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Meta-worry, Worry, and Anxiety in Children: Relationships and Interactions

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Meta-worry, worry, and anxiety in children and adolescents: Relationships and interactions

Anxiety disorders in childhood in general, and generalized anxiety disorder (GAD) specifically, have a number of immediate and long-term negative effects for the child, the child’s family, and society at large. For instance, GAD in childhood and adolescence is associated with thoughts of suicide, social problems, and poor academic performance (Albano & Hack, 2004), as well as a lowered quality of life (Blinded reference). The cardinal feature of GAD is excessive and uncontrollable worry, although worry also occurs in a variety of other psychological disorders (Kertz, Bigda-Peyton, Rosmarin, & Björgvinsson, 2012). Theorists believe that worry perpetuates and exacerbates emotional distress (Cartwright-Hatton, 2006). Evidence-based interventions targeting childhood worry are lacking, and the behavioral techniques, which are the focus of current treatment approaches for child anxiety, may be ineffective against worry (Cartwright-Hatton, 2006).

In contrast, Metacognitive Therapy, based on the metacognitive model (MCM) of GAD (Wells, 1995), has proven to be an effective treatment for adults suffering from excessive worry (Sugiura, 2004; van der Heiden, Muris & van der Molen, 2012; Wells & King, 2006; Wells et al., 2010).

The metacognitive model of GAD in adults

A main tenet of the metacognitive model is that a “Cognitive-Attentional Syndrome” (CAS) underlies all emotional disorders (Wells & Matthews, 1996). CAS is described as a state of mind in which attention is fixed on negative self-thoughts (Wells & Carter, 1996). In general, CAS is associated with an increase in cognitive self-consciousness, beliefs that thoughts must be controlled, and a decrease in cognitive confidence. Furthermore, CAS is associated with the presence of positive and negative meta-beliefs. According to the metacognitive model of GAD in adults, it is not the excessiveness or the content of worry, but the metacognitive beliefs held about worry, that are problematic (Wells, 1995). The model claims that positive and negative beliefs
about worry cause normal worry to become maladaptive. Wells proposes that positive beliefs about worry prime the use of worry as a strategy for coping with, preparing for, or avoiding negative future outcomes. These positive beliefs are held both by people with and without GAD. However, when worry becomes excessive, negative meta-beliefs about worry (e.g., that worry is uncontrollable, and that it can lead to negative consequences for the worrier) activate “meta-worry” (worry about worry; Wells, 1995). While the MCM of GAD for adults proposes that positive and negative beliefs about worry lead to the development and maintenance of GAD, it is the negative beliefs about worry which distinguish normal worry from the complicated worry found in GAD sufferers (Wells, 1995). Research involving adults supports this supposition (Cartwright-Hatton & Wells, 1997; Davis & Valentiner, 2000; Wells & Carter, 2001; Wells & Papageorgiou, 1998).

The metacognitive model of GAD in children

Unlike adult GAD, little is known about GAD in children (Cartwright-Hatton, Reynolds & Wilson, 2011). A recent literature review, evaluating the applicability of the metacognitive model of GAD in children and adolescents, concluded that an extension of Wells’ (1995) model to children is promising (Ellis & Hudson, 2010). This conclusion was based on developmental literature suggesting that children are capable of many of the cognitive components of the Wells model. For instance, young children from around the age of four years possess metacognitive knowledge such as knowing that the content of thoughts can include things that are not present, and from the age of six years children are capable of knowing when and how they came to know something (Flavell, 1999). Between the ages of five and eight, children acquire the knowledge that attention is selective and limited (Pillow, 2008). A finding directly relevant to the MCM, is that nine-year-olds, like adults, understand that thoughts can be automatic and difficult to control (Flavell, Green, & Flavell, 1998). The clinical literature offers findings even more pertinent to the
applicability of the MCM to children. A study on childhood worry revealed that children between
the ages of 8 and 13 can think of worry as difficult to control, and use distraction strategies and
discussion of their worries to deal with them. Moreover, some endorsed benefits (i.e. positive
beliefs) of worrying (Muris, Meesters, Merckelbach, Sermon, & Zwakhalen, 1998). A recent study
found that 56% of children sampled between 6 and 10 years of age endorse positive beliefs (e.g.,
“worry makes you think things through first”; “worry keeps you safe” p. 8) and negative beliefs
about worry (e.g., “worry can make your tummy hurt”; “worry makes you not concentrate” p. 9),
with no age-related effect within this age-range (Wilson & Hughes, 2011). The lack of age-related
effect in relation to metacognition is, however, corroborated by other studies assessing samples with
wider age-ranges, e.g. adolescents aged 13 to 17 years Cartwright-Hatton et al., 2004; Ellis &
Hudson, 2011) and children aged 9 to 17 years (blinded reference), but not all (Bacow, Pincus,
Ehrenreich, & Brody, 2009). The latter study reported an increase in cognitive monitoring with age
in a sample of 7 to 17 year old youth.

If the MCM is applicable to children, then research should demonstrate associations
between meta-beliefs and worry and anxiety in younger samples, as are found in adult populations
Research in child populations supports some of these connections.

Findings on the occurrence of negative beliefs about worry in youth with anxiety disorders
are mixed. In support of the MCM, anxious youth rate their worries as more intense than non-
anxious youth (Perrin & Last, 1997), and youth with specific phobia (Weems, Silverman & La
Greca, 2000). However, another study found no significant difference in level of negative beliefs
about worry held by clinical and non-clinical youth (Bacow et al., 2009). A second paper based on
the same sample also reported no differences between children and adolescents with a principal
diagnosis of GAD compared to other types of anxiety disorders on need to control thoughts,
negative, and positive meta-beliefs (Bacow, May, Brody, & Pincus, 2010). A finding in this study was that the control group endorsed higher levels of cognitive monitoring than the clinical groups with generalized and separation anxiety disorders. The conclusions that may be drawn are limited by the high number of youth with subclinical psychopathology levels in the non-clinical group (Bacow, May, Brody, & Pincus, 2010).

Contrasting these findings, two recent studies of clinical youth reported elevated levels of both positive and negative metacognitions compared to non-clinical controls (Ellis & Hudson, 2011; Smith & Hudson, 2013). Clinically anxious adolescents, however, did not differ from non-clinical controls on the cognitive confidence and cognitive self-consciousness subscales, but did report higher levels of metacognitions regarding the need to control thoughts to prevent bad things from happening (Ellis & Hudson, 2011). Adolescents who fulfilled criteria for a GAD diagnosis did not differ from adolescents who suffered from anxiety other than GAD when post hoc corrections were conducted (Ellis & Hudson, 2011).

Overall, the MCM has received partial support in clinically anxious child and adolescent samples at present. It remains unclear whether negative metacognitions can distinguish between youth with GAD and those with other types of anxiety disorders, and what role, if any, positive metacognitions may play in childhood anxiety disorders. Therefore, the aim of the present study is to test the applicability of the MCM of GAD to children and adolescents by answering the question: Do children and adolescents experience similar processes in GAD and worry as those found in adults? We address this question in two studies investigating first a community sample of youth and second a clinically anxious sample and a non-anxious control sample of children.

**Study 1**
Study 1 seeks to test the MCM in youth by investigating the relationship between metacognitions and worry and anxiety in a community sample of children and adolescents, and assess the strength of the MCM in predicting pathological worry and anxiety in youth. Based on the MCM of GAD, we hypothesize that there will be positive relationships between positive metacognitive beliefs and levels of anxiety and worry. We also hypothesized that negative beliefs about worry, as the driving factor in GAD (Wells & Carter, 2001), will have the greatest influence on the variance of worry and anxiety levels.

Methods

Participants.

Participants were recruited from public schools in Denmark, grades four through nine (median grade = 6; age range 9-17 years). A total of 1134 children and adolescents participated in an extensive testing battery providing data to a number of studies. We expected this to increase the risk of randomly missed items. We replaced missing scores with the mean of the scales, when 20% or less of the items were missing in a scale. Children with more than 20% missing on any of the applied scales were eliminated from the present study. Thus, the final sample consisted of 587 youth, after eliminating cases with missing data ($n = 547$). We found no statistical differences in gender, parental education, number of parents in the home, or family income between participating children and those who were eliminated from the present study due to incomplete questionnaires. A statistically significant difference in age ($t(1096) = -7.01, p < .0001$) was found between those who were excluded from the study ($M = 11.90, SD = 1.59$) and those who were included ($M = 12.59, SD = 1.66$). However, the difference between means was just six months of age.

Of the final sample, 300 (51%) were children (9 to 12 years of age; mean ($SD$) 11 years (9.9 months)), 165 (55%) of whom were female. Adolescents made up 287 (49%) of the participants (13
to 17 years of age; mean (SD) 14 years (10.8 months); 157 (55%) were female. The sample was selected to include children attending 4th grade through the end of public school (9th grade). By 4th grade most children are expected to have acquired sufficient reading skills to complete questionnaires. Adolescents were sampled in addition to children, in order to examine any age-related effects.

Measures.

**Metacognitive beliefs.** The Metacognitions Questionnaire for Children 30 (MCQ-C30; Blinded reference) is a translation of the German *Meta-Kognitionen Fragebogen für Kinder* (MKF-K; Gerlach, Adam, Marschke, & Melfsen, 2008), which is a simplified version of the adolescent version of the Metacognitions Questionnaire (MCQ-A; Cartwright-Hatton et al., 2004). In contrast to the MCQ-C (Bacow et al., 2009), it contains all of the original five subscales that make up the adolescent and adult versions of the questionnaire. It assesses metacognitive processes based on five fundamental tenets of the MCM: “positive beliefs about worry”; “negative beliefs about worry”; “low cognitive confidence” (which is thought to increase attempts to control thoughts); “the need to control thoughts to avoid negative consequences” (which is thought to result in attempts to suppress “dangerous” thoughts); finally, “cognitive self-consciousness”, which assesses the general activity of “self-referent processing” (which is purposed to make worry and meta-worry worse (Wells, 1995)). Metacognitive beliefs are assessed on a 4-point scale (1 = not at all to 4 = completely). Higher sumscores of the full scale and five subscales indicate a greater number and strength of meta-beliefs endorsed. Other studies support a five-factor structure of the MCQ-C30, and significant and strong correlations between the MCQ-C30 and a measure of worry indicate strong concurrent validity. The internal consistency of the MCQ-C30 scale has also been reported to be satisfactory for youth aged 9-17 years (Blinded reference).
**Worry.** The Penn State Worry Questionnaire for Children (PSWQ-C; Chorpita, Tracey, Brown, Collica, & Barlow, 1997) measures the intensity and uncontrollability of worry in children on a 4-point scale ranging from 0-3. A total sumscore is calculated (after recoding three reversed items) with higher scores indicating more worry. The Danish version of the PSWQ-C demonstrates high internal consistency and moderate to high convergent validity (Blinded reference).

**Anxiety.** Screen for Child Anxiety Related Emotional Disorders (SCARED-R; Muris, Merckelbach, Schmidt, & Mayer, 1999; Muris, Merckelbach, van Brakel, & Mayer, 1999) measures child anxiety disorders as defined by the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association, 1994). The 69 items are scored on a 3-point scale (0 = *almost never*, 1 = *sometimes*, and 2 = *often*). The original and Danish-version of the measure are reported to have good internal consistency, satisfactory test-retest reliability, and discriminant validity (Blinded reference; Muris, Merckelbach, Schmidt et al., 1999; Muris, Dreessen, Bögels, Weckx, & van Melick, 2004).

**Procedure.**

An invitation letter was sent to all 210 primary schools in Denmark that had more than three classes in each grade. Nineteen schools consented to participate. Following Danish ethical guidelines, teachers distributed information letters to families and subsequently collected written consent from parents. The participating schools were geographically diverse, representing urban and rural areas in all of Denmark. Project staff administered the test battery in a predetermined order, providing aid as needed. Assent to participate from the youth was obtained orally, and the children were tested in a classroom where their peers could not see their responses to the questions. The youth were given a small token of appreciation for their participation (a pencil or pen).
Data analysis.

To test whether positive and negative metacognitions are significant predictors of pathological worry and anxiety in children, a multiple regression analysis was run twice, first with PSWQ-C (measuring worry) as the outcome variable, and second with SCARED-R (measuring anxiety generally) as the outcome variable. Given the established effects of age and gender on reports of worry and anxiety, age and gender were entered as covariates in the first step of both analyses. As worry and anxiety are significantly correlated, they were each added as a covariate when the other was the outcome variable. Secondly, the multiple regression analysis was run adding each of the five metacognitive processes (subscals from the MCQ-C30) as covariates to assess if they could explain the variance in worry and anxiety beyond the effect of gender, age, and anxiety or worry in the first step.

Results

The results of the regression of worry scores (PSWQ) on gender, age, anxiety, and MCQ-C30 scores are presented in Table 1. In the first step, gender, age, and anxiety predicted a significant proportion of the variance in worry ($R^2 = .32, F(3, 583) = 91.21, p < .0001$). Adding the set of metacognitive processes made an additional individual and significant contribution to the variance in worry ($\Delta R^2 = .46, F(8, 578) = 61.92, p < .0001$). The metacognitive processes accounted for an extra 14% of the variance in worry beyond the effect of gender, age, and anxiety. The Positive and Negative Beliefs About Worry scales, as well as the Cognitive Confidence and Cognitive Self-Consciousness made significant contributions to the variance of worry, with negative meta-beliefs emerging as the strongest overall predictor of worry. Gender and the Need for Control scale, however, did not add to the model’s predictive ability of worry.
Somewhat similar results were found when anxiety (SCARED-R) was the outcome variable (see Table 1). Gender, age, and worry predicted a significant proportion of the variance in anxiety ($R^2 = .40$, $F(3, 583) = 132.22, p < .0001$). However, the set of metacognitive processes made an individual and significant contribution to the variance in anxiety scores when added to the model ($\Delta R^2 = .51$, $F(8, 578) = 76.43, p < .0001$), accounting for an extra 11% of the variance in anxiety.

The Negative Beliefs About Worry scale emerged as a stronger predictor of anxiety than the other metacognitive processes, age, and even worry; The Positive Beliefs About Worry scale was the only metacognitive subscale that did not improve the predictive ability of the model. Overall, gender provided the largest contribution to the predictive strength of the model, with girls reporting higher levels of anxiety than boys.

Discussion Study 1

Results from the regression analyses offer further support for the extension of the MCM of GAD to children. Metacognitive processes accounted for an extra 14% of the variance in worry beyond the effects of gender, age, and anxiety, and an additional 11% of the variance in anxiety in youth beyond the effects of gender, age, and worry. This supports the primary hypothesis that the MCM has predictive value in levels of worry and anxiety symptoms in children and adolescents. The results are also consistent with previous findings. For example, in an adult sample, metacognitive processes predicted anxiety independently of gender, and worry (Spada et al., 2011) and positive beliefs about worry predicted the variance in worry scores in adolescents (Laugesen, Dugas, & Bukowski, 2003). In our study, positive meta-beliefs about worry did not predict anxiety symptoms, which is in contrast to the findings of two other studies of youth (Ellis & Hudson, 2011; Smith & Hudson, 2013). These studies reported positive associations between positive meta-beliefs and anxiety symptoms and emotional symptoms; this lack of consistency may have been caused by
differences in methodological approach. In our study, we controlled for level of worry in our analyses of anxiety symptoms. As worry and anxiety are correlated, this may explain the lack of predictive power of the positive beliefs in relation to anxiety in our study. The inability to predict the presence of anxiety based on positive beliefs is consistent with previous findings in both adults and youth (Bacow et al., 2009; Cartwright-Hatton & Wells, 1997). Finally, in our study, negative beliefs about worry explained the most variance in worry compared to any other predictor in the model and more of the variance in anxiety scores than the other metacognitive processes. This is also in-line with previous findings from adult (Spada, Mohiyeddini, & Wells, 2008) and child research (Ellis & Hudson, 2011; Smith & Hudson, 2013).

In the second regression model, gender made the largest contribution to the variance in anxiety scores, with girls reporting more anxiety than boys. This finding may be explained by girls reporting significantly higher metacognitions and anxiety than boys. Indeed, a study using a sample related to the current one found that level of anxiety mediated the relationship between female gender and higher scores on the metacognitions questionnaire (blinded reference). The recent findings are consistent with a previous study that found that girls report higher negative repetitive thinking and anxiety (Muris, Roelofs, Meesters & Boomsma, 2004), suggesting that it is plausible that girls hold more maladaptive metacognitions than boys. The Need for Control scale offered the second largest contribution to the variance in anxiety among the metacognitive processes, although it did not significantly contribute to the variance in worry scores. According to the metacognitive theory of emotional disorder, the Need For Control scale is more characteristic of obsessive-compulsive disorder than it is of GAD (Wells, 2000). The SCARED-R incorporates obsessive-compulsive disorder (OCD) symptoms to a greater extent than the PSWQ-C scale, which may in part explain this difference in results.
Study 2

The second study is one of few that explore metacognitions in children as young as seven years, and it is the first to do so using the MCQ-C30. Furthermore, it expands the findings from Study 1 by including children with clinical levels of anxiety. The MCM of GAD for children is tested by comparing a group of children with GAD, a group of children with anxiety disorders other than GAD (Oth.AD) and a non-clinical control group of children.

Based on theory, we expect to find that children with GAD have more negative beliefs about worry than both non-clinical children, and children with other anxiety disorders. Furthermore, as all metacognitive processes play a role in the development and maintenance of emotional disorders in adults, we expected that anxious (Oth.AD) children should endorse more metacognitive beliefs than non-anxious children. Previous findings offer conflicting results in respect to differences in metacognitive processes in clinically anxious and non-anxious youth (Bacow et al., 2010; Cartwright-Hatton et al., 2004). Additionally, studies including childhood and adolescent samples have not, as the theory suggests, been able to differentiate GAD samples from samples with other anxiety disorders (Bacow, et al., 2010; Ellis & Hudson, 2011). In accordance with the metacognitive theory of adult GAD, we hypothesized that (a) there would be no significant differences between levels of positive meta-beliefs between the clinical and non-clinical children, and (b) that the GAD group would endorse significantly more negative metacognitive beliefs than the Oth.AD group and the non-clinical group.

Methods

Participants.

Children with anxiety disorders aged 7-13 years, who were recruited for a randomized treatment project were also enrolled in the present project. Control children without disorders were
selected to resemble the clinical sample. The project enrolled 99 families between February 18th, 2009 and July 20th, 2012. Six families were excluded from the main data analysis because of missing data on the MCQ-C30. Participants in the final data set (N = 93) ranged in age from 7 to 12 years, and had a mean age of 9 years and 9.36 months (SD = 1 year and 7.68 months), and 46 (49.5%) of the participants were girls. Children as young as seven years old were sampled because at this age many children are capable of the metacognition required by the MCM. Adolescents above age 13 years were not included as the sample came from a larger clinical trial focused on children. All participants had at least one native Danish-speaking parent. School psychologists, physicians, or parents referred clinical participants to the study.

Parents and children in the control group volunteered participation after receiving an information letter that they received by post or via their teacher. All participants provided written informed consent. During testing, questionnaires were read out loud to any children who did not have sufficient reading skills to read themselves. To ensure that those who read the questions themselves did this correctly, they were asked to read the questions out loud before answering them.

Measures.

**Metacognitive beliefs.** For a description of the MCQ-C30 see Study 1. As the MCQ-C30 had not been validated on children below age 9 years, we calculated the internal consistency for the children aged 7-8 years (n=23) using Chronbach’s alpha. The internal consistency for the total score was excellent (α = .91). The subscales of Positive beliefs, Negative Beliefs, and Cognitive Self-Consciousness all displayed acceptable internal consistency (α = .73; α = .71; α = .75, respectively), whereas the Need to Control Thoughts and Cognitive Confidence displayed lower, yet acceptable, internal consistency (α = .62; α = .69).
Anxiety Diagnosis. The Anxiety Disorders Interview Schedule for DSM-IV, Child and Parent Versions (ADIS-IV-C/P; Silverman & Albano, 1996) were used for diagnosis of anxiety disorders. The ADIS-IV-C/P comprises independent parent and child semi-structured interviews, which are designed to elicit information on DSM-IV-defined symptoms of anxiety disorders, and other psychopathology. A clinical severity rating (CSR) scale ranging from 0-8 is used to rate the severity of symptoms. Clinical levels of difficulties receive a score of \( \geq 4 \). In the present study, the applied diagnoses were the composite score from the child and parent interviews. All interviews were administered by students or staff who had received training in administering and scoring of the interview. Ongoing supervision was provided throughout the project period to ensure reliability of the diagnoses. Consensus-scores were created based on video recordings of the interviews, in cases that were difficult or ambiguous.

In order to compare the metacognitions of children with GAD to those with other anxiety disorders and non-anxious children, the ADIS-C/P was used to categorize children into the three diagnostic groups; GAD; Other Anxiety Disorder; and Non-Clinical.

The GAD group was created using similar criteria as applied in the study by Ellis and Hudson (2011): A total of 22 children met criteria for GAD as either a primary \( (n = 11) \), secondary \( (n = 9) \), or tertiary diagnosis \( (n = 2) \). Those with a secondary or tertiary GAD diagnosis had separation anxiety (SAD; \( n = 7 \)) and specific phobia \( (n = 4) \) as their primary disorders. Ten children \( (46\%) \) in the GAD group had a secondary disorder and 11 \( (50\%) \) also had a tertiary disorder. All of these were anxiety disorders, except for one child, who had a tertiary mood disorder.

The group with other anxiety disorders (Oth.AD) comprised 28 children who did not meet criteria for GAD, but had either separation anxiety disorder \( (n = 17) \), specific phobia, \( (n = 8) \), or social phobia \( (n = 3) \) as their primary disorder. Children with a primary disorder of OCD are, unlike the other anxiety disorders, typically treated in the psychiatric system in Denmark, and were
therefore not enrolled in the present study. A total of 9 children (32%) in the Oth.AD group had a secondary disorder and 8 (29%) also had a tertiary disorder. Apart from other anxiety disorders, the secondary disorders consisted of one case of OCD, mood disorder, and post-traumatic stress disorder (PTSD), and one tertiary disorder of defiant behavior/conduct disorder.

Control children (n = 43) did not meet criteria for any disorder assessed by the ADIS-IV-P. Informants were only asked to provide CSRs if the required number of symptoms and criteria for receiving a diagnosis were met. No child in the non-clinical group met the diagnostic criteria required to warrant a CSR. Therefore, they received a CSR of zero.

**Ethical Considerations.**

The study was approved by the Internal Ethical Review Board of the University of Copenhagen, Denmark. The project adhered to national and university specific ethical guidelines regarding clinical projects. Questionnaire packages were mailed to the families, and completed at home. Oral assent was obtained by the child prior to further assessment, which was conducted by trained project staff. All clinically anxious children were provided with CBT treatment at the anxiety clinic, whereas, children in the control sample were given a gift certificate as an expression of appreciation for their participation.

**Data analysis.**

Mann-Whitney tests were performed to determine whether the control group and the combined clinical groups differed in household income or parental education level. Chi-square was employed to detect possible gender differences between the three groups. A one-way ANOVA was calculated to examine age differences between groups.
For the main analyses, a MANOVA was run with diagnostic group as the independent variable and the five metacognitive processes as the dependent variables. The multivariate test statistic Pillai’s trace was used as it is considered the most conservative and robust method (Field, 2009), due to unequal sample sizes and inequality of covariances of the present data. Finally, post hoc Bonferroni analyses were conducted to determine between-group differences on the subscale level.

Results

Demographics.

The Mann-Whitney tests suggest that control and clinical participants were comparable in terms of mother’s level of education and household income. However, the fathers of the children in the clinical groups ($Mdn = 4.00$; medium-length practical education) had a significantly lower level of formal education compared to fathers of children in the control group ($Mdn = 5.00$; masters-level education or higher), $U = 408.50$, $z = -2.83$, $p < .01$. The modal level of education of mothers of non-anxious children was at the masters-level or higher, while that of mothers of children with clinical anxiety tended to be at the bachelor level, but this difference was not significant. The highest bracket of household income (more than 130,000 USD) was the most frequently reported level of income for the participating families. There was no association between group membership and gender. Finally, no differences were found in mean age between the control, Oth.AD, and GAD groups.

Effects of diagnosis on metacognitions.

The MANOVA revealed a significant multivariate main effect for diagnostic group using Pillai’s trace, $V = 0.42$, $F(10, 174) = 4.69$, $p < .05$, $\eta^2 = .21$. Group total and subscale mean scores on the MCQ-C$_{30}$ for the three diagnostic groups are reported in Table 2. The GAD group scored
highest on all of the subscales, followed by the group with other anxiety diagnoses, and the control
group scored lowest. Post hoc Bonferroni analyses revealed that there were no differences between
the control group and Oth.AD group on Positive Beliefs, Cognitive Confidence, or Cognitive Self-
Consciousness. However, the Oth.AD group had significantly higher levels of Negative Beliefs ($p < 
.01$) and Need to Control Thoughts ($p < .01$) compared to the control group.

Further, the GAD group endorsed higher levels of metacognitive beliefs than the control group
on all subscales (POS: $p = .03$; NEG: $p < .01$; NC: $p < .01$; CC: $p = .04$) except the Cognitive Self-
Confidence scale. The GAD group also held higher levels of metacognitive beliefs than the other
anxiety group on the Negative Beliefs subscale ($p = .04$).

**Discussion study 2**

**Negative meta-beliefs.**

Results of the MANOVA support our hypothesis that children with GAD would endorse
significantly more negative beliefs about worry than children with other anxiety disorders. This
finding is also in accordance with the MCM of GAD (Wells, 1995) and is consistent with results
found in adult populations (Cartwright-Hatton & Wells, 1997; Davis & Valentiner, 2000; Wells &
Carter, 2001; Wells & Papageorgiou, 1998). However, these findings are only partially supported
by previous studies of childhood and adolescent samples. Two recent studies report elevated levels
of negative beliefs among clinical youth when compared to non-clinical controls (Ellis & Hudson,
2011; Smith & Hudson, 2013). However, differences between adolescents with GAD and other
types of anxiety became non-significant after post hoc corrections were conducted (Ellis & Hudson,
2011). Another study also reported no significant differences in negative beliefs about worry in
youth with GAD, other types of anxiety, and non-anxious youth (Bacow et al., 2010).
Viewed in the light of these contrasting previous findings, the current finding that children with GAD endorse significantly more negative beliefs about worry than children with other anxiety disorders is noteworthy. Especially given that only 50% of our GAD group presented with GAD as the primary diagnosis. Ellis and Hudson (2011), as in the present study, included children with GAD as any one of their recorded diagnoses, while Bacow et al. (2010) categorized youth into five groups based on their primary diagnosis. Our study thus lends even more support to a MCM model of GAD in youth, than previously reported.

An additional explanation for the discrepancy in findings may be the methodological differences in assessment. Differences in assessment of beliefs about worry may have affected the results. In most previous studies that have included clinical samples (Bacow et al., 2009; 2010; Smith & Hudson, 2013), the Metacognitions Questionnaire for Children (Bacow et al., 2009) was employed. This instrument has obtained satisfactory psychometric properties when assessed in samples with a mean age of 11 years (Bacow et al, 2009; 2010); however, it has a poor internal consistency for children aged 7-8 years of age (Smith & Hudson, 2013). This may somewhat limit the findings from previous studies that have included younger children and highlights the need for further development of psychometrically sound measures of metacognitions in younger children.

The MCQ-C30, which was used in the present study, has been reported to display adequate reliability in a community sample of children aged 9-17 years of age (Blinded reference), and our analyses of the internal consistency for the 7-8 year old children in the present study suggests that the MCQ-C30 may be a better instrument for younger children than the MCQ-C ($\alpha$’s for the MCQ-C30 vs. MCQ-C: POS, $\alpha = .73$ vs. .46; NEG, $\alpha = .71$ vs. .64; CSC, $\alpha = .75$ vs. .61; NC, $\alpha = .62$ vs. .25; Smith & Hudson, 2013).

Positive meta-beliefs.
The present study also found that children with GAD, but not other types of anxiety, endorsed significantly more positive beliefs about worry than children in the control group. This was incongruent with findings from previous studies employing both youth and adult samples, where no significant difference between patient and non-patient groups in positive beliefs about worry have been reported (Bacow et al., 2010; Cartwright et al., 2004; Cartwright-Hatton & Wells, 1997). Furthermore, one study of children (aged 8–13) who met criteria for GAD found that they were not able to report on positive aspects of worry, while 30.8% of non-anxious children (aged 8 – 13) were able to endorse that worrying has benefits (Muris et al., 1998). Our findings are, however, in line with two of the most recent studies of the MCM in youth. In both studies, clinically anxious children endorsed higher levels of positive beliefs than non-clinical controls (Ellis & Hudson, 2011; Smith & Hudson, 2013).

Cognitive confidence, need to control thoughts and cognitive self-consciousness.

Children with GAD, but not other types of anxiety, also reported higher scores on the cognitive confidence scale than non-clinical controls, indicating lower levels of confidence. This is partly consistent with the study by Ellis and Hudson (2011) who reported no significant differences between clinically anxious and non-anxious children. Other studies have not explored this aspect of metacognition, as they have used the MCQ-C which does not assess cognitive confidence. Apart from differences regarding positive and negative beliefs, we found that anxious children, regardless of diagnosis, had higher levels of meta-beliefs about the need to control thoughts than non-clinical controls. This finding is also in line with Ellis and Hudson (2011), applying the MCQ-A (on which the currently applied MCQ-C\textsubscript{30} is based), but not with studies applying the MCQ-C, where no differences between the clinical and non-clinical groups were found (Bacow et al., 2010; Smith & Hudson, 2013).
Finally, the current study found no significant differences between any of the groups on cognitive self-consciousness. This is consistent with results from previous studies applying adult, adolescent, and childhood samples (Cartwright-Hatton et al., 2004; Cartwright-Hatton & Wells, 1997; Ellis & Hudson, 2011; Smith & Hudson, 2013), but inconsistent with another study of a childhood sample (Bacow et al., 2010). In the latter study, non-anxious youth were reported to have significantly higher levels of cognitive monitoring compared to clinically anxious youth with GAD and SAD.

General Discussion

The present studies aimed to assess the extent to which children experience the same processes in worry and GAD as have been found in adults. According to Cartwright-Hatton and colleagues (2011), this is the first step in extending an adult model of anxiety to children. Previous studies of the MCM in childhood and adolescent samples have only provided partial support for the model (e.g., Bacow et al., 2010; Cartwright-Hatton et al., 2004; Ellis & Hudson, 2011; Matthews, Reynolds, & Derisley, 2006). Our results offer the most substantive support for the applicability of the metacognitive model of GAD (Wells, 1995) to children as young as seven years of age. The strongest support comes from the role of negative worry beliefs. Study 1 suggests that having negative beliefs about worry is the metacognitive process that makes the largest contribution to the variance in worry and anxiety. Study 2 takes these findings a step further in demonstrating that a significant difference between anxious children with and without GAD is negative worry beliefs. This is consistent with theory (Wells, 1995) and previous research (Cartwright-Hatton & Wells, 1997; Davis & Valentiner, 2000; Wells & Carter, 2001; Wells & Papageorgiou, 1998).

According to the developmental psychopathology paradigm, metacognitions are only pieces of a large and complex puzzle that is the etiology of GAD (Kertz & Woodruff-Borden, 2011; Rapee,
Nonetheless, focusing on the developmental mechanisms of anxiety disorders may provide a useful way of understanding present and previous findings from childhood samples. Generally, elevated levels of positive metacognitions have been reported when comparing clinical groups to non-anxious control groups. Two studies have reported elevated levels when comparing clinically anxious children with controls (Ellis & Hudson, 2011; Smith & Hudson, 2013), whereas, our study found that only the GAD group reported higher levels of positive beliefs compared to non-clinical controls. Initially, these findings of higher levels of positive metacognitions in clinical samples compared to non-clinical samples, may seem contradictory to the findings regarding positive metacognitive beliefs in adults populations (Cartwright-Hatton & Wells, 1997); however, a tentative developmental model of the MCM is provided that may account for this difference. As research within this field is still in its infancy, the model can be no more than speculative, and further research must be conducted to test its validity.

We propose that as children develop sufficient cognitive capacity for worry, some children will develop higher levels of positive metacognitive beliefs than others. Positive meta-beliefs elicit higher levels of worry, and worry is correlated with anxiety. We therefore propose that these children will experience higher levels of anxiety symptoms, albeit within the sub-clinical range. In some cases anxiety may reach pathological levels, which are then maintained by positive as well as negative meta-beliefs, especially in GAD.

Anxiety disorders are known to persist across time, and the longer the anxiety disorder persists, the more the child will suffer. Increased suffering may cause the young person to reevaluate the usefulness of worry. If worry is seen as potentially harmful, it may cause the young person to reduce his/her positive meta-beliefs to the level of that seen in the non-clinical adult and some adolescent populations (Cartwright-Hatton, et al., 2004). This would explain the lack of difference between positive meta-beliefs seen in adult populations (Cartwright-Hatton & Wells,
1997). Thus, the presence of elevated levels of positive metacognitive beliefs depends upon the level of suffering experienced by the child and the duration of the anxiety disorder.

Limitations

The current studies are not without limitations, and these should be taken into account when interpreting results. First, both studies are cross-sectional; therefore, definitive conclusions about the etiology of GAD in youth cannot be made. Additionally, Study 1 had issues with missing data. In Study 1, nearly half of the original participants were eliminated from the study due to incomplete items on questionnaires. However, Study 1 still offers a large, nationally representative sample providing substantial power, justifying investigation of the metacognitive model for GAD in children. The sample size in Study 2 is limited, and firm conclusions should not be drawn before the findings have been replicated with a larger sample. Furthermore, the issues of sample size made it impossible to breakdown the Oth.AD groups into groups based on specific anxiety diagnoses. However, we believe that the decision to collect all non-GAD anxiety disorders into one group was theoretically sound as the MCM (Wells, 1995) states that key metacognitive processes distinguish GAD from other anxiety disorders. Another limitation is that the samples of our two studies differ in age-span. Study 1 did not include younger children, whereas study 2 did not include adolescents. We did not assess children aged 7 and 8 in Study 1, as these would not have possessed the required reading skills to complete the questionnaires independently. In Study 2, the questionnaires were read out loud to the children who did not have sufficient reading skills to read themselves. In the latter study, we enrolled children who had been referred to a research clinic for treatment. Only 7-13 year old children were eligible for treatment at the clinic, and we were therefore not able to include adolescents. Although some studies do not report age-related differences (e.g., Ellis & Hudson, 2011; Wilson & Hughes, 2011), we still caution the reader against drawing firm
conclusions based on the present data before these have been replicated in samples including the entire age-range, as metacognitions may develop in early childhood.

Furthermore, we did not control for worry content in our studies, which may have affected our findings. However, Bacow and colleagues (2010) apply a more rigorous design controlling for worry content and did not find differences between subsamples of children with varying anxiety disorders. Nonetheless, one cannot exclude the possibility that their findings were due to secondary GAD diagnoses in the other anxiety subgroups. Despite this difference in sampling, and although theory states that meta-beliefs about worry rather than worry content differentiates sufferers of GAD from sufferers of other anxiety disorders, controlling for worry content may have provided different results in our study.

**Implications for Research, Policy, and Practice**

Although studies are emerging assessing the MCM in childhood and adolescent samples, further studies are still warranted. The field would benefit from research addressing the question of specificity of the MCM. Including larger samples of children with other disorders, e.g., depressive or OCD symptoms would allow for comparisons between these groups and GAD. It would be useful to examine whether these disorders share common maintaining processes or whether some (particularly GAD) involve unique metacognitive processes, as has been shown in certain adult studies (Wells & Carter, 2001; Wells & Papageorgiou, 1998; Yilmaz et al., 2008). In the future, longitudinal studies and intervention designs involving even younger children, who have yet to develop metacognitive beliefs, might illuminate what, if any, casual role metacognitions have in the development of GAD. Longitudinal studies would also provide a means of testing the tentative developmental model of the MCM. Additionally, experimental designs manipulating the levels of worry, or studies involving samples with differing levels of disturbance (e.g. non-clinical, sub-
clinical, out-patient and in-patient) would allow for further testing of the model. Finally, studies addressing the possible role of transmission of metacognitions from parents to child will also increase our understanding of the developmental mechanisms of metacognitive beliefs and anxiety.

In summary, the current data support the extension of the metacognitive model of GAD to children as young as seven years of age, and a tentative developmental model of the MCM is provided. However, more research is needed to increase our understanding of the mechanisms of worry and GAD in children. Nevertheless, the current results have important implications for the understanding and treatment of GAD in children. First, an increased attention to elevated levels of positive meta-beliefs may be indicative of children at risk for developing anxiety disorders, especially in the presence of sub-clinical anxiety levels. Assessments should be conducted using psychometrically sound tools. Although tools are available, these need further work to increase their validity and reliability among young children; at present, the newly developed MCQ-C30 provides the best internal consistency for use with children age 7-8 years. Finally, the findings from existing studies of child and adolescent samples are sufficiently encouraging for the development and testing of Metacognitive Therapy for children with GAD.
References


