAD symptoms at one time point predicting perceived maternal criticism, perceived parental psychological control or perceived attachment quality at future time points (Nelemans et al., 2014; van Eijck et al., 2012; Wijsbroek et al., 2011). Cross path models of these data showed strong support for child effects over and above parental effects; this suggests that in the context of these studies and the data available to them, the GAD symptoms experienced by the young people impacted upon the perception of the relationship they had with their parents. Nelemans et al. suggest this perception precipitates erosion in the parent-child relationship similar to the process of relational erosion shown in adolescents with depressive symptoms (Branje, Hale III, Frijns, & Meeus, 2010). In such a process, child or adolescent GAD symptomology hypothetically results in negative interaction styles with, and excessive demands of parents; this induces negative mood and rejecting interaction styles from the parents which may perpetuate GAD symptoms in the child. Although the data comes from relatively large sample sizes these results should be interpreted with consideration of study limitations: notably all three used self-report data of GAD symptoms and adolescent perception of parent factors, and were correlational studies, so could not predict outcomes. The effect sizes (r = 0.06 to 0.24) were small and so these factors may only make a minor contribution to GAD symptomology.

Perception of internal resources, and responses to anxiety symptoms, in relation to GAD symptoms

Individuals’ own interpretation of their control over external events, their anxiety symptoms and their ability to cope are also implicated in the perpetuation of GAD.
Cannon and Weems (2010) and Frala et al. (2010) reported that GAD symptoms were associated with lower perceived control over internal, emotional and bodily reactions to anxiety-related events. This interpretative bias concerning one's own responses to external events has been proposed as a mediator between negative life events and anxiety during childhood (Chorpita, Brown, & Barlow, 1998), which could then go on to increase anxiety reactivity in response to perceived difficult life events in the future. Perception of control over external events is also implicated in the development of depressive disorders (Seligman, 1975), with which GAD had a high co-morbidity (Masi, Mucci, Favilla, Romano, & Poli, 1999). This underlying vulnerability may be one of the factors that explain this frequent co-morbidity between these disorders. Findings from these reviewed studies should be considered in the context of the sample size of GAD-diagnosed children; for example, in the study by Frala et al. (2010) only 17 out of the total sample of 140 were diagnosed with GAD, which perhaps limits the conclusions that can be made about the relationship between anxiety symptoms and perceived control over anxiety-related events.

Interpretation of anxiety and anxiety-related sensations are strongly related to all types of self-reported anxiety disorder symptoms in childhood (MacLaughlin et al., 2007; Muris et al., 2001), suggesting anxiety sensitivity may be important in the development and maintenance of GAD in children and adolescents. Anxiety sensitivity has been demonstrated as a vulnerability factor for adult anxiety disorders, but in particular panic disorder (Rodriguez, Bruce, Pagano, Spencer, & Keller, 2004) due to fear of anxiety-related sensations featuring so prominently in its specificity. MacLaughlin et al. (2007) also show that it is the subscales of physical (fear of
anxiety-related physical sensations) and social concerns (fear of publicly observable anxiety-related sensations) that were highly correlated with GAD, with psychological concerns (fear of anxiety-related mental concerns) being less so. These results are consistent with Brown et al. (2014), who also highlight the general increase in social concerns in relation to anxiety symptoms during adolescence.

**Cognitive coping and emotion recognition in relation to GAD symptoms**

In terms of cognitive coping ability, anxiety-disordered adolescents have been shown to report using maladaptive coping strategies, such as rumination, self-blame and catastrophizing more frequently than non-anxious controls; over and above this difference GAD-diagnosed adolescents reported ruminating, self-blaming and catastrophizing more than social-phobia-diagnosed adolescents. These findings, however, may be limited by the small sample size of GAD-diagnosed participants used in the analysis. Given that excessive worry is a salient feature of GAD the overall finding is not surprising; however, it is informative that there are distinct strategies that make up the feature of ‘worry’ which could be targeted during treatment. Finally, emotion recognition was found not to differ between anxiety-disordered and control children, so based on available evidence at this time, the usefulness of emotion recognition training as a precursor to other elements of the intervention is unsupported.

**Strengths and limitations**

Strengths of this review include limiting publication bias through correspondence with authors of included papers and lowering the risk of bias in methodological analysis through the use of an independent rater of methodological quality of
included papers. Limitations are that the review was restricted to articles published in English, and it included a comprehensive, but finite number of search terms that may have limited the number of relevant papers included. Grey literature was not included, which could have led to publication bias. One researcher selected and extracted data for inclusion in the review; this allows potential for bias that is usually minimised through two or more researchers undertaking this part of the process.

Strict inclusion criteria of studies in which the relationship between GAD symptoms and cognitive processes could be isolated meant that many studies that did not isolate GAD could not be included. This may have meant that papers measuring other cognitive processes that could be important to consider as influencing the development or maintenance of GAD in children and adolescents were not included. Heterogeneity of cognitive processes investigated and results reported did not allow for a meta-analysis, which is a pity as it does not provide sufficient evidence to suggest which cognitive processes are likely to be most beneficial to assess and treat GAD in young people. Exclusion of studies of single sex populations will have limited the number and diversity of relevant cognitive processes reported to be associated with GAD in included studies. Finally, this review only included studies that employed measures that explicitly measure GAD symptoms. There are a number of studies investigating the relationship between generalized anxiety disorder symptoms and worry in children and adolescents that were not included, despite worry being the main feature of GAD.
Implications for clinical practice

A number of studies in this review highlight cognitive processes that may be included in therapeutic frameworks for the treatment of GAD. Negatively biased perceptions of past events and one’s performance in them, the outcomes of future events and one’s relationship with close family members are specific areas that could be targeted using cognitive therapy. Tolerance of uncertainty and the physical symptoms of anxiety could be increased through the use of graded exposure/behavioural experiments; and social concerns about appearance when anxious could also be decreased through such behavioural techniques. A novel approach to the reduction of attention bias is currently in development: attention bias modification training is a computer-based intervention based on the dot-probe task, which has been shown to reduce attention bias to threat and self-reported anxiety symptoms in adults (Hazen, Vasey, & Schmidt, 2009). This approach may be suitable for children and young people in addition to one-to-one therapy if it is shown to be effective with this population.

Intolerance of uncertainty was the only cognitive process of the adult-based intolerance of uncertainty model (Dugas et al., 1998) reported in included studies of this review. This suggests either that there is not any research into the other three components of this model with children and adolescents or it is not reported in a way that it could be included in this review. It is noteworthy that negative problem orientation, one of the other components of this model, is strikingly similar to the other perceptual biases concerning one’s internal resources reported in included studies, such as low anxiety control and high fear of anxiety sensations. It therefore seems plausible that children with generalized anxiety symptoms may report a
perceptual bias of low problem-solving ability in addition to these other biases. Intolerance of uncertainty and negative problem orientation are the two components of the intolerance of uncertainty model that are most strongly associated with GAD in adults (Dugas et al., 2007), and are both predictive of worry in adolescents (Laugeson et al., 2003). This suggests both components of this model should be considered as important in interventions with children and adolescents. Positive beliefs about worry and cognitive avoidance were not reported in included papers. Further studies that investigate the relationship between the components of the intolerance of uncertainty model and GAD symptoms in young people would clarify the applicability of the model with this population.

Conclusion

This systematic review demonstrates there are a diversity of cognitive processes which may be relevant to the development and maintenance of GAD in children and adolescents. Further research is required to clarify the robustness of many of these findings. There is little evidence so far that supports the applicability of adult cognitive models of GAD to children and adolescents; this appears to be due to lack of research in this area rather than contradictory findings.

References


4. Empirical study: Applicability of the intolerance of uncertainty model to Generalized Anxiety Disorder symptoms in young people

Abstract

Disorder-specific cognitive-behavioural conceptual models of anxiety disorders have informed psychological interventions with adults, but not with adolescents. This study aims to clarify the applicability of the intolerance of uncertainty model to generalized anxiety disorder symptoms in young people and the moderating influence of gender and age on these relationships. 326 young people, aged 11 - 15 years, from three high schools in a semi-rural area in West Scotland, completed self-report measures relating to generalized anxiety disorder symptoms and cognitive variables of the intolerance of uncertainty model. Intolerance of uncertainty and negative problem orientation were found to be predictive of generalized anxiety disorder symptoms; positive beliefs about worry and cognitive avoidance were found to be less important in the prediction of generalized anxiety disorder symptoms. Gender only moderated the relationship between positive beliefs about worry and generalized anxiety disorder symptoms; age did not act as a moderator.
Introduction

Community studies estimate prevalence of worrying in children and adolescents to be approximately 70% (Muris, Meesters, Merckelbach, Sermon, & Zwakhalen, 1998; Muris, Merckelbach, Gadet, & Moulaert, 2000), with 25% of adolescents reporting excessive and worry (Fournier et al. (cited in Laugesen, Dugas, & Bukowski, 2003)). Although common, only a minority develop Generalized Anxiety Disorder (GAD), in which the main symptoms are excessive and uncontrollable worry. Physical complaints such as muscle tension, restlessness, fatigue and sleep disturbance are associated with worry and anxiety and so also form part of the diagnostic criteria (APA, 2000); physical symptoms of GAD are frequently reported in children and adolescents (Ginsburg, Riddle, & Davies, 2006). Diagnosis of GAD is associated with significant distress, impairment to functioning and an elevated risk of future mental health problems (Bittner et al., 2004; Campbell, Brown, & Grisham, 2003; Pine, Cohen, Gurley, Brook, & Ma, 1998).

The prevalence of anxiety disorders such as GAD, vary significantly over childhood and adolescence depending upon age and gender; for example, Cohen et al. (1993) reported an overall decline in the prevalence of anxiety disorders between the ages of 10 and 20 in the USA, but with notable effects of gender; a higher prevalence of anxiety disorders in boys at age ten declined steeply compared to that of girls over the following nine years; meaning from age 11 onwards girls showed a relatively higher prevalence of anxiety disorders. In contrast, Crocetti, Hale III, Fermani, Raaijmakers and Meeus (2009) reported 15-19 year olds scored higher than 11-14 year olds on a GAD measure, suggesting GAD symptoms increase with age during
adolescence. When accounting for effects of gender, however, it was demonstrated that GAD increases steeply with age in females, masking a less pronounced increase for males. This gender-specific pattern in adolescence was also reported by Nelemans et al. (2014).

Furthermore, contextual factors such as parental mental health problems (Beesdo-Baum et al., 2011; Mendes, Crippa, Souza, & Loureiro, 2013), perceived parental alienation and rejection (Hale III, Engels, & Meeus, 2006), attachment difficulties (van Eijck, Branje, Hale III, & Meeus, 2012), early adversity and significant life events (Beesdo-Baum et al., 2011), chronic health conditions (Mendes et al., 2013) and experience of violence (Slopen, Fitzmaurice, Williams, & Gilman, 2012) can predispose young people to GAD. Despite the influence of contextual factors, individual cognitive-behavioural therapy (CBT) has been shown to produce positive treatment outcomes with anxious children and adolescents (James, Soler, & Weatherall, 2009). An important aim for research should be to improve the efficacy of treatment for young people whose symptoms are not improved through current treatments, offering reduction in current distress and potential prevention of later adulthood anxiety (Angst, Gamma, Baldwin, Ajdacic-Gross, & Rössier, 2009).

Despite the potential benefit of treatment of childhood anxiety, research into the development and maintenance of worry and anxiety in childhood lags behind research in adult populations. Disorder-specific cognitive-behavioural conceptual models of anxiety disorders have facilitated the understanding and treatment of anxiety in adults (Salkovskis, 1999; Warwick and Salkovskis, 1990; Wells, 1995). The intolerance of uncertainty model, conceptualized as model-specific to GAD
(Dugas, Gagnon, Ladouceur, & Freeston, 1998), is a cognitive model of excessive worry comprising four components: intolerance of uncertainty\(^1\) (IU); positive beliefs about worry\(^2\) (PBW); cognitive avoidance\(^3\) (CA); negative problem orientation\(^4\) (NPO). The model is shown in Figure 1.

![Intolerance of uncertainty model of GAD](image)

**Figure 1: Intolerance of uncertainty model of GAD**

IU refers to a propensity to find uncertainty distressing, causing worry in situations where the outcome is uncertain. It is best understood as a cognitive bias that leads individuals to negatively appraise uncertain situations. Numerous studies suggest IU is a cognitive vulnerability factor for worry (e.g. Buhr & Dugas, 2006; Koerner & Dugas, 2008). CBT augmented by the IU model has been shown to be more effective.

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1. IU – Intolerance of Uncertainty  
2. PBW – Positive Beliefs about Worry  
3. CA – Cognitive Avoidance  
4. NPO – Negative Problem Orientation
than applied relaxation training in the treatment of GAD in adults (Dugas et al., 2010). A treatment protocol for adults with GAD that targets components of the IU model has been proposed by Robichaud (2013). It would, for example, help clients to recognize and challenge uncertainty beliefs, and incorporate behavioural exposure to uncertainty, re-evaluation of beliefs about worry, cognitive exposure and problem reorientation.

Research has begun to examine whether the IU model is applicable to children and adolescents. Laugeson et al. (2003) reported strong correlations between worry and IU, PBW, and NPO in an analogue sample of adolescents. Similarly, Dugas, Laugeson and Bukowski (2012) found strong correlations between IU and worry over five years in adolescents. Fialko, Bolton and Perrin (2012) reported IU and CA significantly correlated with worry and anxiety, but the relationship between PBW and worry was less robust in their sample of 7-19 year olds. The measures of the IU model components consisted of five items each and were taken from adult scales; 75-86% of the younger children completing the study rated themselves as understanding most or all of the questions, suggesting these scales may have limited reliability with younger children. Kertz and Woodruff-Borden (2013) reported IU and NPO were significantly correlated with worry, but PBW was not. PBW, however, were measured using subscales of the Metacognitions questionnaire for children (Bacow, Pincus, Ehrenreich, & Brody, 2009). The reliability and validity of this measure with 7-8 year olds has been brought into question by Smith and Hudson (2013), who suggested that children were unable to wholly understand all items on the scales. The suitability of this measure for younger children is therefore questionable.
Age-dependent variation in GAD symptoms and their relationship to the IU model components may affect the applicability of the model to children and adolescents. Fialko et al., for example, produced two separate path models for 7-12 year olds and 13-19 year olds to best fit their data. In the adolescent model, PBW were associated with worry but not anxiety; in the younger age model, PBW were not associated with either. This finding was consistent with previous research, which has found a weak or non-existent relationship between PBW, worry and anxiety in younger child samples (Wilson and Hughes, 2011), and strong positive correlations between PBW and worry in adolescents (Gosselin et al., 2007), suggesting this relationship only develops during adolescence. Data from Fialko et al. (2012) also indicated the relationship between IU and anxiety, and between CA and anxiety, develops with age. Fialko et al. and Kertz and Woodruff-Borden (2013) demonstrated that age may moderate the relationship between the IU model variables and worry and anxiety; however, the data from these studies may not be generalizable due to reliability issues of some measures used with younger children.

In addition to age effects, gender potentially impacts upon the relationship between the IU model variables and worry and anxiety. With Iranian adolescents, Barahmand (2008) reported that in males NPO and PBW correlated with worry but IU did not; while in females NPO, PBW and IU correlated with worry. Fialko et al. reported that CA decreased with age during adolescence in girls, but this difference was much less marked in boys, and PBW increased with age in girls but decreased in boys. This suggests there may be a relationship between PBW and worry but gender moderates this relationship. Research into gender differences in the cognitive processes influencing GAD in the adult population demonstrates that women report relatively
higher levels NPO and thought suppression, which is a type of CA (Robichaud, Dugas, & Conway, 2003). They suggest greater endorsement of such cognitive processes in women may explain why women report higher levels of worry than men; although, it is unclear whether this would apply to young people.

Overall, studies indicate that the IU model may be useful within child and adolescent samples. The interaction of age with these variables makes it difficult to understand the applicability of the model across childhood. Research shows that there are potential gender differences in the reported levels of the IU model variables which warrant further investigation. The current study seeks to investigate the extent to which the IU model variables predict generalized anxiety symptoms in an analogue sample of children and adolescents, aged 11-15. A self-report measure of GAD that is validated for children and adolescents and that covers the full range of clinically relevant symptoms is not currently in existence. In order to ensure that as many symptoms of GAD are measured as possible by self report, two separate outcome measures will be used; one to measure frequency and intensity of worries (Penn State Worry Questionnaire for Children (Chorpita, Tracey, Brown, Collica, & Barlow, 1997)), and one to measure the physical symptoms associated with excessive worry and anxiety (Worry and Anxiety Questionnaire (Dugas et al., 2001)). We hypothesized that IU, CA, NPO and PBW would predict GAD symptoms and that age and gender would moderate the relationship of these variables with GAD symptoms.
Method

Participants

Participants were 326 young people aged 11 – 15 recruited from three high schools across a semi-rural area in West Scotland. The ethnicity of pupils was predominantly White British, with English used as a first language by the majority of pupils. The schools served populations from varied socio-economic backgrounds, identified by the percentage of pupils eligible for free school meals (Education Scotland, 2014). The mean age of participants was 13.2 years (S.D. = 0.98), with the sample comprising 169 (52%) males and 157 (48%) females. Included participants possessed the level of proficiency in English to enable completion of measures. Of the 433 pupils approached, 362 (83.6%) elected to participate. Thirty-six participants were excluded from further analysis due to incomplete data.

Measures

These questionnaires were combined into a single questionnaire format in the order described here for the purpose of the study. The full questionnaire is shown in Appendix 3.

Worry and Anxiety Questionnaire (WAQ; Dugas et al., 2001). The GAD physical symptom items from the WAQ were used in this study. It contains six items concerning the physical symptoms of worry in relation to the DSM-IV criteria for GAD. These items are rated on an eight-point Likert scale ranging from ‘not at all’ (0) to ‘very severely’ (8).
Penn State Worry Questionnaire for Children (PSWQ-C; Chorpita et al., 1997). This is a 14 item self-report measure of worry validated for use with children aged seven upwards. Items are rated on a four point Likert scale ranging from ‘never true’ (0) to ‘always true’ (3). The PSWQ-C has good internal consistency (α>0.81) and excellent test-retest reliability (r=0.92) over one week. The items in the PSWQ-C relate to some of the diagnostic criteria for GAD from the DSM-IV; in particular the frequency of excessive worry and the frequency that the individual finds it difficult to control the worries.

Short version of the Intolerance of Uncertainty Scale for Children (SV-IUS-C). This measure combines the accessible wording of the Intolerance of Uncertainty Scale for Children (IUS-C) (Comer et al., 2009) with the 12 items from the short version of the Intolerance of Uncertainty Scale (SV-IUS) for adults (Carleton, Norton, & Asmundson, 2007) to produce a 12 item version of the Intolerance of Uncertainty scale for children. Both the IUS-C and the SV-IUS have excellent psychometric properties. Respondents report on their emotional, cognitive and behavioural reactions to ambiguous situations by rating the extent to which they agree with each item; a five-item Likert scale is used, with responses ranging from ‘not at all’ (1) to ‘very much’ (5).

Why Worry-III (WW-III; Riley, 2010). This 33 item self-report questionnaire has been adapted for use with children from the adult version (Holowka, Dugas, Francis, & Laugeson, 2000). A five-point Likert scale is used to measure agreement, with responses ranging from ‘agree a lot’ (1) to ‘disagree a lot’ (5). Lower scores indicate a greater belief that worrying is beneficial. Development of the measure was.
undertaken with 156 English 12-13 year olds. The measure demonstrates good internal consistency across seven subscales ($\alpha = 0.69-0.81$) and good convergent validity with the PSWQ-C in five of the seven subscales. Flesch Reading Ease analysis suggested the measure is suitable for children aged eleven upwards.

*Negative Problem Orientation Questionnaire - Child version (NPOQ-C; Rowness-Clarke, 2013).* This questionnaire contains 12 items rated on a five-point scale, responses ranging from ‘not at all like me’ (1) to ‘entirely like me’ (5). This questionnaire has been adapted for use with children from the original adult version developed by Robichaud and Dugas (2005). The language of the scale was checked using Flesch’s reading age statistics and was likely to be suitable for children aged eleven upwards. The measure was found to have good reliability ($\alpha = 0.90$) in an analogue sample of 239 English 11-14 year olds.

*The Revised Cognitive Avoidance Questionnaire (R-CAQ; Heary, 2012).* This is a 35 item self-report questionnaire that has been adapted for use with children from the English adult version developed by Sexton and Dugas (2008). A five-point Likert scale is used to measure responses; these range from ‘not at all like me’ (0) to ‘entirely like me’ (4). The language of the questionnaire was checked using Flesch Reading Ease analysis, which suggested it was suitable for children aged eleven upwards. Internal consistency was very good ($\alpha = 0.95$) in an analogue sample of 191 English 12-13 year olds. Convergent validity with the PSWQ-C was adequate.

**Ethical considerations and procedure**

Ethical approval for the study was gained from the lead author’s academic institution research ethics committee (see Appendix 4). Potential participants were recruited via
letters distributed by schools, through which both children and parents/guardians were informed about the research opportunity (see Appendix 5) and how to opt-out (see Appendix 6). Entry into a prize draw to win online shopping vouchers was offered as an incentive. Pupils completed consent forms (see Appendix 6) and questionnaires during lesson time within the school day. Pupils were able to withdraw from the study on the day of data collection if desired.

Power considerations

Green’s (1991) calculation for sufficiently powered multiple regression analysis was utilised; with seven predictors a minimum of 106 participants was required to answer our primary hypothesis. Previous research by Fialko et al. (2012) showed a mean difference of 0.34 between age groups for bivariate correlations of variables of interest in this study. In order to calculate required sample size to answer our hypotheses regarding moderators a power analysis was completed using the MMRPOWER (moderated multiple regression) program (Aguinis, 2011). This showed that with 95% reliability of measures, to achieve 80% power would require a sample size of 300 participants.

Results

Preliminary analysis

SPSS version 21 (IBM Corp., 2012) was used for analysis. Inter-item reliability of measures was good (see Table 1). Missing data from the 326 participants included in final analysis were low (<1%). Missing values were imputed using the Expectation-Maximization approach. Data from four measures were positively skewed. Square
root, log10 and reciprocal transformations of the data from these variables were conducted. This did not reduce the skew of the data to an acceptable level of normality. It was decided to use the untransformed data in the correlational analyses with bootstrapping to give a 95% confidence interval for r (Lunneborg, 1985). In preliminary checks for multiple regression analysis heteroscedasticity, curvilinearity and multicollinearity were not indicated. Outliers were sought using the outlier labelling rule (N=10; 0.5%) (Hoaglin, Iglewicz, & Tukey, 1986) and winsorized prior to further analyses (Tukey, 1962).

Pearson’s product moment correlation analyses were conducted to examine bivariate relationships between all variables. Two multiple regression analyses were conducted, one with the physical symptoms score of the WAQ as the dependent variable and one with the PSWQ-C score as the dependent variable. Independent variables for both analyses were age, gender, intolerance of uncertainty (IU), positive beliefs about worry (PBW), negative problem orientation (NPO) and cognitive avoidance (CA). Moderation analyses examining the influence of age and gender on the relationships between the independent and dependent variables were conducted using Hayes (2013) ‘PROCESSv213’ macro in SPSS.

**Descriptive data**

Table 1 gives information regarding each measure, with total scores subdivided according to gender. Independent t-tests revealed that male and female participants significantly differed in their scores on all measures (p<0.05); females reported a greater amount of worry and physical symptoms, and higher levels of IU model variables than males.
<table>
<thead>
<tr>
<th>Variable (measure)</th>
<th>Inter-item reliability (α)</th>
<th>Total mean (SD) (N=315)</th>
<th>Male mean (SD) (N=169)</th>
<th>Female mean (SD) (N=157)</th>
<th>t-test</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical symptoms of GAD (WAQ)</td>
<td>0.82</td>
<td>18.0 (9.9)</td>
<td>16.4 (9.2)</td>
<td>19.7 (10.5)</td>
<td>-3.0</td>
<td>0.003</td>
</tr>
<tr>
<td>Worry (PSWQ-C)</td>
<td>0.93</td>
<td>16.7 (9.2)</td>
<td>13.6 (7.5)</td>
<td>19.9 (9.8)</td>
<td>-6.5*</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Intolerance of uncertainty (SV-IUS-C)</td>
<td>0.88</td>
<td>24.2 (8.8)</td>
<td>22.4 (8.0)</td>
<td>26.1 (9.2)</td>
<td>-3.9*</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Positive beliefs about worry (WW-III)</td>
<td>0.94</td>
<td>115.2 (23.3)</td>
<td>118.4 (23.8)</td>
<td>111.9 (22.3)</td>
<td>2.6</td>
<td>0.011</td>
</tr>
<tr>
<td>Negative problem orientation (NPOQ-C)</td>
<td>0.95</td>
<td>27.3 (12.0)</td>
<td>23.5 (10.2)</td>
<td>31.3 (12.3)</td>
<td>-6.2*</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Cognitive avoidance (R-CAQ)</td>
<td>0.96</td>
<td>37.2 (27.3)</td>
<td>30.7 (24.5)</td>
<td>44.5 (28.4)</td>
<td>-4.7</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

*Levene’s test showed homogeneity of variance had been violated so t-test results based on equal variances not assumed.

**Analysis of potential confounding variables**

To examine whether socio-economic demographic of the schools was a potential confound, two schools that fell below the national average for pupils eligible for free school meals were grouped together and compared to the third school, from which the percentage of pupils eligible for free school meals was above the national average. T-tests of difference between means revealed a statistically significant difference between total scores on the physical symptoms of GAD (t =-0.43, p<0.001), with participants from the school above the national average for free school meals reporting a greater severity of physical symptoms than participants from the two schools below this average. Participants’ reporting of worry was not significantly different between the schools.
### Table 2: Correlational analysis among variables, showing 95%CI from bootstrapping and p-values

<table>
<thead>
<tr>
<th></th>
<th>Worry</th>
<th>IU</th>
<th>PBW</th>
<th>NPO</th>
<th>CA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>0.58</td>
<td>0.52</td>
<td>-0.18</td>
<td>0.55</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>(0.49; 0.66)*</td>
<td>(0.41; 0.60)*</td>
<td>(-0.28; -0.07)*</td>
<td>(0.45; 0.63)*</td>
<td>(0.25; 0.45)*</td>
</tr>
<tr>
<td>Worry</td>
<td>-</td>
<td>0.66</td>
<td>-0.39</td>
<td>0.72</td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.59; 0.73)*</td>
<td>(-0.49; -0.29)*</td>
<td>(0.65; 0.79)*</td>
<td>(0.36; 0.54)*</td>
</tr>
<tr>
<td>IU</td>
<td>-0.38</td>
<td>-</td>
<td>0.72</td>
<td>0.67</td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td>(-0.47; -0.28)*</td>
<td></td>
<td>(0.59; 0.74)*</td>
<td>(-0.51; 0.56)*</td>
<td></td>
</tr>
<tr>
<td>PBW</td>
<td>-0.41</td>
<td>-0.41</td>
<td>-</td>
<td>0.62</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-0.49; -0.32)*</td>
<td>(-0.49; -0.32)*</td>
<td></td>
<td>(0.55; 0.69)*</td>
<td></td>
</tr>
<tr>
<td>NPO</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.62</td>
<td></td>
</tr>
</tbody>
</table>

* = sig 0.01, two tailed

### Correlational and regression analysis

Pearson correlations were calculated between all variables (see Table 2). Hierarchical regression analysis was performed to further examine the relationship between the four cognitive variables, worry and the physical symptoms of GAD. With worry as the dependent variable, gender and age were entered at step one in order to control for the variance accounted for by these factors (Table 3). At this first step gender and age contributed to 12% of the variance in worry scores. Individual t-tests on Beta coefficients showed that only gender contributed to the prediction of worry scores. At step two IU, PBW, NPO and CA were entered. All variables together explained 60% of the variance in worry scores. IU and NPO explained unique variance in worry. PBW was shown as a statistically significant but minimal predictor of variance in worry, whereas CA did not significantly predict variance in levels of worry.
The same analysis was run with the physical symptoms of GAD as the dependent variable (Table 4). At the first step gender and age contributed to 8% of variance in physical symptoms. Individual t-tests on beta coefficients showed that gender and age contributed to the prediction of worry scores. All variables together explained 37% of the variance in physical symptoms of GAD. IU and NPO explained unique variance in physical symptoms of GAD. PBW was shown as a statistically significant but minimal predictor of variance in physical symptoms of GAD, whereas CA did not significantly predict variance in levels of physical symptoms of GAD.

Moderation analysis of the conditional effect of the cognitive variables on physical symptoms of GAD and worry depending on age and gender revealed that gender, but
not age, influenced some of these relationships. Gender was shown to moderate the relationship between PBW and the physical symptoms of GAD (p=0.04), PBW and worry (p=0.02), and CA and the physical symptoms of GAD (p=0.02). Inspection of correlation coefficients for these relationships by gender showed that a stronger relationship between PBW and worry occurred in females (r=-0.43, p<0.001) compared to males (r=-0.32, p<0.001). The relationship between PBW and the physical symptoms of GAD was shown to be weak-moderate in females (r=-0.26, p<0.001), while no statistically significant relationship between these variables was shown for males (r=-0.06, p=0.21). Finally CA and the physical symptoms of GAD were shown to be moderately correlated in females (r=0.43, p<0.001), but only weakly correlated in males (r=0.20, p<0.01).

Discussion

This study aimed to investigate the extent to which the IU model variables predicted GAD symptoms and whether age and gender moderated these relationships in an analogue sample of 11-15 year olds. The results suggest that, although individually the four variables were correlated with worry, only intolerance of uncertainty (IU), negative problem orientation (NPO) and positive beliefs about worry (PBW) explained unique variance in worry. These findings are consistent with results of Laugeson et al. (2003), but not Kertz and Woodruff-Boden (2013), who found that only IU and NPO were correlated with worry and no components significantly predicted worry scores. Questionable reliability of the measures used and their smaller, younger sample may explain the difference in results. Gosselin et al. (2007) showed cognitive avoidance (CA) predicted worry scores in adolescents; however, as
this was the only component from the IU model analysed, it seems likely that significant variance attributable to CA is lost when other key variables are introduced. Taking into consideration the above issues the results of the current study combined with the results reported by Laugeson et al. suggest IU and NPO strongly predict worry in young people, while PBW has minimal predictive power and CA does not predict worry. These results are directly comparable to results from adult populations; Dugas et al. (2007) reported IU and NPO were most strongly related to GAD severity while the importance of PBW and CA in predicting GAD severity only received modest support. Recent research investigating the relationships between meta-cognitive processes and GAD in children and adolescents, however, found significant relationships between PBW and GAD as well as between negative beliefs about worry and GAD (Esbjorn et al., 2015).

In the current study NPO and IU were both strongly correlated with worry, and both variables uniquely predicted worry scores in 12-15 year olds; whereas in the similar study of adults, Dugas et al. (2007) found IU significantly predicted worry scores above and beyond the other model variables. This relative difference in the contribution of NPO to worry between adolescents and adults may be explained by their differing life experience. Adolescents may experience low problem-solving confidence and low perceived control over problems because in general, they are less autonomous than adults. NPO may therefore be more highly correlated with worry in adolescents than adults, because adults are likely to have experienced some agency over problems in their lives. Additionally, a relatively stronger relationship between worry, IU and NPO was shown in 12-15 year olds, when compared to these relationships in adults. This suggests that an ability to tolerate uncertainty and a
positive impression of one’s problem-solving skills may develop with age and experience. Consequently these components may have a decreased impact on worry severity with age. Differences between measures used in these studies, however, may account for the different results. Dugas et al. used the five-item negative problem orientation component of the Social Problem-Solving Inventory, Revised Short Form (D’Zurilla, Nezu, & Maydeu-Olivares, 1998), which might not be comparable to the NPOQ-C.

With regard to the moderating effect of gender on the relationship between the II model components and GAD symptoms, differences in mean scores of the components varied by gender; IU, PBW, NPO and CA were reported at higher levels in females than males. Furthermore, gender moderated the relationship between PBW and worry, and PBW and the physical symptoms of worry, with this relationship being significantly stronger in females than males. This was partially consistent with the findings of Robichaud et al. (2003), who reported relatively higher levels of CA and NPO in adult females, but that the correlation between PBW and worry was stronger in males than females. The results of the current study may be understood according to the differing socio-cultural experiences of females and males. There may be less variability in the extent that females believe worrying is useful compared to males because worrying is a characteristic that is more consistent with a stereotypical female role (Stavosky and Borkovec, 1988). Worry as a facet of a socially prescribed gender role may be more likely to have associated positive narratives in females than males because it forms part of a ‘normal’ social identity.
An alternative explanation of gender differences in the relationship between PBW and worry is that they correlate more highly at more severe levels of worry, which females display relative to males. This is inconsistent with the results of Muris et al. (1998), who found children meeting criteria for Overanxious Disorder/Generalized Anxiety Disorder were unable to report positive features of their worry in comparison to 30% of control children, suggesting low worry groups endorse PBW more than high worry groups. Cartwright-Hatton et al. (2004), however, reported no significant differences between clinical and control groups on PBW in adolescents. Given the weight of evidence from previous studies suggesting high worriers do not endorse PBW more than low worriers it seems more likely that the gender differences seen in the present study are as a result of socio-cultural differences between females and males.

Gender was found to not moderate the relationship between IU, NPO, CA, and worry. Similar results were found for the relationships between these components and the physical symptoms of worry. This result conflicts with the results reported by Barahmand (2008), who showed that the relationship between IU and worry varied as a function of gender in Iranian adolescents. Cultural differences between study sites may be implicated. Barahmand suggests social pressure and expectations for males to achieve in Iran are much greater than for females, resulting in higher levels of anxiety in males. This pressure to achieve competence is perhaps more equal for females and males in the context of the current study, which may result in similar relationships between the IU model components and worry. The relationship between IU and worry reported in the current study is consistent with the results reported by Boelen, Vrinssen and Van Tulder (2010), who found IU and worry correlations did
not differ across gender in Dutch adolescents. Gender significantly moderated the relationship between CA and the physical symptoms of GAD, with a relatively stronger relationship in females. However, as CA was found not to significantly predict the physical symptoms of GAD this moderating effect was deemed to be of limited utility.

Age was not found to moderate the relationship between the IU model components and worry and physical symptoms of worry. This is inconsistent with the findings of Fialko et al. (2012); they found the relationship between PBW and worry strengthened with age and the relationship between IU and worry weakened with age. Independent of changes in relationships between variables, Dugas et al. (2012) reported worry and IU demonstrated U-shaped patterns of change over time in Canadian adolescents. Highest levels of worry and IU observed at beginning and end of high school and were suggested to relate to periods of transition. Such changes were not observed in the current study, probably due to the narrow age range recruited, with smaller numbers at its tails. Only seven 11 year olds and twenty-nine 15 year olds fully completed all measures, limiting the influence of any differences between participants across ages.

Although the percentage of free school meals registered at each school is only an approximate indicator of the socio-economic status of its pupils, results suggest that pupils from relatively poorer areas experienced a greater amount of physical symptoms of GAD. It is unusual that the same result was not found for worry scores, noting the close association between worry scores and scores on the WAQ. The current finding is inconsistent with previous studies of young people with anxiety.
disorders (Ginsburg et al., 2006; Hofflich, Hughes, & Kendall, 2006), in which socio-economic status, as measured by family income, was not associated with physical symptoms of anxiety. As the results from the present study are based on generalizing socio-economic status from the school the pupils attend it limits the conclusions we can make about the relationship between socio-economic status and physical symptoms of GAD.

Strengths of this study include the comprehensive use of all components of the IU model, use of self-report measures that have been previously validated with young adolescents, and a well-powered sample size that enabled analysis of gender and age as moderators. The short version of the Intolerance of Uncertainty Scale for children, which combined two previously validated questionnaires, was shown to have good inter-item reliability, and so is potentially useful as a short measure in future studies.

Limitations include the cross-sectional design, which does not allow for interpretation of the causal role of IU model components. We acknowledge that the lengthy questionnaires may have impacted on participants’ ability to maintain focus during participation. Focusing exclusively on the IU model meant information concerning contextual factors that may also influence anxiety symptoms were not included and so reduces the generalizability of the model. Furthermore, this was an analogue sample, which may limit whether the model is generalizable to clinical cases.

Although physical symptoms of GAD were significantly correlated with all IU model components, these relationships were weaker than the relationships between the IU model components and worry. Furthermore, hierarchical regression analysis showed
only 37% of variance in physical symptoms of GAD was explained by the IU model components; this compares to 60% of variance in worry explained by the same components.

A possible explanation of this result is the Penn State Worry Questionnaire for Children and the questionnaires for the IU model components measure cognitive constructs and so are conceptually similar, whereas the measurement of physical symptoms is conceptually different to that of the IU model components. Additionally some of the individual symptoms making up the Worry and Anxiety Questionnaire (e.g. fatigue, sleep disturbance and irritability) are frequently reported within the adolescent population, and may be associated with other potential causal factors. For example, fatigue is frequently reported in adolescent girls, with 30.6% reporting they feel fatigued in the morning at least once a week (Ghandour, Overpeck, Huang, Kogan & Scheidt, 2004); sleep disturbance in adolescents is found to be correlated with electronic media use at night (Lemola, Perkinson-Gloor, Brand, Dewald-Kaufmann & Grob, 2015); and irritability is associated with family stress (Tarter, Blackson, Brigham, Moss & Caprara, 1995).

Overall this suggests that measuring physical symptoms of GAD in isolation may not be the most useful measure of GAD when looking at relationships with cognitive models without taking into consideration multiple potential confounding variables.
Implications for research and practice

The results of this study suggest that elements of the IU model are related to GAD symptoms in 11-15 year olds, as they are in adults; this demonstrates the potential utility of IU and NPO, both as explanatory concepts for the development of GAD in childhood, and as focus areas of psychological interventions targeting the cognitive processes maintaining GAD. Gender differences in the relationship between PBW and worry suggest females who experience higher levels of worry are more likely to endorse positive beliefs about worry than males. This finding requires further research given its novelty and inconsistency with previous research in adults. As negative beliefs about worry have been found to be more closely related to GAD than PBW in children and adolescents (Esbjorn et al. 2015) further investigation of how this meta-cognitive process relates to IU and NPO is warranted.

With regard to IU and NPO, Robichaud (2013) has suggested uncertainty recognition and exposure, and problem reorientation and training, could be useful specific strategies within CBT for GAD. A treatment protocol involving such strategies could be developed and investigated to demonstrate whether reductions in IU and NPO result in subsequent reductions in GAD symptoms in clinical populations of children and adolescents. Furthermore, Given the demonstrated efficacy of CBT augmented by the IU model in adults for the treatment of GAD in comparison with applied relaxation training (Dugas et al., 2010), future research involving GAD-diagnosed children and adolescents should investigate the efficacy of an IU-informed intervention in relation to a comparable cognitive-process informed intervention, such as the meta-cognitive model (Wells, 1995).
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5. Full reference list


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**Appendices**

**Appendix 1: Author guidelines**

**GUIDE FOR AUTHORS**

*Introduction*

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<table>
<thead>
<tr>
<th>Criteria</th>
<th>Well covered – low risk of bias</th>
<th>Adequately addressed – unclear risk of bias</th>
<th>Poorly addressed/not reported – high risk of bias</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aim of study</strong></td>
<td>The aim of the study is clearly defined and is an appropriate line of investigation following on from the literature review.</td>
<td>The aim of the study can be ascertained from the description given and the literature review, but is not clearly defined.</td>
<td>The aim of the study is not clearly defined and cannot be adequately ascertained from the description of the study.</td>
</tr>
<tr>
<td><strong>Inclusion / exclusion of participants</strong></td>
<td>Inclusion and exclusion criteria for participants are precisely defined.</td>
<td>A broad description of participants is given. This lacks detail when considering inclusion and exclusion criteria, but some details of participants can be ascertained from results.</td>
<td>Minimal description of participants is given, with no reference to inclusion / exclusion criteria.</td>
</tr>
<tr>
<td><strong>Representative of general child population</strong></td>
<td>Participants are representative of the general child population (from where the sample is collected) in terms of age, gender and nationality/ethnicity.</td>
<td>Participants are only representative of two out of three features from the general child population.</td>
<td>Participants are only representative of one of the three features from the general child population or this information is not accessible.</td>
</tr>
<tr>
<td><strong>Response / Attrition rate</strong></td>
<td>Response rate is stated or is calculable and is more than 60% (Hudson, 1996; Johnston &amp; Owens, 2003), or in longitudinal studies the attrition rate from baseline is no more than 40%.</td>
<td>Response rate is stated or is calculable and is less than 60% or in longitudinal studies attrition rate is greater than 40% but the authors allay concerns about selection bias by demonstrating the sample is representative of the general study population (i.e. by checking whether the response pattern of non-responders would alter the outcome) (Hudson, 1996; Johnston &amp; Owens, 2003).</td>
<td>Response rate stated or is calculable and is less than 60% or attrition rate is greater than 40% but authors have not allayed concerns about possible selection bias, or is not reported.</td>
</tr>
<tr>
<td><strong>GAD measure</strong></td>
<td>Semi-structured diagnostic interview measure of GAD is reliable and valid and is applied by a clinician or assistant researchers with appropriate training and supervision.</td>
<td>Semi-structured interview measure of GAD is valid and reliable and is applied by non-clinical staff or measure of GAD is by self-report.</td>
<td>Measure of GAD is of limited reliability or validity.</td>
</tr>
<tr>
<td><strong>Cognitive process measure</strong></td>
<td>It has been established that measures used have good reliability and validity or detailed description of method allows replication of experimental studies.</td>
<td>It has been established that measures used have at least adequate reliability and validity or detail is lacking in description of method in experimental studies.</td>
<td>Measures do not have adequate reliability or validity, or the reliability/validity of measures has not been established yet. Inadequate description of method in experimental studies.</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>Power calculated prior to data collection and sufficient power is achieved.</td>
<td>Power calculated post-hoc or the elements to calculate power are present.</td>
<td>Power not calculable or elements to calculate power are not reported, or insufficient power is reported.</td>
</tr>
<tr>
<td><strong>Statistical analysis</strong></td>
<td>Confidence intervals or standard deviation are provided and statistical significance has been assessed.</td>
<td>One or other of confidence intervals (or standard deviation) or statistical significance are provided.</td>
<td>Confidence intervals or standard deviations are not provided and statistical significance has not been assessed.</td>
</tr>
<tr>
<td><strong>Generalizability of findings</strong></td>
<td>A detailed description of the generalizability of findings is provided. Potential confounding variables are reported or dealt with.</td>
<td>The generalizability of findings have been discussed in some detail and a limited number of confounding variables identified.</td>
<td>There is insufficient description of the generalizability of the findings or confounding variables.</td>
</tr>
</tbody>
</table>
Appendix 3: Anxious Feelings Questionnaires

Please fill in a consent form before completing these questionnaires.

<table>
<thead>
<tr>
<th>What is your age?</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
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</thead>
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<tr>
<td>(please circle)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Over the past six months how much have you been disturbed by these feelings when you were worried? Rate each feeling by circling a number (0-8).

(a) Feeling restless or feeling keyed up or feeling on edge

Not at all Moderately Very severely
012345678

(b) Being easily fatigued (tired out)

Not at all Moderately Very severely
012345678

(c) Having difficulty concentrating or your mind going blank

Not at all Moderately Very severely
012345678

(d) Being irritable (getting easily cross or angry)

Not at all Moderately Very severely
012345678

(e) Muscle tension (your muscles feeling tight)

Not at all Moderately Very severely
012345678

(f) Having difficulty falling or staying asleep, or having restless, unsatisfying sleep.

Not at all Moderately Very severely
012345678
Below are a series of statements. Please read each statement carefully and circle which box best describes you. For example, if you always like watching TV, then for this statement you would circle ‘always true’.

<table>
<thead>
<tr>
<th></th>
<th>I like watching TV</th>
<th>Never true</th>
<th>Sometimes true</th>
<th>Most times true</th>
<th>Always true</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Now it’s your turn. Read each statement and circle the box that best describes you.

<table>
<thead>
<tr>
<th></th>
<th>My worries really bother me</th>
<th>Never true</th>
<th>Sometimes true</th>
<th>Most times true</th>
<th>Always true</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
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<td></td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>I don’t really worry about things</th>
<th>Never true</th>
<th>Sometimes true</th>
<th>Most times true</th>
<th>Always true</th>
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</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Many things make me worry</th>
<th>Never true</th>
<th>Sometimes true</th>
<th>Most times true</th>
<th>Always true</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>I know I shouldn’t worry about things, but I just can’t help it</th>
<th>Never true</th>
<th>Sometimes true</th>
<th>Most times true</th>
<th>Always true</th>
</tr>
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<tr>
<td>4</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>When I’m under pressure, I worry a lot</th>
<th>Never true</th>
<th>Sometimes true</th>
<th>Most times true</th>
<th>Always true</th>
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<tbody>
<tr>
<td>5</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>I am always worrying about something</th>
<th>Never true</th>
<th>Sometimes true</th>
<th>Most times true</th>
<th>Always true</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>I find it easy to stop worrying when I want</th>
<th>Never true</th>
<th>Sometimes true</th>
<th>Most times true</th>
<th>Always true</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>When I finish one thing, I start to worry about everything else</th>
<th>Never true</th>
<th>Sometimes true</th>
<th>Most times true</th>
<th>Always true</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>I never worry about anything</th>
<th>Never true</th>
<th>Sometimes true</th>
<th>Most times true</th>
<th>Always true</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>I’ve been a worrier all my life</th>
<th>Never true</th>
<th>Sometimes true</th>
<th>Most times true</th>
<th>Always true</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>I notice that I have been worrying about things</th>
<th>Never true</th>
<th>Sometimes true</th>
<th>Most times true</th>
<th>Always true</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Once I start worrying, I can’t stop</th>
<th>Never true</th>
<th>Sometimes true</th>
<th>Most times true</th>
<th>Always true</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
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<td></td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>I worry all the time</th>
<th>Never true</th>
<th>Sometimes true</th>
<th>Most times true</th>
<th>Always true</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>I worry about things until they are done</th>
<th>Never true</th>
<th>Sometimes true</th>
<th>Most times true</th>
<th>Always true</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td></td>
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</tr>
</tbody>
</table>
Below is another series of statements. Please read each statement carefully and circle which box best describes you.

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Surprise events upset me greatly</td>
<td>Not at all like me</td>
<td>A bit like me</td>
<td>Somewhat like me</td>
<td>Very like me</td>
</tr>
<tr>
<td>2</td>
<td>It frustrates me to not have all of the information I need</td>
<td>Not at all like me</td>
<td>A bit like me</td>
<td>Somewhat like me</td>
<td>Very like me</td>
</tr>
<tr>
<td>3</td>
<td>Not knowing what could happen keeps me from enjoying life</td>
<td>Not at all like me</td>
<td>A bit like me</td>
<td>Somewhat like me</td>
<td>Very like me</td>
</tr>
<tr>
<td>4</td>
<td>One should always plan ahead to avoid surprises</td>
<td>Not at all like me</td>
<td>A bit like me</td>
<td>Somewhat like me</td>
<td>Very like me</td>
</tr>
<tr>
<td>5</td>
<td>Plans can be ruined by things you didn’t think would happen</td>
<td>Not at all like me</td>
<td>A bit like me</td>
<td>Somewhat like me</td>
<td>Very like me</td>
</tr>
<tr>
<td>6</td>
<td>When it is time to do things, not knowing what could happen keeps me from acting</td>
<td>Not at all like me</td>
<td>A bit like me</td>
<td>Somewhat like me</td>
<td>Very like me</td>
</tr>
<tr>
<td>7</td>
<td>When I am not sure of something I can’t go forward</td>
<td>Not at all like me</td>
<td>A bit like me</td>
<td>Somewhat like me</td>
<td>Very like me</td>
</tr>
<tr>
<td>8</td>
<td>I always want to know what will happen to me in the future</td>
<td>Not at all like me</td>
<td>A bit like me</td>
<td>Somewhat like me</td>
<td>Very like me</td>
</tr>
<tr>
<td>9</td>
<td>I don’t like being taken by surprise</td>
<td>Not at all like me</td>
<td>A bit like me</td>
<td>Somewhat like me</td>
<td>Very like me</td>
</tr>
<tr>
<td>10</td>
<td>The smallest doubt can stop me from doing things</td>
<td>Not at all like me</td>
<td>A bit like me</td>
<td>Somewhat like me</td>
<td>Very like me</td>
</tr>
<tr>
<td>11</td>
<td>I should be able to prepare for everything in advance</td>
<td>Not at all like me</td>
<td>A bit like me</td>
<td>Somewhat like me</td>
<td>Very like me</td>
</tr>
<tr>
<td>12</td>
<td>I must get away from situations where I don’t know what will happen</td>
<td>Not at all like me</td>
<td>A bit like me</td>
<td>Somewhat like me</td>
<td>Very like me</td>
</tr>
</tbody>
</table>

Below are another series of statements. Please read each statement carefully and circle which box best describes you.

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>If I’m worrying, it shows that I’m a caring person</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
</tr>
<tr>
<td>2</td>
<td>If I’m worrying, it helps me plan and solve problems</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
</tr>
<tr>
<td>3</td>
<td>If I’m worrying, I think less about really upsetting things</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
</tr>
<tr>
<td>4</td>
<td>If I stopped worrying, I would be selfish</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
</tr>
<tr>
<td>Question</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neither Agree or Disagree</td>
<td>Strongly Agree</td>
<td>Agree</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>-------------------</td>
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<td>--------------------------</td>
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<td>-------</td>
</tr>
<tr>
<td>If I stopped worrying, I would be more upset when something bad happens</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
<td>Agree a lot</td>
</tr>
<tr>
<td>If I stopped worrying, I would not be able to find the best solution</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
<td>Agree a lot</td>
</tr>
<tr>
<td>By worrying about things, I have the chance to change what happens</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
<td>Agree a lot</td>
</tr>
<tr>
<td>Worrying in itself means there will be less chance something bad happens</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
<td>Agree a lot</td>
</tr>
<tr>
<td>Worrying is the sign of a good person</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
<td>Agree a lot</td>
</tr>
<tr>
<td>If I am worrying about something before it happens, I will be less disappointed when something bad happens</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
<td>Agree a lot</td>
</tr>
<tr>
<td>If I did not worry, I wouldn’t have the motivation to do things</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
<td>Agree a lot</td>
</tr>
<tr>
<td>If I am worrying about something, I will be better prepared when it does happen</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
<td>Agree a lot</td>
</tr>
<tr>
<td>If I am worrying, it makes me feel less upset</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
<td>Agree a lot</td>
</tr>
<tr>
<td>If I’m worrying, it helps me to find solutions to my problems</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
<td>Agree a lot</td>
</tr>
<tr>
<td>If I’m worrying about something, I will know what to do when it does happen</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
<td>Agree a lot</td>
</tr>
<tr>
<td>If I’m worrying, it shows that I’m a sensitive person</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
<td>Agree a lot</td>
</tr>
<tr>
<td>If I’m worrying, it means that I can think of a way to stop something bad happening</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
<td>Agree a lot</td>
</tr>
<tr>
<td>If I’m worrying, it gives me more motivation</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
<td>Agree a lot</td>
</tr>
<tr>
<td>Worrying in itself can make me safe</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
<td>Agree a lot</td>
</tr>
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</tr>
<tr>
<td>20</td>
<td>If I stopped worrying, I would be a bad person</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
</tr>
<tr>
<td>21</td>
<td>If I am worrying then I can cope with bad things</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
</tr>
<tr>
<td>22</td>
<td>If I’m worrying, it shows that I care about other people</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
</tr>
<tr>
<td>23</td>
<td>If I did not worry, there is more chance something bad would happen</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
</tr>
<tr>
<td>24</td>
<td>If I am worrying, it stops me from thinking about more upsetting things</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
</tr>
<tr>
<td>25</td>
<td>If I’m worrying, it can help me to find a better way of doing things</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
</tr>
<tr>
<td>26</td>
<td>If I didn’t worry, I would be a careless person</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
</tr>
<tr>
<td>27</td>
<td>If I’m worrying, it helps me to know what I can do</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
</tr>
<tr>
<td>28</td>
<td>Worrying in itself can stop bad things from happening</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
</tr>
<tr>
<td>29</td>
<td>If I am worrying, it encourages me to do things</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
</tr>
<tr>
<td>30</td>
<td>If I am upset, worrying makes me feel calmer</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
</tr>
<tr>
<td>31</td>
<td>If I stopped worrying, I would not be prepared for bad things</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
</tr>
<tr>
<td>32</td>
<td>If I’m worrying, it helps me make sense of things, which helps me to solve problems</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
</tr>
<tr>
<td>33</td>
<td>If I am worrying, I will be less upset when bad things happen</td>
<td>Disagree a lot</td>
<td>Disagree a little</td>
<td>Neither Agree or Disagree</td>
<td>Agree a little</td>
</tr>
</tbody>
</table>
People react in different ways when faced with problems in their daily lives (e.g. health problems, arguments, lack of time, etc). Below are a series of statements. Please read each statement carefully and circle which box best describes you.

<table>
<thead>
<tr>
<th></th>
<th>Statement</th>
<th>Not at all like me</th>
<th>Slightly like me</th>
<th>Moderately like me</th>
<th>Very Like me</th>
<th>Entirely like me</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I see problems as a threat to my well-being.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2</td>
<td>I often doubt whether I can solve problems.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3</td>
<td>Before I try to solve a problem, I think that it is hard to solve problems.</td>
<td></td>
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</tr>
<tr>
<td>4</td>
<td>It often seems like I can't beat my problems.</td>
<td></td>
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</tr>
<tr>
<td>5</td>
<td>When I try to solve a problem I often think I can't</td>
<td></td>
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</tr>
<tr>
<td>6</td>
<td>I often feel that my problems cannot be solved.</td>
<td></td>
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</tr>
<tr>
<td>7</td>
<td>I think my problems will not go away, even if I can think of ways to solve them.</td>
<td></td>
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<tr>
<td>8</td>
<td>I see problems as a danger.</td>
<td></td>
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</tr>
<tr>
<td>9</td>
<td>When I have a problem, the first thing I do is think that I do not have the ability to solve it</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>10</td>
<td>I think my problems as bigger than they really are</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>11</td>
<td>When I think about all the ways to solve a problem, I still wonder if my answer will work</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>12</td>
<td>I think that problems will get in the way of things I need to do</td>
<td></td>
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</tbody>
</table>
Below are one last series of statements. Please read each statement carefully and circle which box best describes you.

<p>| | | | | | | | | |</p>
<table>
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<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>I say ‘stop’ to myself to stop thoughts that I do not want to have</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I talk to people about things which upset me but I do not tell them the most upsetting part</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>When I have thoughts that I don’t want to think about I repeat comforting words or phrases in my head</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>I try to replace upsetting thoughts with ones that don’t upset me</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>I do an activity so I don’t have to think about certain things</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>To stop having pictures upsetting situations in my mind, I describe the event by saying things to myself in my head</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>To stop thinking about things which upset me, I make myself think about something else</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>I think about things which upset me but never let myself think about the worst part of it</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>To stop thoughts I do not want to have I tell myself not to be so stupid</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>10</td>
<td>I pinch or slap myself to stop thoughts I do not want to have</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>11</td>
<td>I tell myself a story about a situation rather than watch the pictures in my head</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>12</td>
<td>I concentrate on smaller details rather than the worst bits of upsetting thoughts</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>13</td>
<td>I stay away from places that make me think about things I do not want to think about</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>14</td>
<td>I often do things (e.g. play with friends or play on computer) so I do not have to think about my thoughts</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td></td>
<td>I think about things which upset me as if they were happening to someone else</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>15</td>
<td>Rather than think about certain things I bring to my mind positive thoughts</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<tr>
<td>16</td>
<td>I keep myself busy so I don’t have to think about things I don’t want to</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>17</td>
<td>To stop thinking about things I don’t want to, I do something I enjoy</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>18</td>
<td>I tell myself to ‘snap out of it’ to stop thoughts that I do not want to have</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>19</td>
<td>There are things I don’t let myself think about</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>20</td>
<td>I stay away from people who make me think about things that I do not want to think about</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>21</td>
<td>I distract myself so I do not have to think about things which upset me</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>22</td>
<td>When I have scary pictures in my mind I talk to myself about what is happening</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>23</td>
<td>I stay away from information (e.g. websites, films, TV) that remind me of things I don’t want to think about</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<tr>
<td>24</td>
<td>There are things I try not to think about</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>25</td>
<td>When I can’t stop myself from thinking upsetting thoughts I try to block out the worst parts</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>26</td>
<td>When I want to get rid of upsetting thoughts I give myself a mental shake</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>27</td>
<td>If a picture in my mind is too scary I talk to myself about it instead</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>28</td>
<td>I avoid activities that make me think about things I do not want to think about</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>29</td>
<td>I try to push thoughts which upset me out of my mind</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td></td>
<td>Description</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
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<td>31</td>
<td>If pictures in my mind are too upsetting I describe the picture instead</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<tr>
<td>32</td>
<td>I try to stop things coming into my mind</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>33</td>
<td>I stay away from situations that make me think about things I do not want to think about</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<td>34</td>
<td>When I start to think about things going wrong I imagine a happier ending</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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<tr>
<td>35</td>
<td>I have thoughts that I try to keep out of my mind</td>
<td>Not at all like me</td>
<td>A little like me</td>
<td>Moderately like me</td>
<td>Very like me</td>
<td>Entirely like me</td>
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</table>

Thank you for taking part
Dear Rob,

Application for Level 2/3 Approval

Re: Age and gender differences in the application of the intolerance of uncertainty model to generalized anxiety symptoms in young people

Thank you for submitting the above research project for review by the Section of Clinical Psychology Ethics Research Panel. I can confirm that the submission has been independently reviewed and was approved on the 19th March 2014.

Should there be any change to the research protocol it is important that you alert us to this as this may necessitate further review.

Yours sincerely,

Kirsty Gardner
Secretary
Clinical Psychology
Appendix 5: Information sheet for parents and pupils

Information sheet version 8, 21.05.14

How young people manage anxious feelings

Information sheet
You are being invited to take part in a research study that is being done as part of a Doctorate in Clinical Psychology at the University of Edinburgh. Before you decide, it is important for you to understand why the research is being done and what you are being asked to do. Please take your time to read this information sheet carefully and discuss it with your parents or carers. You can ask us if there is anything that is not clear. Take your time to decide if you wish to take part or not.

What is the point of the study?
The study is about worry and anxiety in young people. We would like to find out more about how young people manage anxious feelings. We would like to find out if particular ways of thinking and solving problems are more common in people who feel anxious. We hope that by finding this out we can improve care for young people who come to health services for help with anxiety in the future.

Why have I been chosen?
Everyone can feel anxious from time to time. Anxiety is a normal human reaction. We are asking young people aged 11 to 15 to take part in this study. You have been asked to take part because you are aged 11 to 15.

Do I have to take part?
No, it is up to you and your parents or carers to decide if you want to take part. If you decide not to take part your parents or carers should sign and return the reply slip. You can also tell the researcher on the day that they visit your class that you do not want to take part.

If I agree to take part can I withdraw later from the study?
Yes. You can withdraw at any time before you hand in the filled-in questionnaires. You do not need to give a reason for this.

What will I have to do if I take part?
During your tutor group between 8:50am-9:15am, on one day over the next few weeks, you will be asked to fill in some questionnaires. It takes approximately 25 minutes to complete the questionnaires. If you don’t finish before 9:15am you will be given the opportunity to finish during tutor group the following school day. The researcher will be available during the lesson to answer any questions you have about the study. Examples of typical questions asked might be: How often you worry about
things? Do you think worrying is helpful? Do you find uncertainty easy? Do you think you are good at solving problems?

What are the possible disadvantages and risks of taking part?
We do not believe there are any risks in taking part in this study. If you find you feel uncomfortable answering some of the questions you are free to stop taking part at any time.

What are the possible benefits of taking part?
There are no benefits for you personally in taking part in this study. The information we get from this study may help us treat young people better if they seek help for anxiety problems in the future. If you take part in this study you will entered in a prize draw, with the chance to win one of four £25 Amazon vouchers.

Will the information I give be kept private?
All information which is collected will be kept strictly private. This means the consent forms and questionnaires will be kept in a locked cupboard in Royal Crichton Hospital, Dumfries. The only people who will see the answers on questionnaires will be the researcher and their supervisors. You will not put your name on the questionnaires, only your age and gender. This means all your answers will be anonymous (no-one will know who has filled in each questionnaire). All your answers will be put onto an electronic database along with everyone else’s who takes part. All electronic information will be stored on a password protected computer file. Your anonymised data will be kept by the University of Edinburgh for a minimum of ten years.

Who has reviewed the study?
The University of Edinburgh Research Ethics Committee has read all the information about this study. The University of Edinburgh Research Ethics Committee has agreed that this study can go ahead.

Who can I contact for independent advice about the study?
Dr Melanie Platten, Clinical Psychologist
Department of Psychological Services and Research
Queensberry East, Royal Crichton Hospital
Dumfries
Tel: 01387 244495

If you have any questions about the study, please contact the researcher:

Robert Watts, Trainee Clinical Psychologist
Department of Psychological Services and Research
Cree West, Royal Crichton Hospital
Dumfries
Tel: 01387 244495
E-mail: robert.watts@nhs.net
Appendix 6: Introductory letter/opt out form and pupil consent form

Dear Parent or Carer,

I am a Trainee Clinical Psychologist working in Dumfries and Galloway and I am currently doing some research as part of my training with Edinburgh University. I am asking young people in schools in the Dumfries area about their anxious feelings and how they manage them.

I am writing to make you aware that [name of school] is one of the schools participating in the research project in September 2014, and I will be inviting your child to take part. This will involve completing a consent form and answering a set of questionnaires. This should take about 25 minutes and will be completed during the tutor group at the start of the school day. Attached is an information sheet that outlines the aims of the study as well as some answers to some of the key questions you may have about it.

If you do not wish your child to take part in the study please make the school aware by sending back the tear off slip below. If you are happy for your child to take part, then you do not need to take any action. Please make sure you discuss this study with your child so they are aware of it and have sufficient time to decide whether they want to participate or not. If you have any further questions about the study, you can contact me using the details on the information sheet. Many thanks for your time.

Important: If you do not wish your child to take part in the study, please return the reply slip to the school by Friday 19th September 2014.

Yours sincerely

Robert Watts
Trainee Clinical Psychologist

I ________________________________ (name) do not wish my son/daughter ________________________________ (name) in class ________________________________

to take part in the research on anxiety in young people.

Signed ___________________________ Date ___________________________
How young people manage anxious feelings

Pupil Consent Form

Name of Researcher: Robert Watts

Thank you for agreeing to take part in the study. Please read through and sign the consent form. The form must be filled in by you before you start the questionnaires.

Please tick box

1. I confirm I have read and understood the information sheet dated 21st May 2014 (version 8) for the above study and have had the opportunity to ask questions.

2. I understand that I am taking part because I want to and that I can stop taking part at any time, without giving any reason.

3. I agree to take part in the above study.

______________________________  ____________________  ____________________
Name                                      Date                                      Signature

Tutor Group  [name of school]