Understanding and assessing worrying – analyzing relevant psychopathological mechanisms relevant for generalized anxiety disorder across the lifespan

I n a u g u r a l - D i s s e r t a t i o n

zur
Erlangung des Doktorgrades
der Humanwissenschaftlichen Fakultät
der Universität zu Köln
nach der Promotionsordnung vom 10.05.2010

vorgelegt von
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Köln 2014

Diese Dissertation wurde von der Humanwissenschaftlichen Fakultät der Universität zu Köln im April 2015 angenommen.

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Tag der mündlichen Prüfung: 08.04.2015

Erwachsene haben ihre Sorgen. Kinder haben ihre Sorgen. Und manchmal sind die Sorgen größer als die Kinder und die Erwachsenen, und dann werfen die Sorgen, weil sie so groß und breit sind, sehr viel Schatten. Und da sitzen dann die Eltern und die Kinder in diesem Schatten und frieren.

Erich Kästner

DANKSAGUNG

Ich möchte mich an dieser Stelle gern bei all denen, die mich auf diesem Weg begleitet und unterstützt haben und so zum Gelingen dieser Arbeit beigetragen haben, von Herzen bedanken.

An erster Stelle ist zweifellos mein Betreuer und „Doktorvater“ Prof. Dr. Alexander Gerlach zu nennen. Ich weiß sehr zu schätzen, dass neben der kompetenten und engagierten Begleitung seine Bürotür für Fragen aller Art immer offen stand. Sein großer Wissensfundus, die Ideenvielfalt und Freude an der Forschung haben meine berufliche Entwicklung sehr bereichert, wofür ich mich herzlich bedanken möchte.

Zu meiner großen Freude hat sich Frau Prof. Dr. Jutta Stahl bereit erklärt die Zweitgutachterin dieser Arbeit zu sein. Durch die Arbeit „Tür an Tür“ war sie in meiner Promotionszeit ein wichtiger Begleiter, wofür ich sehr dankbar bin. Nicht nur ihr offenes Ohr für fachliche Fragen aller Art, sondern auch die aufmunternden Worte waren für mich eine sehr wertvolle Unterstützung.

Auch bedanke ich mich bei meinen Mitdoktoranden und Arbeitskollegen für den unterstützenden Austausch und für die wertschätzende Arbeitsatmosphäre. Ein besonderer Dank für die schnelle Hilfe bei technischen Fragen und Problemen gilt Gerhard Mutz. Außerdem möchte ich mich bei der Diplomandin Susanne Adam herzlich bedanken, deren Daten ich verwenden durfte.

Zudem möchte ich mich bei allen Versuchspersonen der vorliegenden Studie bedanken, ohne die diese Arbeit nicht möglich gewesen wäre.

Allen meinen lieben Freunden, meiner Familie und meinem Freund danke ich für die liebevolle Unterstützung, Ermutigung und das große Verständnis.

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ABSTRACT

Background

Metacognitions concerning worrying and cognitive avoidance are important psychopathological constructs, conceptualized within the scope of worrying and generalized anxiety disorder (GAD). Both constructs are considered crucial for the development and/or maintenance of persistent recurring and intrusive thoughts across the lifespan. Unfortunately, adequate instruments for the assessment of metacognitions in children and cognitive avoidance in adults in German are missing. Also, research is needed further evaluating both constructs across the lifespan for a better understanding of their role in exacerbating pathological worrying and other symptoms of GAD.

Aims

The aim of the two presented studies was to evaluate the factor structure and psychometric properties of the newly developed German Metacognitions Questionnaire for children (MKF-K, study one) and the translated German Cognitive Avoidance Questionnaire (CAQ-D, study two) for adults. Further, the objective was to evaluate the relevance of both constructs for pathological worrying and other psychopathologically relevant conditions.

Methods

The factor structure of both instruments was examined using explanatory and confirmatory factor analyses. Construct validity was assessed by correlation coefficients with related constructs and hierarchical regression analyses predicting worry and anxiety in a children's sample (study one) and positive and negative metacognitions, as well as worry and depressive symptoms in an adult sample (study

two). In addition to psychometric analyses, age effects of metacognitions and the transdiagnostic value of cognitive avoidance were considered.

Results

The fit indices of the factor structure of both measures indicate moderate to good model fits. Results confirm good psychometric properties in general. Both constructs contributed significantly to the prediction of worrying and anxiety independent of the developmental status (study one), and negative metacognitions, worrying, and depressive symptoms (study two), even after controlling for demographic variables and related constructs.

Discussion

The German MKF-K serves as reliable and valid instruments for the assessment of different metacognitive believes in childhood and the CAQ-D for cognitive avoidance strategies in adulthood. Metacognitions and cognitive avoidance are relevant constructs to at least two highly relevant psychopathological conditions (anxiety and depression) across the lifespan. The studies provide further support for the validity of both constructs for persistent recurring and intrusive thoughts. Furthermore, metacognitions and cognitive avoidance are important transdiagnostic risk factors across the lifespan and likely contribute substantially to the exacerbation of anxiety in GAD.

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LIST OF ABBREVIATIONS

APA	American Psychiatric Association
BDI-V	Beck Depression Inventory, simplified version
CAQ	Cognitive Avoidance Questionnaire
CAQ-D	Cognitive Avoidance Questionnaire, German version
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CSCY	Coping Scale for Children and Youth
DSM	Diagnostic and Statistical Manual of Mental Disorders
EFA	Explanatory Factor Analysis
GAD	Generalized anxiety disorder
GAD-Q-IV	Generalized Anxiety Disorder Questionnaire for DSM-IV
ICD	International Classification of Diseases
IoU	Intolerance of Uncertainty
IUS	Intolerance of Uncertainty Scale
MCQ	Metacognitions Questionnaire
MD	Major depression
MKF-30	Metacognitions Questionnaire, short German version
MKF-K	Metacognitions Questionnaire for children German version
NPOQ	Negative Problem Orientation Questionnaire
OAD	Overanxious disorder
OR	Odds Ratio
PSKJ	Penn State Worry Questionnaire for children, German version
PSWQ	Penn State Worry Questionnaire
RMSEA	Root Mean-square Error of Approximation

List of Abbreviations

RSQ-D	Response Styles Questionnaire, German version
SCARED	Screen for Child Anxiety Related Emotional Disorders
SCAS	Spence Children Anxiety Scale
TLI	Tucker Lewis Index
UI-18	Intolerance of Uncertainty Scale, short German version
WDQ	Worry Domain Questionnaire
WHO	World Health Organization
WLSMV	Mean and variance adjusted weighted least square
WW-II	Why Worry II Questionnaire

1. INTRODUCTION

1.1. Understanding worrying and GAD across the lifespan

Worry is a common human phenomenon, which can be observed across the entire lifespan. Everybody experiences worries from time to time (Borkovec, Ray, & Stober, 1998). Even children at the age of three report to worry occasionally (e.g., Muris, Meesters, Merckelbach, Sermon, & Zwakhalen, 1998; Muris, Merckelbach, Meesters, & van den Brand, 2002; Orton, 1982; Silverman, Lagreca, & Wasserstein, 1995). Following Borkovec and colleagues (1983) widely accepted definition, "Worry is a chain of thoughts and images, negatively affect-laden and relatively uncontrollable. The worry process represents an attempt to engage in mental problem-solving on an issue whose outcome is uncertain but contains the possibility of one or more negative outcomes. Consequently, worry relates closely to fear process." (p. 10).

Note that an important distinction is made regarding "worry" itself and the process of worry, namely "worrying". Worrying is initiated by a single worry. Worries therefore can be seen as the driving force of the cognitive phenomenon worrying.

From the perspective of developmental psychology, the question arises what kind of cognitive preconditions or capacities need to be fulfilled for worry processes to take place in children. Vasey and Colleagues (1994) shifted the focus on the role of children's developing cognitive abilities in the process of worry and its content. Results of their study supported the assumption that worrying is closely related to children's level of development, since older children were significantly more able to elaborate potential negative consequences of worrisome outcomes. Furthermore, worrisome thoughts were more prevalent and complex among children aged eight and older. In line with these theoretical considerations, a recent study on three to seven

year old children (Grist & Field, 2012) showed the following variables to be mediators in the association between age and worry elaboration: cognitive development (specifically concrete operational skills as suggested by Piaget), belief-desire theory of mind and the understanding of multiple possible outcomes. These three developmentally determined cognitive abilities enable children to anticipate and elaborate worry. Thus, for the understanding of child psychopathology, various developmental considerations need to be considered for assessment as well as for the treatment of pathological worrying (compare Ollendick, Grills, & King, 2001 for further explanation).

In general, worrying is characterized as a rather verbal or linguistic than an imaginal activity (Borkovec et al., 1983). The nature of worrying is primarily determined by phonological aspects of the central executive of the working memory (Rapee, 1993). The experience of worrying is commonly accompanied by negative emotional states, such as anxious and depressed mood states (Segerstrom, Tsao, Alden, & Craske, 2000). Brief experimentally induced worry episodes lead to increased negative cognitive intrusions (Wells & Papageorgiou, 1995; York, Borkovec, Vasey, & Stern, 1987). Furthermore, worrying is more likely oriented towards the future than the present or past, in anticipation of upcoming events or situations (Borkovec et al., 1983). Worrying also often entails elements of mental problem-solving in order to be better able to prevent or cope with anticipated negative outcomes (Szabo & Lovibond, 2002).

Whereas “normal” worrying is a common and everyday form of cognition (Dupuy, Beaudoin, Rheaume, Ladouceur, & Dugas, 2001), excessive worries perceived as uncontrollable are the core diagnostic feature of generalized anxiety disorder (GAD). GAD can be diagnosed across the lifespan, in adults as well as in

children and adolescents (for diagnostic criteria see 1.1.2). For GAD in childhood and adolescence empirical evidence concerning the role of worrying and its phenomenology is rare and only just developing. In healthy children (age seven to 12), anxiety in general is significantly associated with worrying, with the three most common worry topics involving school, health and personal harm (Silverman et al., 1995). Worries are strongly self-focused and vary with age (Vasey et al., 1994, see also 1.1.2). Muris et al. (1998) studied children aged eight to 13 and concluded that worry seems to be a common phenomenon among all children. However, children diagnosed with GAD or overanxious disorder (OAD) reported on average six specific worries, whereas healthy control children only reported one worry topic. Also, GAD/OAD children reported a more frequent occurrence of their main worry, a stronger interference of worrying with daily activities and more difficulty with the control of worrying. Furthermore, GAD children can also be distinguished from children with other anxiety disorders. Most importantly, Weems and colleagues (2000) found children suffering from GAD to worry more intensely compared to children with simple phobia.

In adults, research findings underline the central and specific role of worrying as main symptom of GAD. In terms of content or quality of worries, GAD patients worry more about minor concerns or daily hassles compared to non-anxious controls (e.g., Craske, Rapee, Jackel, & Barlow, 1989; Hoyer, Becker, & Roth, 2001), and compared to clinical control groups (e.g., Hoyer et al., 2001 for individuals with social phobia), but do not differ regard to other worry topics. Arguably, GAD patients thus only have a lower threshold for the initiation of worrying.

Another central feature of worrying in GAD in adults is the higher perceived uncontrollability of worrying compared to controls: GAD patients experience

uncontrollability to a much greater extent (Craske et al., 1989; Hoyer et al., 2001) and also experience less control over negative intrusive thoughts occurring in the aftermath of acute worrying episodes. Also, GAD patients appraise their thoughts as more dangerous and uncontrollable (Ruscio & Borkovec, 2004). Interestingly, regardless of age, frequent worriers have less perceived control over their anxiety, less control over the inner experience of emotions, and less control over the external signs of emotion (Gould & Edelstein, 2010). Regarding the quantity of worrying, GAD patients spent substantially more time worrying than controls, and worry more enduringly and frequently. Daily worry periods range from 310 to 381 minutes in GAD, whereas controls worry only between 55 to 103 minutes (Dupuy et al., 2001; Hoyer et al., 2001). Finally, GAD patients report a higher number of different worry topics, more distress during worrying, and more bodily symptoms while worrying (Hoyer et al., 2001).

1.1.1. Functions of worrying

Why do individuals worry? In order to better understand worrying, different conceptualizations have addressed the functionality of worrying.

Firstly, Barlow (1988) proposed worrying to be at least partly a misguided coping strategy used in preparation of potential problems in the future. He suggested that worriers hoped that worrying might allow them to prevent future catastrophes or to allow them to develop strategies for better coping with future danger. This is in line with Wells metacognitive model (2004, see 2.1.3), which suggests that worrying is initiated in order to better handle anticipated dangers and threats, accompanied by cognitions like “my worrying helps me to solve problems”, “worrying helps me to avoid problems in the future”, or “worrying helps me cope”. According to Wells (2005), individuals strategically use worrying as a coping tool to deal with potential

future problems. Thus, worrying may resemble problem-solving, at least to a certain degree. On the other hand, Mathews (1990) argued that worry based problem-solving attempts do not lead to solutions or satisfactory outcome, but create supplementary problems, such as unnecessary distress and decreases of working memory capacity.

Secondly, research by Borkovec and colleagues (Borkovec, Alcaine, & Behar, 2004) suggested that worrying serves as a cognitive avoidance mechanism, applied to avoid somatically arousing images of future threat. In line with this notion, worrying suppresses aversive physiological arousal, which is induced by fear images of a threating future, as the nature of worrying is primarily verbal (e.g., Borkovec et al., 1983; Rapee, 1993). From a learning perspective, worrying is thus negatively reinforced, since aversive somatic anxiety reactions are reduced by the avoidance of concrete mental images of future threats (Borkovec et al., 1998).

Thirdly, Dugas and colleagues (Dugas, Gagnon, Ladouceur, & Freeston, 1998) similarly proposed that cognitive avoidance strategies contributes to worrying. They conceptualize cognitive avoidance as a set of strategies that help avoiding threatening cognitive and emotional content, which can be divided into implicit or automatic strategies on the one hand and explicit or voluntary strategies on the other hand (Dugas & Robichaud, 2007). Supporting this notion, clinical worrying is specifically related to cognitive avoidance (e.g., Dugas, Marchand, & Ladouceur, 2005) and cognitive avoidance is a robust predictor of worrying in general (e.g., Dickson, Ciesla, & Reilly, 2012).

Finally, Dugas and colleagues additionally suggested that worrying is used to deal with feelings of uncertainty (see 1.1.3). Specifically, they link worrying to intolerance of uncertainty (IoU), which is described as a cognitive bias that affects how an individual perceives, interprets, and responds to uncertain situations on a

cognitive, emotional, and behavioral level (Dugas, Hedayati, et al., 2005). Indeed, measures of IoU are closely related to worrying (Dugas, Gosselin, & Ladouceur, 2001; Ladouceur, Gosselin, & Dugas, 2000; Ladouceur, Talbot, & Dugas, 1997). Furthermore, individuals with high IoU report an increased need for certainty, consequently gather more detailed information for decision-making, and have a greater tendency to seek reassurance from other people or by checking and rechecking relevant facts (Ladouceur et al., 1997). IoU contributes to worrying through direct and indirect pathways: Firstly, individual's cognitive biases lead to incorrect appraisal of threat and coping (i.e., overestimation of probability of occurrence of highly unlikely future events); Secondly, biased processing results in negative mood, which may lead to inefficient problem-solving (Freeston, Rheaume, Letarte, Dugas, & Ladouceur, 1994).

1.1.2. Classification and epidemiology of worrying and GAD

Diagnostic criteria

Diagnostic criteria are available in DSM-IV-TR (Diagnostic and Statistical Manual of Mental Disorders; American Psychiatric Association (APA), 2000) as well as ICD-10 (International Classification of Diseases; World Health Organization (WHO), 1993), which show relevant differences regarding specific aspects of GAD. In terms of age, ICD-10 suggests different diagnostic criteria for adults and children, while the DSM-IV-TR proposes the same criteria for the whole lifespan. Interestingly, the DSM-IV-TR criteria are consistent with the ICD-10 research criteria for GAD in childhood, but not with the criteria for GAD in adulthood. Further, DSM-IV-TR is more detailed and focuses on excessive and uncontrollable worries. Following ICD-10 criteria, panic disorder and obsessive-compulsive disorder cannot be diagnosed in addition to GAD, which might result in underestimation of the occurrence of GAD.

Since no changes in the recently published DSM-5 (APA, 2013) have been made in the diagnosis of GAD, and DSM-IV-TR is frequently used in clinical practice, DSM-IV-TR criteria are presented in Table 1.

As reported, for ICD-10, two diagnoses exist for GAD in childhood versus GAD in adulthood based on the suggestions that children and adolescents usually hardly report typical symptoms of the disorder (Petermann, Essau, & Petermann, 2002) and physical symptoms are less characteristic for children (Petermann et al., 2002). For diagnostic criteria of GAD in childhood (aged below 18) see Table 2 and for GAD in adulthood see Table 3.

Table 1 *DSM-IV (APA, 2000): Diagnostic criteria for generalized anxiety disorder (300.02)*

A.	Excessive anxiety and worry (apprehensive expectation), occurring more days than not for at least six months, about a number of events or activities (such as work or school performance).
B.	The person finds it difficult to control the worry.
C.	The anxiety and worry are associated with three (or more) of the following six symptoms (with at least some symptoms present for more days than not for the past six months). Note: only one item is required in children. (1) Restlessness or feeling keyed up or on edge (2) Being easily fatigued (3) Difficulty concentration or mind going blank (4) Irritability (5) Muscle tension (6) Sleep disturbance (difficulty falling or staying asleep, or restless unsatisfying sleep)
D.	The focus of the anxiety and worry is not confined to features of an Axis I disorder, e.g., the anxiety or worry is not about having a panic attack (as in panic disorder), being embarrassed in public (as in social phobia), being contaminated (as in obsessive-compulsive disorder), being away from home or close relative (as in separation anxiety disorder), gaining weight (as in anorexia nervosa), having multiple physical complaints (as in somatization disorder), or having a serious illness (as in hypochondriasis), and the anxiety and worry do not occur exclusively during posttraumatic stress disorder.
E.	The anxiety, worry, or physical symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.
F.	The disturbance is not due to the direct physiological effects of a substance (e.g., a drug of abuse, a medication) or a general medical condition (e.g., hyperthyroidism) and does not occur exclusively during a mood disorder, a psychotic disorder, or a pervasive developmental disorder.

Table 2 *ICD-10 (WHO, 1993): Diagnostic criteria for generalized anxiety disorder of childhood (F93.80)*

A.	A period of at least one month with recurrence of excessive, disproportionate and intrusive anxieties or worries, as indicated by at least three of the following: (1) Excessive concerns about the quality of one's performance in areas such as schoolwork, sports, and other regular activities. (2) Excessive concerns about physical health (despite an evident good health, or, if hurt or sick, concerns that go beyond a normal apprehension) or about being injured. (3) Excessive concerns or anticipatory worries in relation to particular non-health themes (money or financial well-being, punctuality, appearance, catastrophes, disasters, etc.). (4) Free floating anxiety unrelated to specific situations. (5) A frequent need for reassurance that persists in spite of several appropriate attempts to reassure the child. (6) Marked feelings of tension, inability to relax or to concentrate, nervousness, difficulty getting to sleep, autonomic symptoms (such as palpitations, sweating, dry mouth, etc.). (7) Recurrent somatic complaints (headaches, stomachaches, etc.) for which no physical basis can be demonstrated.
B.	The multiple anxieties and worries occur across at least two situations, activities, contexts or circumstances. Generalized anxiety does not present as discrete paroxysmal episodes (as in panic disorder), nor are the main worries confined to single, major thoughts (as in separation anxiety disorder) or situations (as in social anxiety disorder or phobic disorder in childhood). When more focused anxiety is identified in the broader context of a generalized anxiety, generalized anxiety disorder takes precedence over other anxiety disorders.
C.	Onset in childhood or adolescence (below age 18).
D.	The symptoms in A interfere daily in a significant way with the child's activities.
E.	The disorder does not occur as part of a broader disturbance of emotions, conduct, personality, or of a pervasive developmental disorder, psychotic disorder or psychoactive substance use disorder.

Table 3 *ICD-10 (WHO, 1993): Diagnostic criteria for research for generalized anxiety disorder (F41.1)*

A.	A period of at least six months with prominent tension, worry and feelings of apprehension, about every-day events and problems.
B.	At least four symptoms out of the following list of items must be present, of which at least one from items (1) to (4). Autonomic arousal symptoms (1) Palpitations or pounding heart, or accelerated heart rate. (2) Sweating. (3) Trembling or shaking. (4) Dry mouth (not due to medication or dehydration). Symptoms concerning chest and abdomen (5) Difficulty breathing. (6) Feeling of choking. (7) Chest pain or discomfort. (8) Nausea or abdominal distress (e.g., churning in stomach). Symptoms concerning brain and mind (9) Feeling dizzy, unsteady, faint or light-headed. (10) Feelings that objects are unreal (derealization), or that one's self is distant or "not really here" (depersonalization). (11) Fear of losing control, going crazy, or passing out. (12) Fear of dying. General symptoms (13) Hot flushes or cold chills. (14) Numbness or tingling sensations. Symptoms of tension (15) Muscle tension or aches and pains. (16) Restlessness and inability to relax. (17) Feeling keyed up, or on edge, or of mental tension. (18) A sensation of a lump in the throat, or difficulty with swallowing. Other non-specific symptoms (19) Exaggerated response to minor surprises or being startled. (20) Difficulty in concentrating, or mind going blank, because of worrying or anxiety. (21) Persistent irritability. (22) Difficulty getting to sleep because of worrying.
C.	The disorder does not meet the criteria for panic disorder (F41.0), phobic anxiety disorders (F40.-), obsessive-compulsive disorder (F42.-) or hypochondriacal disorder (F45.2).
D.	Most commonly used exclusion criteria: not sustained by a physical disorder, such as hyperthyroidism, an organic mental disorder (F0) or psychoactive substance-related disorder (F1), such as excess consumption of amphetamine-like substances, or withdrawal from benzodiazepines.

Only few studies have compared DSM-IV and ICD-10 diagnostic for GAD in terms of concordance. Prevalence rates following DSM-IV and ICD-10 diagnostic for GAD in adulthood are almost identical, but still research implies that the two diagnostic systems diagnose different groups of individuals (Slade & Andrews, 2001). Statistical overlap between DSM-IV and ICD-10 is small (kappa = 0.39) and Slade and Andrews (2001) suggest to re-examinate two criteria of the ICD-10 to increase the agreement with DSM-IV: first the emphasis on autonomic symptoms and second the absence of the requirement that the worry is excessive.

Interestingly, the agreement between ICD-10 and DSM-IV-TR for the diagnosis in childhood is satisfactory (F.41.1: Yule's $Y = 0.75$) for the interview of children, but problematic when parents are asked to rate their children's symptomatology (F.41.1: Yule's Y = 0.62; Adornetto, Suppiger, In-Albon, Neuschwander, & Schneider, 2012). With the DSM-IV-TR criteria, more children are diagnosed with clinical GAD compared to the ICD. First suggestions for the ICD-11 propose to allow comorbid anxiety disorders with GAD, since empirical support for not allowing comorbid anxiety diagnosis is scarce.

Epidemiology

Epidemiological studies show that worry is a common anxiety phenomenon among children. The percentage of children aged three to 14 who report worrying from time to time ranges from around 60 up to 80% (e.g., Muris, Meesters, et al., 1998; Muris et al., 2002; Orton, 1982; Silverman et al., 1995). Worrying can thus be seen as a normal developmental phenomenon (Cartwright-Hatton, 2008). How many children develop symptoms of worrying in a pathological range is relatively unknown. Although worry is the core feature of GAD, intense worries play an important role in other anxiety disorders in childhood, too, e.g., in separation anxiety

disorder, obsessive-compulsive disorder, and social phobia (Perrin & Last, 1997). In terms of epidemiology for GAD in childhood, solid, consistent findings are missing. A recent review of epidemiological studies on the prevalence of DSM-III-R or DSM-IV anxiety in pre-adolescent children, reports prevalence's for GAD ranging from 0.16% to 9.2% (for the age five to 11; Cartwright-Hatton, McNicol, & Doubleday, 2006). Note that only four of the 11 studies included reported GAD prevalence's. Thus further epidemiological research is needed to gain reliable statements.

In adulthood worry is a common phenomenon, too (Borkovec et al., 1998). Lifetime prevalence of GAD is estimated at around 3 to 5%, 12-month-prevalence at around 2% (e.g., Lieb, Becker, & Altamura, 2005). A German study, examining lifetime prevalence rates of mental disorders in a 18- to 64-year old general population of a northern Germany, found a lifetime prevalence rate of 0,8% for GAD (C. Meyer, Rumpf, Hapke, Dilling, & John, 2000). In primary care patients, prevalence rates for GAD are around 8%, with GAD being the most frequent anxiety disorder in primary care. Additionally, GAD patients are high users of primary care resources (Wittchen, 2002). Women are two to three times more often affected than men (C. Meyer et al., 2000; Wittchen, 2002).

Although GAD can occur at any age, incidence rates increase significantly at the age of 25 (Wittchen, 2002). The highest rate was reported for individuals aged 45-55, while women and men do not differ regarding age of onset (Wittchen, 2002).

In terms of GAD's life course, untreated GAD is a chronic condition, with fluctuating symptomatic over the years, and increasing probability of intervening symptoms or syndromes of other disorders, such as major depression (MD) or medical conditions (Ballenger et al., 2001; Wittchen & Hoyer, 2001). Spontaneous

remission is the exception for GAD and is estimated around 20 to 25% (Ballenger et al., 2001).

There is little consensus about the role of children's age in the frequency of worries (Cartwright-Hatton, 2008). Some studies analyzing age changes in worry frequency in non-clinical samples provide evidence for the prevalence of worrying to first increase in childhood. Children after the age of seven show higher prevalence's of worrisome thoughts than younger children (Muris, Merckelbach, Gadet, & Moulaert, 2000). As reported before (see 1.1), worry elaboration increases with age and worry becomes increasingly present as children become older. With cognitive development, worry elaboration enhances and increases the chance of a personal worry to occur (Muris et al., 2002). The advances in cognitive development occurring around age seven to eight (i.e., ability to reason about future possibilities, consider multiple threatening outcomes, elaborate potential negative consequences) seem to have the capability to strongly increase the complexity and prominence of worrying (Vasey et al., 1994).

In adulthood findings concerning worrying's frequency across age are inconsistent. Some findings suggested that individuals aged 45 and older engage in worrying more often and more enduring, but that other GAD symptoms are experienced as commonly among younger aged worriers (Carter, Wittchen, Pfister, & Kessler, 2001; Wittchen & Hoyer, 2001). Other studies showed worrying to decrease with advancing age. In a non-clinical sample, younger adults aged 18 to 25 compared to older adults aged 65 to 86 reported significantly more worry and utilized a greater number of coping strategies in an effort to control worrying (Hunt, Wisocki, & Yanko, 2003). Adults aged 30 to 85 reported fewer worries than adults from 16 to 29 in participants with and without a GAD diagnosis (Goncalves & Byrne, 2013). A

recent study by Miloyan and colleagues (2014), examining age related changes in GAD symptoms, assumed that older adults tend to endorse fewer symptoms compared to younger adults and that these symptoms are qualitatively different from those observed in younger adults. Apparently, further research is needed for clarification. In terms of worries content, worries develop from more physical and concrete worries in younger children to increasingly psychological and abstract worries in adolescence (Cartwright-Hatton, 2008).

Comorbidity

There are several other disorders which co-occur with GAD, especially MD (Carter et al., 2001). In epidemiological and clinical studies, GAD among adults has high comorbidity rates with other common mental disorders (Lieb et al., 2005; Wittchen, 2002). For example Lieb and colleagues (2005) found the following mental disorders to be significantly related to GAD (Odds Ratio: OD): MD (OR = 33.7), agoraphobia (OR = 25.7), panic disorder (OR = 20.3), post traumatic stress disorder (OR = 15.1), social phobia (OR = 13.5), alcohol dependence (OR = 11.2) and alcohol abuse (OR = 2.5). Another study found that 59% of all the individuals diagnosed with GAD also fulfilled criteria for MD and 56% the criteria for any other anxiety disorder (Carter et al., 2001). GAD also has been identified as a risk factor for first onset MD (Hoffman & Mychaskiw, 2008).

1.1.3. Etiology and maintenance of worrying and GAD

For the understanding of GAD and its development and maintenance, different models have been established. Following, the models of Borkovec (2004), Wells (1995), and Dugas and colleagues (1998) are illustrated, since they gained first empirical support, especially in adult samples. Furthermore, these three models have explicit therapeutic treatment implications, and are therefore of great interest in the

clinical field. In childhood and youth, etiological models of worry are mainly untested (e.g., Kertz & Woodruff-Borden, 2013). Some studies examining the applicability of well-validated adult etiology models to younger age groups will, however, be presented below.

Avoidance model of worry and GAD

Following Borkovecs' avoidance model of worry (Borkovec et al., 2004), worry can be understood as an avoidance mechanism, which suppresses sympathetic activation to anxiety-provoking material and is thereby negatively reinforced. Worries are a primarily lexical or verbal-linguistic activity, rather than an imaginal process (Borkovec & Inz, 1990; Freeston et al., 1996). Mental images play a central role in the generation of an anxiety reaction. Indeed, therapeutic outcome in exposure treatment of anxiety disorders is increased, if the stimuli, the individual is exposed to, is emotionally processed (Foa & Kozak, 1986). Following this emotional processing theory of anxiety, anxiety processes can be reduced, i.e. extinguished, if the full fear network in memory is activated (Foa & Kozak, 1986). The activation of the threat memory network is apparently a necessary precondition for the inclusion of new non-threatening information. From the operant conditioning perspective, verbal-linguistic worry is negatively reinforced through the avoidance of threatening emotional imagery and its associated somatic sensations. Worry, however, inhibits emotional processing and preserves thereby activation of the cognitive and affective fear structures (Borkovec & Hu, 1990). In fact, individuals with GAD have less mental images than healthy controls, both in a relaxing and in a worrying condition (Borkovec & Inz, 1990). Interestingly, worrying also leads to a reduction of autonomic hyperactivity, e.g., tachycardia or hyperventilation (Borkovec & Hu, 1990).

Unfortunately, to date, there is no study available, showing similar physiological suppression processes in children or adolescent samples. Research is needed to extend and validate the avoidance theory of worry to children's and adolescents worry processes.

Metacognitive model of worry and GAD

Following Wells metacognitive model (1999; for further illustration see 2004, 2005), initially developed for GAD, positive and negative metacognitive beliefs and their interaction play a key role for the development and maintenance of pathological worrying. To understand worrying, it is important to examine the individuals appraisal of worrying. The metacognitive model of GAD describes two types of worries: "Type 1" worries deal with external events and social and physical health (i.e., worries about an accident). "Type 2" worries, or meta-worries, which are appraisals of Type 1 worries, are focused on the nature and occurrence of worries or thoughts themselves (i.e., "worrying harms me"). Finally, positive and negative metacognitions are distinguished. "Worrying helps me to solve problems" for instance is a positive metacognition and "my thoughts are disturbing my concentration" is a negative metacognition.

With regard to this model, worry frequency is mainly related to these metacognitions. The clinical relevance of worrying often increases when negative metacognitions begin to develop. Positive metacognitions additionally reinforce the process of worrying. In Wells metacognitive model of GAD (presented in *Figure 1*), a maladaptive circle of worrying is described. Type 1 worries (everyday worries), which occur in response to external and/or internal events, activate metacognitions about worries, which can be both positive and negative. Positive metacognitions such as "if I worry I'll be prepared", activated by danger appraisals, reinforce the tendency

of using worrying as a strategy to cope with anticipated dangers. This helps reducing anxiety symptoms in the short term and thereby negatively reinforces the use of worrying. Thus, the more often and enduring worrying occurs, the more intense negative meta-worries will appear. Following Wells, this may lead to typical worries about the process of worrying (Type 2 worries), which is experienced as harmful and uncontrollable. Typical well-known drawback mechanisms will follow, which reinforce the individuals believe of worrying to be dangerous and uncontrollable. At the same time, meta-worries stimulate emotionally, physiologically and behaviorally anxious avoidance behavior and the tendency to interpret neutral situations as potentially dangerous, increasing the likelihood of Type 1 worries to occur.

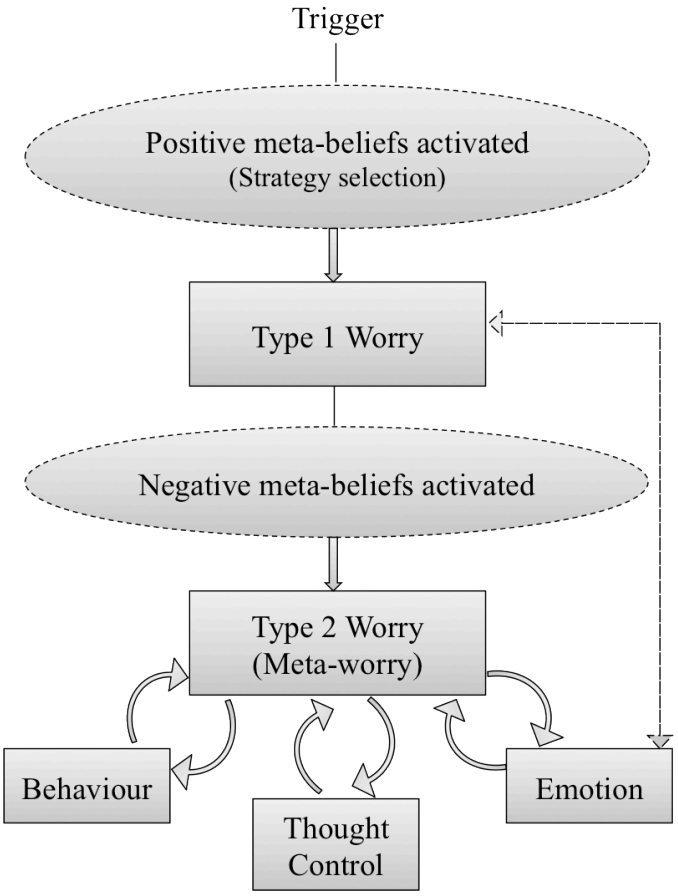

Figure 1. The metacognitive model of GAD. Compare Wells (1997).

The metacognitive model has proven to be quite helpful for the understanding and treatment of GAD and has received growing evidence in adults (for a review, see Wells, 2004). For example, individuals with and without GAD indeed have positive and negative beliefs about worries (Roemer, Borkovec, Posa, & Borkovec, 1995). Furthermore, metacognitions, positive as well as negative ones, are associated with intensity and frequency of worries (Arndt, Patzelt, Andor, Hoyer, & Gerlach, 2011; Cartwright-Hatton & Wells, 1997; Wells & Carter, 2001; Wells & Cartwright-Hatton, 2004) and negative metacognitions contribute to the maintenance of worrying (Andor, Gerlach, & Rist, 2008). Finally, Type 2 worries are GAD specific compared to other clinical samples (Wells & Carter, 2001). Importantly, metacognitions are also associated with other emotional psychopathological conditions, such as trait anxiety and obsession (Cartwright-Hatton & Wells, 1997), different anxiety disorders (Wells & Carter, 2001) and MD (Papageorgiou & Wells, 2001, 2003).

Several efforts were made to broaden and apply this theoretical framework to children's worry processes. In a recent review on the metacognitive model of GAD in children (Ellis & Hudson, 2010), the authors showed promising support for an application of the model to children. Children at the age of five are able to describe beliefs about their cognitions. Of course, since age and cognitive development proceed, metacognitive abilities further elaborate and expand. For example, Flavell and colleagues (1998) found that most five-year-old participants showed little awareness of mental uncontrollability, whereas nine and 13 year old participants were able to understand that individuals have only limited control over their mental activity. A recent study with a first sample of community children aged seven to 17 showed negative beliefs about worry to be a strong predictor of worry (Esbjorn et al., 2014). In a second study, children with GAD aged from seven to 12 had significantly

higher levels of negative beliefs about worry than non GAD anxious children and controls. Children judge worry to be as difficult to control as adults do and engage similarly in worry control strategies, such as self-distraction (Muris, Meesters, et al., 1998).

Cognitive model of GAD ("Intolerance of Uncertainty Model")

According to the comprehensive cognitive model of Dugas and colleagues (1998), four core features play an important role in the development and maintenance of GAD: IoU, cognitive avoidance, positive beliefs about worry, and poor problem orientation (for illustration see *Figure 2*).

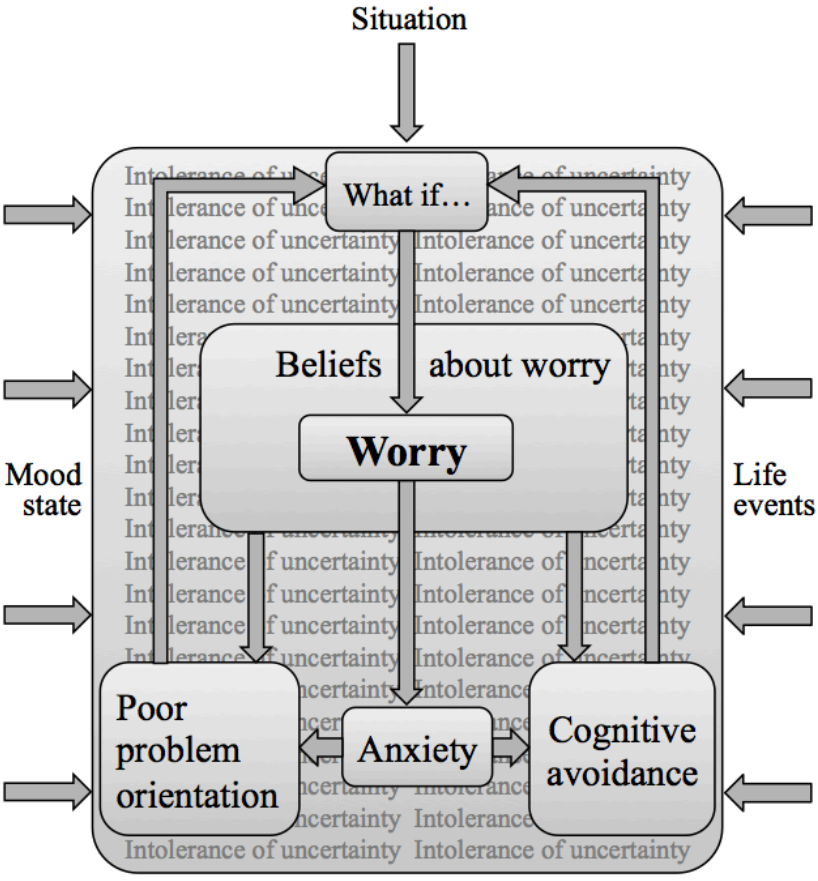

Figure 2. Cognitive model of GAD. Compare Dugas et al. (1998).

According to Dugas' model, patients with GAD have special difficulties when dealing with ambiguous or uncertain situations. This so called "intolerance of uncertainty" (IoU) is the core feature of the model and is defined as a cognitive bias, affecting how a person perceives, interprets, and responds to uncertain situations on a cognitive, emotional and behavioral level (Dugas, Hedayati, et al., 2005). IoU is associated with (future orientated) increased vigilance, with the belief that future events will be negative and upsetting and should therefore be avoided, and with the tendency to experience uncertain future situation as stressful. Furthermore, IoU is characterized by worrying, arguable because it serves as a way of dealing with uncertainty and ambiguous situations. Supporting this notion, non-clinical worrying is significantly correlated with IoU (Freeston et al., 1994) and GAD patients have higher IoU than healthy controls and than other individuals with anxiety disorders (Dugas et al., 1998; Dugas, Marchand, et al., 2005; Ladouceur et al., 1999). Moreover, experimental manipulations of IoU determine state worry intensity (de Bruin, Rassin, & Muris, 2006; Grenier & Ladouceur, 2004; Ladouceur et al., 2000).

Within this model, cognitive avoidance refers to a variety of strategies (e.g., thought suppression and distraction) that may help to avoid threatening cognitive and emotional content and can be divided into implicit or automatic strategies on the one hand and explicit or voluntary strategies on the other hand (Dugas & Robichaud, 2007). Individuals with GAD have higher levels of cognitive avoidance as measured with the White Bear Suppression Inventory than non-clinical individuals (Ladouceur et al., 1999) and cognitive avoidance is especially closely associated with clinical worrying (Dugas, Marchand, et al., 2005). However, cognitive avoidance is not specific for GAD compared to other anxiety disorders. Most individuals suffering from mental disorders characterized by recurring and persistent intrusive thoughts

tend to adopt various strategies to avoid these thoughts (Gosselin et al., 2002). Unfortunately, the use of cognitive avoidance strategies such as thought suppression often serves as a risk factor for psychopathological conditions like obsessions, depression, and anxiety (Wegner & Zanakos, 1994). In consequence, cognitive avoidance is associated with higher levels of reported depressive symptoms (Ottenbreit & Dobson, 2004), and is a robust predictor of rumination, worry, sadness, as well as anxiety (Dickson et al., 2012).

In Dugas' model, positive beliefs about worry are another crucial factor in GAD, partially reminiscent of the ideas of the metacognitive model described above. Arguably, positive beliefs about worry develop and are maintained by operant conditioning, namely positive and negative reinforcement. For one, positive beliefs become more likely, if worrying is followed by a positive outcome, for example if worrying allows an individually to successfully engage in a social situation such as a job interview. More often, however individuals may erroneously believe that worrying helped prevent a negative outcome. For example, a mother may worry about her child getting sick and urge the child to wear a jacket in consequence. If the child does not get sick, worrying is thus negatively reinforced. Research with the "why worry" inventory demonstrated that GAD patients, or healthy individuals meeting some GAD criteria have more positive beliefs about worry than healthy controls, or those who do not fulfill GAD criteria (Freeston et al., 1994; Ladouceur, Blais, Freeston, & Dugas, 1998). Other anxiety disorders have similar levels of positive beliefs about worry (Ladouceur et al., 1999). However, research with the Metacognitions Questionnaire (for further explanation see 1.2), which also has a subscale assessing positive beliefs about worry, consistently failed to find differences

between GAD patients and healthy controls with regard to these positive beliefs (e.g., Wells & Carter, 2001).

Problem solving abilities of individuals with GAD do not differ from healthy controls (Dugas, Letarte, Rheaume, Freeston, & Ladouceur, 1995). GAD sufferers, however, underestimate their ability to deal with upcoming problems and overestimate the actual potential risk when confronted with ambiguous situations. Dugas' model labels these characteristics as "poor problem orientation". When faced with a problem, GAD patients perceive problems as threatening, doubt their own problem skills and are pessimistic about their problem solving outcomes. Importantly, poor problem orientation, and not problem-solving skills, predicts worry scores, even when mood state is statistically controlled (Dugas, Freeston, & Ladouceur, 1997). GAD patients report a more negative orientation towards problems than healthy controls (Dugas et al., 1998) and other anxiety disorders (Ladouceur et al., 1999) and changes in problem-solving confidence lead to parallel changes in catastrophic worrying (Davey, Jubb, & Cameron, 1996).

The evidence supporting the extended application of this model to adolescent worry is rare. In a study with 14 to 18 year old adolescents worrying was correlated with IoU, negative problem solving orientation, use of thought suppression strategies and beliefs about the usefulness of worry. However, only IoU and problem solving orientation significantly predicted worry (Laugesen, Dugas, & Bukowski, 2003). In children aged seven to 17, IoU was significantly associated with anxiety and worry. Consistent with findings in adults, worrying is associated with problem-solving beliefs (confidence and control) but not with problem-solving skills in children aged eight to 11 (Parkinson & Creswell, 2011). Importantly, negative beliefs about worry, IoU and positive beliefs about worry are highly correlated with clinical levels of

worrying in children (Kertz & Woodruff-Borden, 2013). Another study, observing children and adolescents, showed significant correlations between the measures of IoU, positive beliefs about worry, cognitive avoidance, worry and anxiety (Fialko, Bolton, & Perrin, 2012). Especially IoU had strong predictive power in path models, suggesting it to be a strong vulnerability factor for worrying (Fialko et al., 2012). In consequence of these findings, Fialko and colleagues conclude that cognitive models of pathological worry in adults may be partially valid in childhood and adolescent (2012).

Integrated model of GAD

Gerlach and colleagues (2008) presented an integrated model of GAD, including the three most prominent and empirical supported models of GAD, which were presented so far. *Figure 3* illustrates how the core aspects of these models interact.

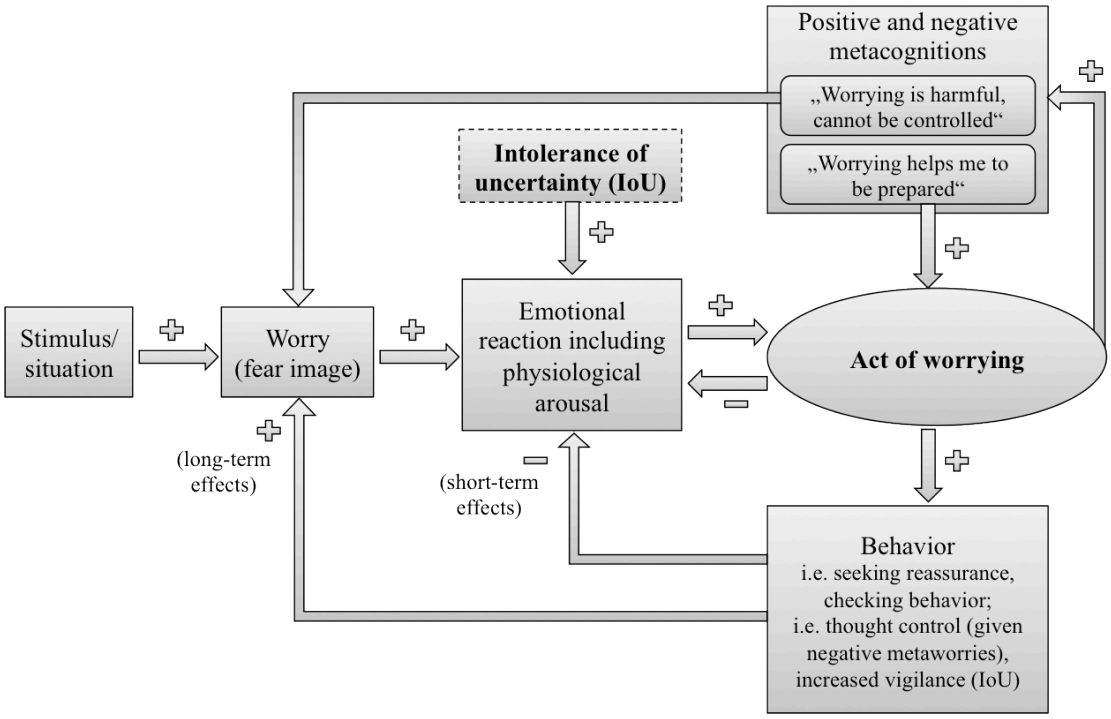

Figure 3. Integrated model of GAD. Compare Gerlach et al. (2008).

As a reaction to a trigger situation or stimulus (internal or external), an individual imagines a possible feared situation. This single worry or fear image leads to an aversive emotional reaction, including physiological arousal. Following Borkovecs avoidance theory of worry, an individual starts worrying as a reaction to the negative emotional arousal induced by the fear image. Worrying is a primarily verbal process, which reduces or prevents physiological arousal, thus serves as an avoidance strategy, which negatively reinforces worrying. Worrying is accompanied by different behaviors, such as seeking reassurance, checking behavior, or thought control. These behaviors initially lead to reduced aversive emotional reactions, but enhance the importance of initial worry, resulting in an increase of worrying. Emotional processing is prevented due to cognitive avoidance, which maintains anxiety.

Following Wells metacognitive model, negative metacognitions, such as beliefs about harmfulness and loss of control of worrying, can be understood as additional worries, which initiate the act of worrying. The act of worrying itself in turn reinforces these negative beliefs about worries ("worries cannot be controlled"). Positive metacognitions, such as the idea that engaging in worrying helps to prevent danger, promote the active initiation of worrying. As mentioned above, positive beliefs about worry are also part of Dugas' cognitive model of GAD. Dugas' additional components, cognitive avoidance and IoU also play a key role in the integrated model of Gerlach. Cognitive avoidance mechanisms are conceptualized as a part of the behavioral aspect of worrying. IoU plays a key role in this model, too. Fear images instill the feeling that something bad is about to happen, which is regularly associated with feelings of uncertainty. If individuals have an increased level of IoU, they do react more intensely to fear images and worrying processes are

initiated more easily. Finally, increased vigilance leads to attentional biases, increasing the risk of interpreting ambiguous stimuli as dangerous or threatening.

1.2. Assessing worrying across the lifespan

Diagnostic measures

The commonly used self-report measure "Generalized Anxiety Disorder Questionnaire for DSM-IV" (GAD-Q-IV, Newman et al., 2002) was developed as a screening instrument using the diagnostic criteria of GAD. The GAD-Q-IV is a revised form of the GAD-Q, which was based on the DSM-III-R (Roemer et al., 1995). It consists of nine questions, capturing excessiveness of worrying, problems to control worries, the most frequent worry topics, worry frequency in the last six months, bodily symptoms associated with worry (e.g., restlessness, irritability) and the disturbance caused by these symptoms and by the worries. The GAD-Q-IV is clinically valid, with high two-week stability for the assessment of GAD diagnoses and excellent external validity with a structured interview (Newman et al., 2002). Factor analysis of the questionnaire supports a one-factor structure (Rodebaugh, Holaway, & Heimberg, 2008). Consequently, the GAD-Q-IV screens adequately for the diagnosis of GAD in psychiatric treatment settings (Moore, Anderson, Barnes, Haigh, & Fresco, 2014). Although a German translation of the GAD-Q-IV exists (Hoyer, n.d.), psychometric properties of this German version of the questionnaire are still missing.

Unfortunately, there is no similar measure to assess GAD in children. The child and parent self-report instrument "Screen for Child Anxiety Related Emotional Disorders" (SCARED), developed by Birmaher and colleagues (1997), assess GAD as one among other anxiety disorders and is also based on the DSM-IV criteria. The scale is recommended as a screening tool for children aged nine to 18, in addition to

clinical interviews for anxiety disorders in children. The revised version (Birmaher et al., 1999) consists of 41 items, nine screening for GAD, 13 for panic disorder or significant somatic symptoms, eight for separation anxiety, seven for social anxiety disorder, and four for significant school avoidance. The total score reflects the presence of an anxiety disorder. The items are rated from 0 to 2, with 0 for "not true or hardly ever true", with 1 for "somewhat true or sometimes true" and 2 for "very true or often true". The SCARED questionnaire is reliable and valid for the screening of childhood anxiety disorders in clinical settings, with good internal consistency, good test-retest reliability, good discriminative validity and moderate parent-child agreement (Birmaher et al., 1999; Birmaher et al., 1997; Muris, Merckelbach, et al., 1998). A German version also has good internal consistency as well as good convergent and discriminant validity (Weitkamp, Romer, Rosenthal, Wiegand-Grefe, & Daniels, 2010).

In addition to the SCARED questionnaire, the "Spence Children Anxiety Scale" (SCAS; Spence, 1998) assesses the DSM-IV criteria for GAD as well as for five other anxiety disorders in childhood, namely separation anxiety disorder, social phobia, obsessive-compulsive disorder, panic disorder, and physical injury fears. The 38 items are rated on a four-point Likert-type rating scale ranging from 1 for "never" to 4 for "always". The SCAS also has a high internal consistency, acceptable test-retest reliability, good convergent validity, but shows poor agreement between parent and child evaluations (Spence, 1998). The German version of the SCAS has good psychometric properties as well (Essau, Muris, & Ederer, 2002).

Assessment of worrying

For the assessment of the general tendency to worry and associated GAD symptomatic the "Penn State Worry Questionnaire" (PSWQ, T. J. Meyer, Miller,

Metzger, & Borkovec, 1990) is the "gold standard" (Gerlach & Stevens, 2014) (Gerlach & Stevens, 2014). It consists of 16 items measuring characteristic aspects of worry on a five-point-scale ranging from 1 "not at all typical of me" to 5 "very typical of me". The original adult version, first published by Meyer and colleagues (1990), has good psychometric properties in English (e.g., Brown, Antony, & Barlow, 1992; Stöber, 1995) as well as in the translated German version (Stöber, 1995).

For assessing worry, its intensity, excessiveness and uncontrollability in children and adolescent, the PSWQ for children (PSWQ-C, Chorpita, Tracey, Brown, Collica, & Barlow, 1997) can be used. The PSWQ-C is an adaption of the adult version (T. J. Meyer et al., 1990). The questionnaire consists of 14 items, which are rated on a Likert-type rating scale from 0 "never" to 3 "always". Psychometric properties are acceptable, including high internal consistency, high convergent validity (Chorpita et al., 1997; Pestle, Chorpita, & Schiffman, 2008) and sufficient discriminative validity between diagnostic categories (Pestle et al., 2008). A German version of the PSWQ-C is available, but psychometric evaluation of this version is missing (Adam & Hoyer, 2003).

Another questionnaire assessing the extent of ones worry is the "Worry Domain Questionnaire" (WDQ; Tallis, Eysenck, & Mathews, 1992). The WDQ was developed to assess non-pathological worry content, including five different worry domains: "Relationships", "Lack of Confidence", "Aimless Future", "Work Incompetence", and "Financial" (Joormann & Stober, 1997). The 25 items, concerning potential worry content areas, are rated on a five-point scale from 0 "not at all" to 4 "extremely". The WDQ has high internal consistency and modest reliability (Tallis et al., 1992). Some evidence provides initial support of the psychometric properties of the WDQ for clinical populations (McCarthy-Larzelere et al., 2001). A

German version of the WDQ has good psychometric properties and high congruence with the original English version in a student sample (Stöber, 1995). To the author's knowledge, no children version of the WDQ exists.

Assessment of etiologically relevant constructs

Different questionnaires cover the main aspects of the Metacognitive model of worry and GAD and the Cognitive model of worry and GAD (see 1.1.3).

A widely used questionnaire for the structural assessment of adult metacognitive beliefs is the "Metacognitions Questionnaire" (MCQ; Cartwright-Hatton & Wells, 1997), respectively the short version of the Metacognitions Questionnaire (MCQ-30; Wells & Cartwright-Hatton, 2004). The short and more economic version consists of five subscales, measuring cognitive confidence, positive beliefs about worry, cognitive self-consciousness, negative beliefs about uncontrollability and danger of thoughts, and beliefs about the necessity to control thoughts. The 30 Items are rated on a four-point Likert-type rating scale from 1 "do not agree" to 4 "agree very much". The MCQ-30 has a factor structure consistent with the original scale and good internal consistency and convergent validity, as well as acceptable to good test-retest reliability (Wells & Cartwright-Hatton, 2004). Psychometric properties of the German MCQ-30 are in a similar range (Arndt et al., 2011).

Based on the MCQ-30, different questionnaires assessing positive and negative metacognitions in childhood and adolescence have been developed: the MCQ-A for adolescents (age 13 to 17; Cartwright-Hatton et al., 2004) and the MCQ-C for both children and adolescents, which is an adaption of the MCQ-A (age seven to 17; Bacow, Pincus, Ehrenreich, & Brody, 2009). For the MCQ-A the language of the MCQ-30 was modified very slightly, to increase its usability by young readers.

The MCQ-A has acceptable to good psychometric properties, with acceptable internal consistency, good test-retest reliability (with the exception of the subscale uncontrollability and danger), and good criterion validity (Cartwright-Hatton et al., 2004). The MCQ-C reveals good internal consistency, as well as good concurrent and criterion validity (Bacow et al., 2009). The MCQ-A retained the original factor structure of the MCQ-30 (no fit indices reported), whereas the MCQ-C analysis resulted in a four-factor solution (CFI = 0.845; RMSEA = 0.077), including the factors positive metacognitions towards worrying, negative metacognitions toward worrying, superstition, punishment and responsibility beliefs and cognitive monitoring. Since a German Metacognitions Questionnaire for children to date is missing, study one deals with the development and evaluation of a measurement for this purpose (see 3.2.1).

A questionnaire, developed for the assessment of IoU, is the "Intolerance of Uncertainty Scale" (IUS), which was originally developed in French (Freeston et al., 1994), but was also translated into English (Buhr & Dugas, 2002). The IUS consists of 27 items, which assess emotional, cognitive and behavioral reactions to ambiguous situations, implications of being uncertain, and attempts to control the future. Items are rated on a five-point Likert-type rating scale ranging from 1 "not at all characteristic of me" to 5 "entirely characteristic of me". The English translation shows excellent internal consistency, good test-retest reliability over a five-week period, and good convergent and divergent validity (Buhr & Dugas, 2002). A short German 18 item version (UI-18), of the questionnaire also has excellent psychometric properties (Gerlach et al., 2008).

For the assessment of IoU in children, parallel child- and parent-report forms were adapted from the 27-item English version of the adult IUS (IUSC; Comer et al.,

2009). Findings provide preliminary support for the use of the IUSC for the assessment of children's IoU, showing strong internal consistency and convergent validity (Comer et al., 2009). Unfortunately, there is no German translation of the children's version of the IUS.

For the assessment of cognitive strategies used to avoid intrusive thoughts, Gosselin et al (2002) developed the "Questionnaire d'Evitement Cognitif". The questionnaire was translated into English (Cognitive Avoidance Questionnaire, CAQ) by Sexton and Dugas (2008) and covers a broad range of different explicit or voluntary attempts to avoid worrisome thoughts, such as thought suppression, thought substitution, distraction, avoidance of threatening stimuli and transformation of images into thoughts (Dugas & Robichaud, 2007). The items of the CAQ are not related to specific situations and assess cognitive avoidance in general. The CAQ consists of 25 items, which are rated on a five-point Likert-type rating scale ranging from 1 "not at all typical" to 5 "completely typical". The French version has good psychometric properties, with a good internal consistency, an appropriate validity and excellent temporal stability across a period of four weeks (Gosselin et al., 2002). The English CAQ and its subscales also have good to excellent internal consistency and good stability over a five-week period. Moreover, primary evidence for good convergent and divergent validity was found (Sexton & Dugas, 2008). Since a German version of the CAQ has been missing, study two contains the translation and validation of this questionnaire (see 4.2.1).

To date no children's version of the CAQ does exist. A questionnaire, assessing cognitive avoidance as one dimension among other coping strategies is, however, the "Coping Scale for Children and Youth" (CSCY; Brodzinsky et al., 1992). The CSCY assesses four coping categories, namely assistance seeking,

cognitive-behavioural problem solving, cognitive avoidance, and behavioural avoidance. The 44 items of the questionnaire are rated on a four-point Likert-type rating scale ranging from 0 “never” to 3 “very often”. The cognitive avoidance factor includes 11 items, involving emotion management, cognitive redefinition, selective attention and minimization of the problem. Test-retest reliability and internal consistency for the four subscales is moderate to high (Brodzinsky et al., 1992). Similar to the IUS, no German translation of the CSCY exists.

Finally, the “Why-Worry II” questionnaire (WW-II; Holowka, Dugas, Francis, & Laugesen, 2000) is a revised version of the Why-Worry questionnaire (Freeston et al., 1994). The WW-II consists of 25 items assessing positive beliefs about the function of worry. Items are rated on a five-point Likert-type rating scale ranging from 1 “not at all true” to 5 “absolutely true”. The five subscales are “worry helps in problem solving”, “worry helps motivate”, “worrying protects the individuals form difficult emotions in the event of a negative outcome”, “the act of worrying itself prevents negative outcomes”, and “worry is a positive personality trait”. The English version has good psychometric properties, with high internal consistency, high test-retest reliability for six weeks, and good convergent and divergent validity (Holowka et al., 2000). Neither a German translation of the WW-II nor an adapted children version exists. However, positive beliefs about the usefulness of worry might be covered by the questionnaires assessing metacognitions, as described above. Note however, that research using the MCQ has not as consistently provided evidence that GAD sufferers indeed have more positive metacognitions towards worrying (Borkovec & Roemer, 1995; Cartwright-Hatton & Wells, 1997; Wells & Carter, 2001).

The "Negative Problem Orientation Questionnaire" (NPOQ) was originally developed in French (Gosselin, Ladouceur, & Pelletier, 2005), but was translated into English as well (Robichaud & Dugas, 2005a). The 12 items of the NPOQ assess negative problem orientation as a dysfunctional cognitive set that includes the tendency to see a problem as a threat, to doubt one's own problem-solving ability, and to be pessimistic about the outcome. The items are rated on a five-point Likert-type rating scale ranking from 1 "not at all true of me" to 5 "absolutely true of me". The questionnaire has a unifactorial structure and its internal consistency is excellent. Convergent and discriminant validity are good, too (Gosselin et al., 2005). The psychometric evaluation of the English version further supported the one-factor structure and showed excellent internal consistency, high test-retest reliability over five weeks and good convergent and discriminant validity (Robichaud & Dugas, 2005a, 2005b). There are no child or adult versions of the NPQQ.

1.3. Metacognitions and Cognitive Avoidance as psychopathological mechanisms in GAD

Several etiological models, as presented in 1.1.3, try to explain why and how normal worrying turns into pathological worrying and what kind of cognitive processes are important for the understanding of this transition. Unfortunately, little research has examined this shift to from normal to clinically relevant anxiety and worry.

The two constructs, metacognitions and cognitive avoidance, which are the main focus of this work, have been described as important components in the psychopathological exacerbation process in worrying and GAD.

Metacognitions and GAD

Firstly positive and negative metacognitive beliefs are crucial components of different etiological models for worrying and GAD. Research supports the hypothesis of negative beliefs about worry to be pathognomic of GAD (Wells, 2005).

Wells conceptualized metacognitions as key components in his metacognitive model of worrying and GAD (1995), as described above in 1.1.3. Notably, beliefs about worry are also a component within Dugas' and colleagues cognitive model of worrying and GAD (1998) as well as the model suggested by Gerlach and colleagues (2008).

Generally, individuals with and without GAD report to have positive and negative metacognitions about worrying (Roemer et al., 1995). Research findings show metacognitions, positive as well as negative ones, to be associated with intensity and frequency of worries (Arndt et al., 2011; Cartwright-Hatton & Wells, 1997; Wells & Carter, 2001; Wells & Cartwright-Hatton, 2004).

High worriers, including GAD individuals, report positive beliefs about worrying more often compared to non-anxious controls (Borkovec & Roemer, 1995). Positive beliefs about worrying, however, are not GAD specific: They are generally associated with pathological worrying, but cannot distinguish GAD individuals from controls or anxious individuals (Cartwright-Hatton & Wells, 1997; Wells & Carter, 2001).

As supported by the current literature, negative beliefs about worry play a key role in the metacognitive model. Individuals with GAD report to have more negative beliefs about worry and Type 2 worries compared to individuals without a anxiety disorder, with subclinical anxiety or worry, with panic disorder, or with mood disorders (Cartwright-Hatton & Wells, 1997; Ruscio & Borkovec, 2004; Wells, 2005;

Wells & Carter, 2001). Although these studies support essential statements of the metacognitive model, further evidence is needed to analyze the causal role of negative metacognitions in the development of GAD. Also, as mentioned above, the role of metacognitions in children and adolescents for GAD still needs to be further evaluated, as it is still unclear whether the association of negative metacognitions and pathological worry and GAD, empirically supported in adult samples, can be replicated for childhood samples.

Cognitive avoidance and GAD

Secondly, cognitive avoidance (or thought control) is a central part of different etiological models for worrying and GAD. If pathological worry or GAD, however, are associated with ineffective control strategies is not conclusively answered. (Davey & Wells, 2006).

Borkovec (2004) conceptualized worry as a maladaptive cognitive avoidance mechanism, inhibiting emotional processing, reducing autonomic hyperactivity, and preventing the activation of the cognitive and affective fear structures (Borkovec & Hu, 1990). Individuals with GAD have less mental images than healthy controls, both in a relaxing and in a worrying condition (Borkovec & Inz, 1990). While worrying is initially applied as a strategy to distract from more emotionally distressing topics, worrying turns into an uncontrollable and aversive experience (Borkovec & Roemer, 1995). As concluded by Najmi and Wegner (2008), "once the worries themselves become unwelcome, they may initiate a cycle of self-perpetuating counterproductive attempts at controlling them" (p. 452).

Within Dugas and colleagues' (1998) model, cognitive avoidance is one of the key components, proposed as misguided strategies helping to avoid threatening cognitive and emotional content with the consequence of maintaining worrying and

generalized anxiety. Cognitive avoidance thus plays a pivotal role for GAD. Cognitive avoidance is related to clinical worrying (Dugas, Marchand, et al., 2005) and individuals with GAD report the use of more cognitive avoidance strategies than non-clinical individuals (Ladouceur et al., 1999). Also, individuals with GAD can be distinguished from healthy individuals by the degree to which they engage in thought suppression strategies (Dugas et al., 1998). Since cognitive avoidance is also prominent within individuals suffering from other mental disorders characterized by recurring and persistent intrusive thoughts, it cannot be considered as a GAD specific process (Gosselin et al., 2002).

In Wells metacognitive model (1995), thought suppression is conceptualized as a strategy to resolve the conflict initiated by negative metacognitions (e.g., worries are dangerous), which is mostly unsuccessful. The model refers to previous suppression research, showing thought control strategies to be counterproductive (Purdon, 1999; Wegner, Schneider, Carter, & White, 1987), as they turn into the reinforcement of negative metacognitions. Also, the inability to suppress worrisome thoughts is not GAD specific although individuals with GAD report to have more problems suppressing thoughts of their main worry compared to thoughts of a neutral stimulus than individuals with speech anxiety and nonanxious control participants (Becker, Rinck, Roth, & Margraf, 1998).

Notably, Wegner and colleagues well-known experimental work on thought suppression (e.g., Wegner, 1989; Wegner et al., 1987; Wegner & Zanakos, 1994) is supporting the paradoxical rebound effect: asking individuals to attempt not to think about a specific thought often leads to a subsequent (immediate or delayed) increase of exactly this thought. Unfortunately, research examining rebound effects of thought suppression of worries is inconsistent. For example a study by Mathews and Milroy

(1994) could not find the rebound effect for worries in a nonclinical sample of high worriers. Regardless of the priming condition (1. Worry: Think about the topic you worry most about; 2. Suppress: Think of anything except the topic you worry most about; 3. Non-worry: Think about a non-worrisome topic), worriers reported more frequent worries than controls. Apparently, the attempt to suppress the most relevant worries did not increase their intrusive quality.

2. OVERALL OBJECTIVES

For the development and maintenance of pathological worry different models have gained special interest within the research field of GAD: the metacognitive model of GAD by Wells (1995), with metacognitive beliefs as main feature, Borkovecs' avoidance model of worry (2004), conceptualizing worrying as a avoidance strategy, and the cognitive model of GAD by Dugas and colleagues (1998), including cognitive avoidance as a core feature of the model. Metacognitions and cognitive avoidance (e.g., thought suppression) both play a key role for clinical worrying across the lifespan (Andor et al., 2008; Arndt et al., 2011; Esbjorn et al., 2014; Muris, Meesters, et al., 1998; Wells & Carter, 2001). Research on metacognitive processes in childhood and cognitive avoidance strategies in adulthood, particularly with regard to GAD specificity and possible methods of assessment, is, however, scarce.

Indeed, well-validated questionnaires for the assessment of worrying and etiological relevant constructs in childhood are still missing. Due to developmental issues, it seems necessary to develop child-appropriate measurements for the assessment of metacognitions in children and evaluate the role of negative metacognitions for worrying with regards to the developmental status. Also, the role of cognitive avoidance in GAD in adults in contrast to other dysfunctional cognitive processes, i.e. rumination, and its relation to metacognitive beliefs has to be clarified. Further construct evaluation and validation is needed, clarifying the psychopathological mechanisms suggested in the theoretical framework of GAD.

The two following studies deal with the development and psychometric evaluation of questionnaires in German, for the assessment of metacognitions in children (study one) and cognitive avoidance in adults (study two). The measures are

indented to provide useful information for the diagnostic and treatment process of pathological worrying (and other persistent recurring and intrusive thoughts) and furthermore will help to answer the question of GAD specificity of the construct of metacognitions and of cognitive avoidance and the special role of negative metacognitions.

3. STUDY ONE: METACOGNITIONS AND THEIR RELATION TO WORRYING IN CHILDREN

3.1. Objective

The present study examines the relation and assessment of metacognitions and worrying in childhood. Metacognitive beliefs are important for the understanding of worrying in adulthood (Andor et al., 2008; Arndt et al., 2011; Wells & Carter, 2001), as well as in childhood (Esbjorn et al., 2014; Muris, Meesters, et al., 1998). Since no instrument to assess metacognitions in children is available in German, a short questionnaire suitable for children (7-14) was developed and evaluated, based on the validated German version of the Metacognitions Questionnaire for adults (Arndt et al., 2011). Factor structure and psychometric properties were studied. The use of a German schoolchildren sample helps to gather supplementary information in addition to previous findings in the United States and Australia and may lead to an extended generalizability of the construct. Further construct validity was examined by analyzing the association of metacognitions with worry and anxiety. Finally, since negative metacognitive beliefs are closely related to worry frequency in adults and have often been described as a key factor in the development and maintenance of GAD, the influence of cognitive development, resp. age, on this relation, with special interest to the youngest participants aged eight and the question if the close relation of worrying and negative metacognitions towards worrying is already established at this early age was examined.

Study one covers the following research questions:

1. Evaluating the factor structure of the German version of the MKF-K by means of factor analysis in a German sample.

2. Report of psychometric properties of the German version of the MKF-K in a German sample.
3. Examination of the MKF-Ks construct validity in a German sample in terms of worry and anxiety symptoms by means of correlation coefficients and regression models.
4. Examination of the association of worry and negative metacognitions across the age span eight to 13 by means of regression models.

3.2. Methods

3.2.1. Development

For the development of a German metacognitions questionnaire suitable for children, the short German version of the "Metacognitions Questionnaire" for adults (MKF-30; Arndt et al., 2011), the translation of the MCQ-30 (Wells & Cartwright-Hatton, 2004), was used as a basis. Items were rephrased considerably to adjust them for children. Therefore sentences were shortened and simplified by avoiding nominal and subjunctive constructions. The four-point Likert-type rating scale (1 = "not at all true" to 4 = "completely true") was visually supported. Ten clinical psychologists rated the first version of the questionnaire for its content equivalence with the adult version. Items were subsequently adapted accordingly.

3.2.2. Participants

The entire sample consisted of 972 unselected schoolchildren aged seven to 14 years, attending school in Münster (Germany) and its surroundings. The pupils were collected in 39 different school classes in classes 3 to 6 of 13 different schools (primary and secondary schools). In terms of gender distribution and ratio of pupil to school type, it was ensured to be representative for North Rhine-Westphalia (German

state) according to data of the Federal Office of Statistics. The mean age of the participants was 10.6 years (SD=1.5) and 51.5% of them were girls. The majority's mother tongue was German (86.8%). The characteristics of the total sample in terms of age and gender distribution are presented in Table 4.

Table 4 *Total Sample Characteristics (N = 972)*

		Frequency	Percent
Gender	Girls	501	51.5
	Boys	471	48.5
Age	7	4	0.4
	8	122	12.6
	9	124	12.8
	10	134	13.8
	11	266	27.4
	12	266	27.4
	13	54	5.6
	14	2	0.2

In order to be able to compute both an explanatory factor analysis (EFA) and a confirmatory factor analysis (CFA), the data set was split in two halves using the randomization routine provided by SPSS (sample 1 and sample 2).

Sample 1: The first partial sample consisted of 489 pupils. The mean age was 10.6 (SD=1.5). 52.6% of the participants were female and 85.1% had German as their mother tongue.

Sample 2: The second partial sample consisted of 483 participants. The mean age of the pupils was 10.6 (SD=1.5), whereas 50.5% of them was girls. The majority's mother tongue was German (88.6%).

3.2.3. Procedure

First contact with schools was made by phone. The study was presented to the cooperating schools in school conferences and the parents were asked for their permission after given comprehensive information. The participation rate lay between 60 and 80%. At the survey day, pupils still had the chance to decide to take part or refuse. At this point all children decided to take part. On average, one school lesson was needed for the pupils to answer to all given questions. Children were informed appropriately about the goals of the study and encouraged to ask questions.

3.2.4. Measures

Participants of the survey made demographic statements and filled out three questionnaires. In addition, the MKF-K questionnaire regarding metacognitions concerning worrying and anxiety symptoms, were part of the assessment. The sequence of presentation of the questionnaires was varied from class to class in order to prevent sequence effects.

The German version of the PSWQ for children, named PSKJ (Adam & Hoyer, 2003), was used in study one for the measure of worry, it's intensity, excessiveness and uncontrollability (for further explanation see 1.2).

Anxiety symptoms were assessed using the German version of the SCAS (SCAS-D; Essau et al., 2002), translated and validated based on the version by Spence (1998). The questionnaire consists of six subscales measuring separation anxiety disorder, social phobia, obsessive-compulsive disorder, panic disorder, physical injury fears and GAD for children aging between eight and 12 years (for further explanation see 1.2).

3.2.5. Statistical analyses

In order to examine the factor structure of the MKF-K EFA and CFA were computed with the help of the statistical modeling program Mplus (B. O. Muthén & L. K. Muthén, 2010). Items were assumed to be on an ordinal level of measurement and therefore handled with a specifically developed factor-analytic method for ordinal data, provided by Mplus. Mean and variance adjusted weighted least square (WLSMV) estimation was thus used for the factor analyses. Geomin (oblique) rotation was employed for the EFA since factors were expected to be associated.

First a CFA was conducted with sample 1 in order to test the original five-factor structure supported in the German and English adult version of the MCQ. Since the model fit was not satisfying, EFA models with one to five dimensions were computed with sample 1 in a second step, in order to obtain the dimensional solution which best explains the covariance of the answers to the MKF-K items. The Screenplot (Cattell, 1966) was examined as the criterion (eigenvalue > 1) to set the number of factors to extract. In order to receive consistent factors, item selection was conducted next. Item loadings were examined concerning defined selection criteria, and the theoretically most convincing and statistically satisfying solution was extracted. Third a CFA was conducted with sample 2 in order to confirm the solution retained from the EFA.

As model fit indices the Comparative Fit Index (CFI), the Tucker Lewis Index (TLI) and the Root Mean Square Error of Approximation (RMSEA) were examined. The goodness-of-fit was expected to be within the conventional standards recommended.

For a psychometric evaluation Internal Consistency of the total questionnaire and its subscales were studied, reported as Cronbach's Alpha coefficient. Further

corrected item-total correlations and facility indices were computed. The results were expected to be within the recommended conventional values.

Finally, construct validity was observed by computing Pearson's Correlation Coefficients with other questionnaires regarding related psychopathological constructs used in study one: the PSWQ-C for worry, the SCAS-D for separation anxiety disorder, social phobia, obsessive-compulsive disorder, panic disorder, physical injury fears, and generalized anxiety. Positive correlations were anticipated since metacognitions are known to be highly relevant for anxiety disorders. For the purpose of correcting for alpha level inflation due to multiple testing, the critical alpha level with a modified Bonferroni correction that accounts for the number of tests as well as for the mean correlation between the respective dependent variables was adjusted (Perneger, 1998).

To further examine the association of the MKF-K, age and related constructs, namely worry and anxiety symptoms, two regression analysis (method: "Inclusion") were conducted. The subscales of the MKF-K were expected to explain variance of the PSKJ and SCAS-D, while controlling for gender. As cognitive functions increase in children from eight to 14 years, age was also expected to explain variance of the PSKJ.

3.3. Results

3.3.1. Answer frequencies

Since EFA and CFA involved χ^2-based computations, answer categories with less than 5% of the observations were combined until this value was achieved. The answer category number 4 (= "completely true") was not answered with the required frequency for 12 items (items 4, 6, 8, 10, 14, 17, 19, 22, 23, 26, 28, and 29**)** and was thus merged with answer category number 3 (= "rather true").

3.3.2. Factor structure

Model fit indices of the CFA indicated that the five-factor structure of the adult version of the MCQ could not be confirmed for the MKF-K in a children sample. The indices computed did not fit the recommended conventional cutoff criteria (Hu & Bentler, 1999): the RMSEA was .063, the CFI was .863, and the TLI was .850.

The EFA results support a four or five factor solution with the following RMSEA values: .107 for one factor, .086 for two factors, .056 for three factors, .037 for four factors, and .031 for five factors. The examination of the screenplot showed the four and five factor solution to be the best representation of the results as well. Although the content analysis for the five-factor solution revealed no reasonable factor structure, the four factor solution showed a clear factor structure similar to recently found ones, namely positive beliefs, uncontrollability and danger, cognitive confidence and cognitive self-consciousness. These four factors were found in the adult version of the MCQ as well, with the exception of the fifth factor need to control thought, which could not be established for the child version.

On the basis of the EFA, the questionnaire was shortened to the five best items per factor, with the first factor loading as high as possible and the second factor loading as low and far distanced as possible. In addition item-total correlations and facility indices were analyzed. The criteria for the five best items for each subscale can be described and subsumed as followed: highest factor loading $\geq .43$, second highest factor loading $\leq .33$, difference of first and second highest loading $\geq .19$.

The results of the CFA in the second sample half confirm the extracted four-factor structure. All factor loadings for the items on their associated factor were

statistically significant, with factor correlations varying between r^2= .30 and r^2= .87 (see Table 5 for CFA factor loadings).

Table 5 *Factor loadings for the confirmatory factor analysis of the MKF-K (sample 2; N = 483)*

No	Item	I	II	III	IV
7	I need to worry in order to be organised. *Wenn ich mich sorge, dann kann ich besser einen Schritt nach dem anderen planen.*	.50			
10	Worrying helps me to get things sorted out in my mind. *Wenn ich mich sorge, kann ich klarer denken.*	.52			
20	Worrying helps me cope. *Wenn ich mich sorge, komme ich besser zurecht.*	.87			
23	Worrying helps me to solve problems. *Wenn ich mich sorge, kann ich meine Probleme besser lösen.*	.72			
28	I need to worry, in order to work well. *Ich muss mich sorgen, um gut klar zu kommen.*	.71			
2	My worrying is bad for me. *Es ist schlecht für mich, wenn ich mich sorge.*		.30		
4	I could make myself sick with worrying. *Vom Sorgen kann ich krank werden.*		.51		
9	My worrying thoughts persist, no matter how I try to stop them. *Wenn ich mich einmal sorge, kann ich nicht mehr damit aufhören.*		.80		
16	My worrying could make me go mad. *Wenn ich mich weiter sorge, dann kann ich verrückt werden.*		.57		
22	When I start worrying, I cannot stop. *Wenn ich anfange, mich zu sorgen, kann ich nicht mehr aufhören.*		.81		
8	I have little confidence in my memory for words and names. *Ich glaube, ich kann mir Wörter und Namen nicht gut merken.*			.66	
14	My memory can mislead me at times. *Ich kann mir nicht immer alles richtig merken.*			.66	
18	I have a poor memory. *Ich kann mir schlecht etwas merken.*			.86	
24	I have little confidence in my memory for places. *Ich glaube, ich kann mir Orte nicht gut merken.*			.56	

Table 5 *continued*

No	Item	I	II	III	IV
26	I do not trust my memory. *Ich glaube, ich kann mir schlecht etwas merken.*			.91	
13	I should be in control of my thoughts all of the time. *Ich muss jederzeit bestimmen können, was ich denke.*				.60
5	I am aware of the way my mind works when I am thinking through a problem. *Während ich über meine Probleme nachdenke, verstehe ich, was in meinem Kopf vorgeht.*				.45
12	I monitor my thoughts. *Ich überwache, was ich denke.*				.68
17	I am constantly aware of my thinking. *Ich achte immer darauf, was ich denke.*				.80
19	I pay close attention to the way my mind works. *Ich achte genau darauf, wie mein Kopf arbeitet.*				.69

Note. All factor loadings significant at $p < .001$. MKF-K = Meta-Cognitions Questionnaire for Children; Factor I = positive beliefs; Factor II = uncontrollability and danger; Factor III = cognitive confidence; Factor IV = cognitive self-consciousness. Comparative Fit Index (CFI) = .95; Root Mean-square Error of Approximation (RMSEA) = .05; The German MKF-K in italics.

The fit indices of the CFA indicate a good fit between the hypothesized model and the observed data, since Hu and Bentler (1999) suggest a cutoff value for the RMSEA close to .06 (and lower) and a cutoff value close to .95 (and higher) for the CFI and the TLI. The following indices were computed: the RMSEA was .050, the CFI .947, and the TLI .938.

3.3.3. Psychometric properties

The internal consistency of the total scale was Cronbach's $\alpha = .76$. The following internal consistency values were observed: $\alpha = .73$ for positive beliefs, $\alpha = .70$ for uncontrollability and danger, $\alpha = .77$ for cognitive confidence, and $\alpha = .71$ for cognitive self-consciousness. Means, standard deviations, Cronbach's Alpha,

item-total correlations and facility indices for the four MKF-K subscales are presented in Table 6.

Table 6 *Means, standard deviations, range, cronbach's alpha, item-total correlations and facility index for the MKF-K subscales (total sample; N = 972)*

	Total Score	I	II	III	IV
M	36.39	8.05	8.85	8.33	11.15
SD	7.25	2.81	2.99	2.83	3.27
Range	60	15	15	15	15
α	.76	.73	.70	.77	.71
r_{it}	-	.40-.59	.33-.56	.42-.66	.32-.59
p	-	.36-.50	.36-.50	.38-.48	.54-.59

Note. α = Cronbach's alpha; r_{it} = corrected item-total correlation; p = facility index; MKF-K = Meta-Cognitions Questionnaire for Children; Factor I = positive beliefs; Factor II = uncontrollability and danger; Factor III = cognitive confidence; Factor IV = cognitive self-consciousness.

Correlations of the four subscales with the total score rank from .57 to .64. Four correlations among the subscales were significant: factor I positive beliefs correlated significant with factor III cognitive confidence (.15) and factor IV cognitive self-consciousness (.24) and factor II uncontrollability and danger correlated significant with factor III cognitive confidence (.26) and with factor IV cognitive self-consciousness (.21).

3.3.4. Construct validity and age effects

The PSKJ and the SCAS-D correlated significantly with the MKF-K total score (.50 and .51) and its four subscales (ranking from .15 to .63). Both questionnaires have the highest correlations with the MKF-K subscale uncontrollability and danger (.63 and .55). The correlation matrix can be seen in

Table 7. Taking Alpha adjustment into consideration, Alpha was set to $p < .003$ for this analysis.

Table 7 *Correlation matrix for measures (total sample; N = 972)*

	MKF				PSKJ	SCAS						
	I	II	III	IV	total	total	1	2	3	4	5	6
MKF	.59*	.64*	.57*	.64*	.50*	.50*	.35*	.39*	.53*	.43*	.23*	.43*
I	-	.07	.15*	.24*	.20*	.20*	.14*	.15*	.24*	.16*	.09	.15*
II		-	.26*	.21*	.63*	.55*	.39*	.44*	.50*	.48*	.29*	.52*
III			-	.03	.25*	.33*	.21*	.29*	.34*	.29*	.17*	.24*
IV				-	.15*	.15*	.11*	.08	.21*	.12*	.03	.15*

Note. MKF = Metacognitions Questionnaire for Children; Factor I = positive beliefs; Factor II = uncontrollability and danger; Factor III = cognitive confidence; Factor IV = cognitive self-consciousness; PSKJ = Penn State Worry Questionnaire for children; SCAS-D = Spence Children Anxiety Scale; Factor 1 = separation anxiety disorder; Factor 2 = social phobia; Factor 3 = obsessive-compulsive disorder; Factor 4 = panic disorder; Factor 5 = physical injury fears; Factor 6 = generalized anxiety disorder. * $p < .003$.

In addition two regression analyses were conducted to determine the contribution of (1) the MKF-K subscales and cognitive development, resp. age, to the prediction of worry (PSKJ) and (2) to the prediction of anxiety symptoms (SCAS-D). For both predictions it was controlled for gender. Note that for both analyses seven- and 14-year old participants were excluded, since the sample size of these age groups are not sufficiently large enough (compare Table 4).

For the prediction of worry ($R^2 = .44$, $p < .001$) the following three subscales contributed significantly in addition to gender ($\beta = .14$, $p < .001$): positive beliefs ($\beta = .14$, $p < .001$), uncontrollability and danger ($\beta = .58$, $p < .001$), and cognitive confidence ($\beta = .07$, $p < .01$). Surprisingly, age did not contribute significantly for the

prediction of worry (β = .03). Results for the regression analysis are presented in Table 8.

Table 8 *Summary of regression analyses for variables predicting scores of the PSKJ (sample: age eight to 13; N = 966)*

Variables	B	SE B	β	r	pr
(constant)	11.76	1.56			
Gender[a]	1.92	.34	.14***	.20	.18
Age	.13	.11	.03	-.00	.04
I Positive beliefs	.35	.06	.14***	.20	.18
II Uncontrollability and danger	1.35	.06	.58***	.63	.59
III Cognitive confidence	.18	.06	.07**	.25	.09
IV Cognitive self-consciousness	.02	.06	.01	.15	.01

Note. PSKJ = Penn State Worry Questionnaire for children; r = zero-order correlation; pr = partial correlation. [a] Gender coding: 0 = male; 1 = female. R^2 = .44***; * p < .05; ** p < .01; *** p < .001.

For the prediction of anxiety symptoms (R^2=.41, p < .001) three of the four subscales, namely positive beliefs (β = .13, p < .001), uncontrollability and danger (β = .47, p < .001), and cognitive confidence (β = .18, p < .001) were significant predictors in addition to gender (β = .22, p < .001) and age (β = -.05, p < .05). Results for the regression analysis are presented in Table 9.

Table 9 *Summary of regression analyses for variables predicting scores of the SCAS-D (sample: age eight to 13; N = 966)*

Variables	B	SE B	β	r	pr
(constant)	32.10	3.45			
Gender[a]	6.40	.73	.22***	.27	.27
Age	-.50	.25	-.05*	-.09	-.06
I Positive beliefs	.67	.14	.13***	.20	.16
II Uncontrollability and danger	2.30	.13	.47***	.55	.50
III Cognitive confidence	.91	.14	.18***	.33	.21
IV Cognitive self-consciousness	.11	.12	.03	.15	.03

Note. SCAS-D = Spence Children Anxiety Scale; r = zero-order correlation; pr = partial correlation.

[a] Gender coding: 0 = male; 1 = female. R^2 = .41***; * p < .05; ** p < .01; *** p < .001.

The MKF-K subscale negative beliefs about uncontrollability of thoughts and danger correlated significantly with the PSKJ for the age group eight to 13 (r = .63, p < .001), as can be seen in the scatterplot presented in *Figure 4*. For the youngest age group, aged eight, the subscale uncontrollability and danger also correlated significantly with the PSKJ total score (r = .44, p < .001), as can be seen in the scatterplot presented in *Figure 5*.

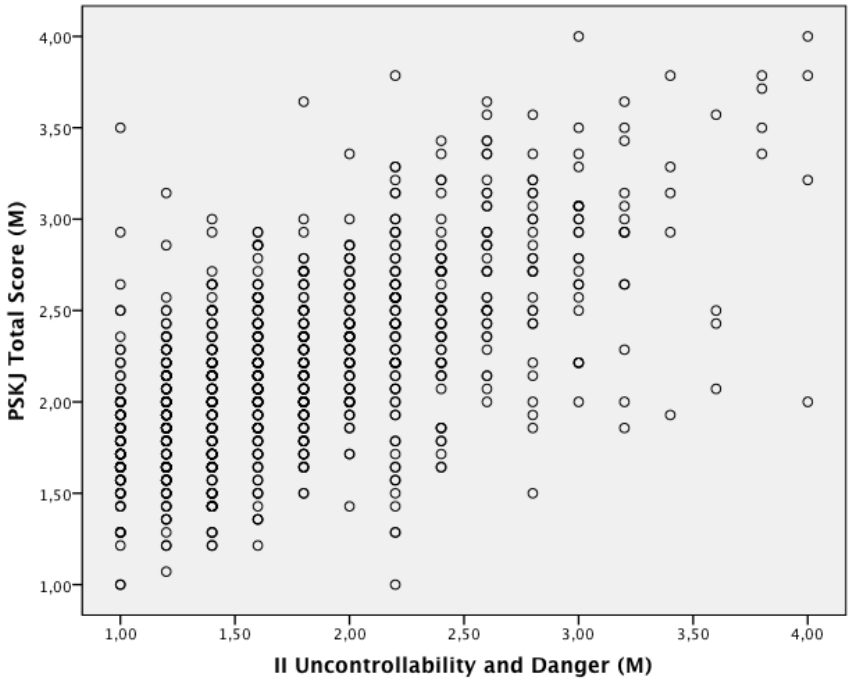

Figure 4. Relationship between negative metacognitive beliefs (MKF-K subscale II) and worry (PSKJ). (sample: age eight to 13; N = 966).

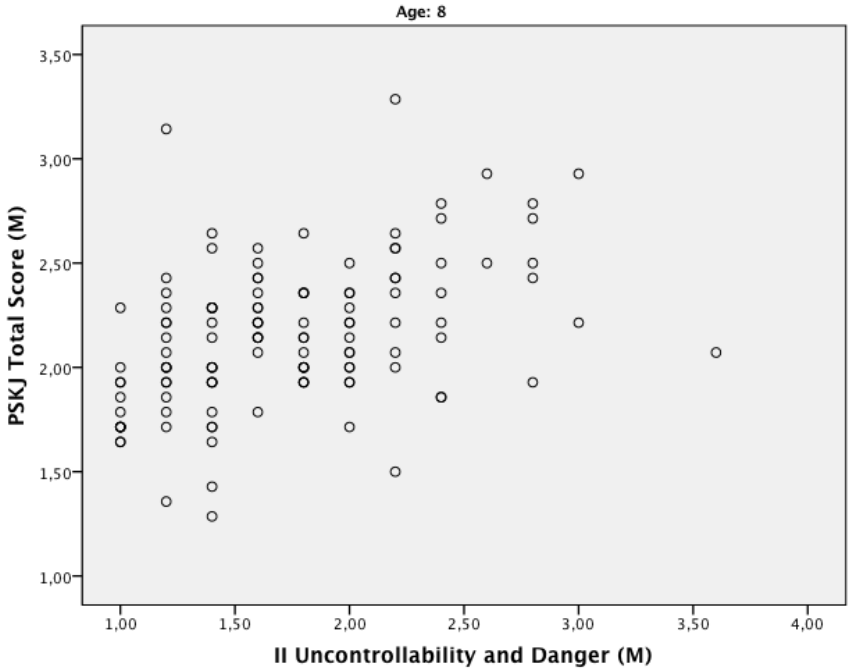

Figure 5. Relationship between negative metacognitive beliefs (MKF-K subscale II) and worry (PSKJ). (sample: age eight; N = 122).

3.4. Discussion

The aim of study one was to develop and evaluate a German metacognitions questionnaire suitable for children and to gain further evidence for the role of metacognitions in worry and anxiety symptoms in children across the age span of seven to 14. The factor structure of the original adult version (Arndt et al., 2011; Wells & Cartwright-Hatton, 2004) could not be replicated by means of CFA. Thus an EFA was conducted, which lead to a four-factor structure with 20 remaining items. The structure could be confirmed in a subsequently conducted CFA, showing the factor structure to be independent of the sample. The models overall goodness-of-fit was satisfying, lying within the conventional recommended range (Tabachnick & Fidell, 2007). Thus no model adjustments were performed. Compared to the fit-indices reported in the MCQ-C analysis (Bacow et al., 2009) the fit-indices of the MKF-Ks four factor model are better. Since no fit-indices for the MCQ-A (Cartwright-Hatton et al., 2004) were reported a comparison with their factor-structure is not possible. The four-factor structure and the shortened number of items of the MKF-K seem to be the most economical and clinically useful solution with good internal fit. The short 20-item version increases the practicability for research and treatment context.

The fifth factor of the adult MCQ need to control thoughts (Arndt et al., 2011; Wells & Cartwright-Hatton, 2004) could not be reliably established in the child version of the questionnaire. However, as shown in previous studies, factor loadings on this dimension were rather low and its interpretation ambiguous (Cartwright-Hatton & Wells, 1997; Wells & Cartwright-Hatton, 2004). Accordingly, the fifth factor was relatively weak in both adult studies and showed the lowest internal consistency. Since present support for the factor can be considered as low, the four-

factor solution, arguably, does best reflect the variance assessed by the questionnaire. Possibly, the need to control thoughts increases from childhood to adulthood and can therefore not be found in children. There is little research on thought control in children. Evidence from an experimental study with non-clinical children aged seven to 11 show children not to have the same immediate enhancement and rebound effects as adults in a suppression task (Gaskell, Wells, & Calam, 2001). The authors suggest that children of this age do not experience the effects, when they attempt to suppress neutral or anxiety-provoking thoughts. It can be suggested, that the need to control thoughts develops later in adolescence, as well as the experimental effects of though suppression.

On examination of the correlation matrix, the four subscales clearly measure different aspects of metacognitions. Noteworthy, subscale correlation showed three significant associations. Positive beliefs and uncontrollability and danger correlated significant with cognitive self-consciousness. Children who make more use of thought monitor processes also report more positive and negative metacognitive beliefs. Uncontrollability and danger was also significant correlated with cognitive confidence. In other words, children who report to worry more about the danger and uncontrollability of their thoughts in parallel report to have less confidence in their memory. The subscales clearly hold additional diagnostic potential and the option of a differentiated perspective on metacognitive processes in children opening up the possibility to target metacognitions towards worrying not only in adults but also in children and adolescents.

Reliability can be seen as adequate based on the acceptable internal consistency of the subscales and the total score. The MCQ-A analysis (Cartwright-Hatton et al., 2004) showed slightly better alpha coefficients, which may be due to the

older age range from 13 to 17, where problems with understanding the items are more unlikely than in younger ages. Compared to the MCQ-C analysis with children/adolescents aged seven to 17 in the non-clinical sample (Bacow et al., 2009), similar alpha coefficients could be attained. One possible explanation for the relatively low reliability outcomes in the present study is the young age and the wide age range of the sample associated with different stages of cognitive development. Item-total correlations turned out medium to high within an acceptable range. Facility indices of the items lie within the usually recommended range.

In terms of performance objectivity, it should be mentioned that the assessment procedure was only partly standardized. The same investigator completed the procedure within consistent environments (class rooms). Still, although instructions were the same, the young participants were encouraged to ask occurring understanding questions, which lead to slightly different performances. Requesting served the purpose of better comprehension, thus enhanced internal validity.

The initial evaluation of the MKF-Ks construct validity shows promising results. As expected, the correlations with worry symptoms and anxiety symptoms were high. Correlation of the MKF-K with measures of anxiety disorders were found in the following descending order: obsessive-compulsive disorder, GAD, panic disorder, social phobia, separation anxiety disorder and physical injury fears. This is in line with current research showing metacognitions not only to be relevant for GAD (Cartwright-Hatton & Wells, 1997; 2001, 2003). For example, the study of Wells and Carter (2001) supported the important role of metacognitive beliefs in depression.

For further construct validity examinations two regression analyses were conducted, showing that the MKF-K subscales commonly are significantly associated with worry and anxiety symptoms. The subscale uncontrollability and danger is most

strongly associated with worry and anxiety symptoms. Barcow and Colleagues (2009) obtained similar results showing the PSWQ-C reveals the highest correlations with the MCQ-Cs subscale uncontrollability and danger. This is also in line with several studies in adult samples, showing negative metacognitions to play a key role in pathological worrying (e.g., Wells, 2005). Following Wells theoretical framework, worry first becomes pathological when individuals start holding negative metacognitive beliefs about the uncontrollability and danger of worry (1999). Children reporting higher worry and anxiety symptoms more often think that thoughts can be dangerous and difficult to control. The subscales positive beliefs, and cognitive self-consciousness are significantly associated with worry and anxiety symptoms. The subscale cognitive self-consciousness is not significantly associated with neither worry nor anxiety symptoms, thus seems to be negligible.

Surprisingly, age was not significantly correlated with worry. The close relation of worry and negative metacognitions thus seems to already be established in children aged eight and does not increase within the examined age span from eight to 13. Negative metacognitions are significantly associated with worry independently of the cognitive developmental stage, which was estimated with the age. In contrast, age was significantly associated with anxiety symptoms as measured by the SCAS. This is in line with existing research showing younger children to score slightly higher on the scores of the SCAS than older children (Spence, 1998), particularly for the subscales separation anxiety disorder and panic disorder (Essau et al., 2002). Notably in both regression analyses, gender was significantly associated with worry and anxiety, with girls reporting more worry and anxiety than boys. This corroborates previous research showing girls to have significantly higher scores than boys on both questionnaires, the

PSKJ (Muris, Meesters, & Gobel, 2001; Pestle et al., 2008) and the SCAS (Essau et al., 2002; Spence, 1998).

In summary, the findings with regard to construct validity are coherent with research, in both adolescent and children, which indicate a significant association of metacognitive beliefs and measures of worry, anxiety and obsessive-compulsive symptoms (e.g., Bacow et al., 2009; Cartwright-Hatton et al., 2004; Ellis & Hudson, 2010; Mather & Cartwright-Hatton, 2004; Smith & Hudson, 2013). Thus, metacognitive processes, particularly negative metacognitions about uncontrollability and danger of thoughts, add significantly to the comprehension of different anxiety symptoms and worry in particular independent of developmental stage, resp. age. This further supports the notion that metacognitions are an important factor in anxiety disorders in children aged eight to 13 and has therefore important implications in terms of treatment for children (e.g., metacognitive therapy). Metacognitive beliefs are well established in young children, as early as at the age of eight and older in a comparable degree as in adult populations, and are closely linked to the experience of anxiety and should therefore be considered by clinicians.

In terms of study limitations a number of points should be noted. The collected sample is non-clinical, thus generalizability for clinical populations is limited. Also, the study did not directly assess the children's developmental status and their ability to understand of the questions. Convergent validity needs to be further evaluated as well, since only primary investigations regarding convergent validity could be made. Moreover, discriminant validity was not measured. However, since metacognitive processes are important for different mental disorders, the selection of a meaningful measurement for this aim is especially problematic. Given that the number of instruments assessing psychopathology in children is quite restricted, this

problem is further complicated. Notably, retest-reliability was not assessed within the study. Finally, the study analyses only cross-sectional data. Hence, our results cannot be interpreted as causal.

However, the metacognitive processes in children, measured by means of the MKF-K, seem to be a quite relevant cognitive construct for worrying as well as for further anxiety symptoms. The MKF-K offers a short, economic, reliable and valid instrument for the assessment of metacognitions, which seem to be an important piece of information for explanatory models for different anxiety disorders in childhood. Negative metacognitions, which play a key role in the development of GAD, are already established in eight-year-old children and can be measured reasonably with the MKF-K. A metacognitive questionnaire for children is now available in German, as well as in English and should be considered.

4. STUDY TWO: ASSOCIATION OF COGNITIVE AVOIDANCE AND WORRYING IN ADULTS

4.1. Objective

The present study investigates the relation of cognitive avoidance and worrying as well as depressive symptoms in adults. Cognitive avoidance is an important psychopathological construct relevant across a number of different mental disorders (Dickson et al., 2012; Gosselin et al., 2002; Ottenbreit & Dobson, 2004; Wegner & Zanakos, 1994). In particular, cognitive avoidance appears to be important for the development and/or maintenance of persistent recurring and intrusive thoughts or images (Gosselin et al., 2002). In consequence, since no instrument to assess cognitive avoidance is available in the German language, it was planned to translate and examine the Cognitive Avoidance Questionnaire (Gosselin et al., 2002; Sexton & Dugas, 2008) with regards to its original factor structure and its psychometric properties. The use of a German sample offers the opportunity of gaining additional information to previous findings in Canada and may lead to an extended generalizability of the construct. Furthermore, construct validity was examined by analyzing the association of cognitive avoidance with worry, rumination and depression. In addition, as GAD models explicitly suggest strong associations between cognitive avoidance (or thought control) and negative metacognitions, the association of cognitive avoidance strategies and metacognitive beliefs is examined separately, as an analysis of the discriminant validity. Finally, given that cognitive avoidance has been suggested as a transdiagnostic risk factor for the development and maintenance of a number of mental disorders, its relation to worry and depression, over and beyond other psychopathologically relevant constructs (i.e., metacognitions

concerning worrying in GAD or rumination in major depression) and sociodemographic factors such as age and gender was examined.

The study thus has the following aims:

1. Confirming the five-factor structure of the German version of the CAQ (CAQ-D) by means of confirmatory factor analysis in a German sample.
2. Analysis of the psychometric properties of the CAQ-D.
3. Examination of the CAQ-Ds construct and discriminant validity by analyzing its relation with other psychopathological constructs using regression models predicting metacognitions.
4. Examination of the CAQ-Ds transdiagnostic relevance by analyzing their interconnectivity between worry and depressive symptoms by means of regression models.

4.2. Methods

4.2.1. Translation

For the development of a German version of the CAQ, the English version (Sexton & Dugas, 2008) was translated into German and vice versa translated into English by two independent bilingual speakers, who were both clinical psychologists. The translation was based on the guidelines suggested by Brislin (1970). The versions were compared and in case of incongruities the German version was adjusted appropriately.

4.2.2. Participant

All students registered at the Justus Liebig University in Giessen (Germany) were contacted by email in April 2012 and requested to participate in an online survey concerning worries and the handling of various thoughts. The online survey was

conducted as a browser-supported online questionnaire with the software Enterprise Feedback Suite (Version 8.1) of the Globalpark AG (2011). 628 students started answering the survey, and 397 completed it. Thus, the final sample consisted of N = 397 students studying various courses at the Justus Liebig University. 35% already had some form of university degree (i.e. a bachelor degree). In the mean, participants had studied 5.3 semesters (SD = 3.6). Most of the students were associated with the department of social and cultural science (23.2%), the department of agriculture sciences, ecotrophology and environmental management (20.9%), and the department for language, literature and culture (16.1%). Mean age was 24.16 years (SD = 3.98). 82% of the participants were female. Most of the participants were unmarried (93.5%), a minority was married (6%). The vast majorities mother tongue was German (96.5%).

4.2.3. Measures

Participants of the survey filled out five questionnaires and questions concerning demographic characteristics. Besides the CAQ-D questionnaires regarding related psychopathological constructs were part of the assessment.

Intensity, excessiveness, and uncontrollability of worrying was measured with the German version of the PSWQ (Stöber, 1995; for further explanation see 1.2).

Metacognitions were assessed using the short German Metacognition Questionnaire (MKF-30; Arndt et al., 2011). The questionnaire consists of five subscales, measuring cognitive confidence, positive beliefs about worry, cognitive self-consciousness, negative beliefs about uncontrollability of thoughts and danger, and beliefs about need to control thoughts (for further explanation see 1.2).

The German simplified “Becks Depression Inventory” (BDI-V; Schmitt & Maes, 2000) is based on Becks Depression Inventory (A. T. Beck, Ward, Mendelson,

Mock, & Erbaugh, 1961) and allows to measure behavioral manifestations of depression. The simplified German version used in study two consists of 20 items, which inquire depressive symptoms on a six-point Likert-type scale (0 = "never"; 5 = "almost always"). Thus the total score can range from 0 to 100. The instrument has good psychometric properties (Schmitt, Hubner, & Maes, 2010) and norms for the German population are available (2006).

The German Version of the "Response Styles Questionnaire" (RSQ-D; Kühner & Weber, 1999) used is based on the RSQ published in 1991 (Nolen-Hoeksema & Morrow). It is designed to assess how individuals generally tend to respond to depressed mood. The questionnaire score is associated with severity of depression (Bürger & Kuhner, 2007). The German RSQ-D consists of 23 items, which are answered on its four-point Likert-type rating scale (1 = "almost never" to 4 = "almost always") and has a total score from 23 to 92. The short version is a reliable and valid measurement for assessing self- and symptom-referring rumination and distraction as a response to feelings of depression (Kühner, Huffziger, & Nolen-Hoeksema, 2007).

4.2.4. Statistical analyses

In order to replicate the five-factor structure supported in the French and English Version of the CAQ a CFA with the help of the statistical modeling program Mplus (B. O. Muthén & L. K. Muthén, 2010) was conducted. Items were assumed to be on an ordinal level of measurement and therefore handled with a specifically developed confirmatory factor-analytic method for ordinal data, provided by Mplus. As model fit indices the CFI, the TLI and the RMSEA were examined. The goodness-of-fit was expected to only be moderate, since in the English validation values were lower than conventional standards recommend (Sexton & Dugas, 2008).

In the next step the Internal Consistency of the total questionnaire and its subscales were studied, reported as Cronbach's Alpha coefficient. Furthermore corrected item-total correlations were conducted and facility indices calculated. The results were expected to be within the recommended conventional limits.

Finally, construct validity was studied by computing Pearson's correlation coefficients with other questionnaires assessing related psychopathological constructs used: the PSWQ for worry, the MKF-30 for metacognitive processes, the BDI-V for depressive symptoms, and the RSQ-D for coping styles in response to depression symptoms. Positive correlations were anticipated following the basic assumption that the CAQ-D measures a transdiagnostic mechanism concerning recurring and persistent intrusive thoughts in general. For the purpose of correcting for alpha level inflation due to multiple testing, the critical alpha level with a modified Bonferroni correction that accounts for the number of tests as well as for the mean correlation between the respective dependent variables was adjusted (Perneger, 1998; Sankoh, Huque, & Dubey, 1997).

To further test the association of thought control with negative and positive metacognitive beliefs, as an analysis of discriminant validity, two regression analysis for the CAQ-D subscales predicting the MKF-30 subscale negative beliefs about uncontrollability of thoughts and danger and positive beliefs about worry were conducted. It was expected that the CAQ-D subscales explain variance of the subscale uncontrollability and danger but not of the subscale positive beliefs. These analyses were based on the notion that whereas positive beliefs about worrying should not induce efforts to control thoughts, fear of losing control over worrying should.

To further examine the relationship of the CAQ-D with related constructs, hierarchical regression analyses were conducted for worry (PSWQ) and depressive

symptoms (BDI-V). On the one hand it was expected that the CAQ-D subscales explain variance of the PSWQ beyond the variance explained by the MKF-30, which assesses already known relevant aspects related to worry. On the other hand it was expected that the CAQ-D subscales explain variance of the BDI-V beyond the variance explained by the RSQ-D, which is an already known relevant construct for depressive symptoms.

4.3. Results

4.3.1. Answer frequencies

Since CFA using the WLMSV estimator involved χ^2-based computations, answer categories with less than 5% of the observations were combined until this value was achieved. The answer category number 5 (= "completely typical") was not answered with the required frequency for ten items (items 3, 4, 6, 15, 17-20, 23 and 24) and was thus merged with answer category number 4 (= "very typical").

4.3.2. Factor structure

To evaluate the validity of the five subscales, which were supported in the first French (Gosselin et al., 2002) and translated English (Sexton & Dugas, 2008) version of the CAQ, a CFA was executed for the German version. Since high correlations of the subscales of the CAQ-D were expected, the five factors were allowed to covary in this model (factor correlations ranged from r = .53 to r = .68) using geomin rotation, the standard rotation method suggested by the authors of Mplus (L. K. Muthén & B. O. Muthén, 2010). The results confirm the predicted five-factor structure. All factor loadings for the items on their associated factor were statistically significant, with factor correlations varying between $r^2 = .35$ and $r^2 = .92$ (see Table 10 for CFA factor loadings of the CAQ-D).

Table 10 *Factor loadings for the confirmatory factor analysis of the CAQ-D*

No	Item	FA	ldg
1.	There are things that I would rather not think about. *Es gibt Dinge, über die ich lieber nicht nachdenken würde.*	I	.67
2.	I avoid certain situations that lead me to pay attention to things I do not want to think about. *Ich vermeide bestimmte Situationen, die mich dazu bringen auf Dinge zu achten, über die ich nicht nachdenken will.*	I	.82
5.	I have thoughts that I try to avoid. *Ich habe Gedanken, die ich zu vermeiden versuche.*	I	.80
6.	I try not to think about the most upsetting aspects of some situations so as not to be too afraid. *Ich versuche über die verstörendsten Aspekte mancher Situationen nicht nachzudenken, um nicht zu ängstlich zu sein.*	I	.75
14.	There are things I try not to think about. *Es gibt Dinge, über die ich nicht nachzudenken versuche.*	I	.83
4.	I think about things that concern me as if they were occurring to someone else. *Ich denke über Dinge, die mich betreffen so nach, als ob Sie bei jemand Anderem auftreten würden.*	II	.35
11.	I think about trivial details so as not to think about important subjects that worry me. *Ich denke über unbedeutende Details nach, um nicht über wichtige Themen nachzudenken, über die ich mich sorge.*	II	.88
17.	I think about past events so as not to think about future events that make me feel insecure. *Ich denke über vergangene Ereignisse nach, um nicht über zukünftige Ereignisse nachzudenken, die mich dazu bringen mich unsicher zu fühlen.*	II	.72
20.	I think about many little things so as not to think about more important matters. *Ich denke über viele kleine Dinge nach, um nicht über wichtigere Angelegenheiten nachzudenken.*	II	.87
25.	I think about things that are worrying other people rather than thinking about my own worries. *Ich denke lieber über Dinge nach, über die sich andere Personen sorgen, als über meine eigenen Sorgen.*	II	.63
8.	I distract myself to avoid thinking about certain disturbing subjects. *Ich lenke mich selber ab, um Gedanken über bestimmte beunruhigende Themen zu vermeiden.*	III	.87
10.	I often do things to distract myself from my thoughts. *Ich mache oft Sachen, um mich von meinen Gedanken abzulenken.*	III	.79
12.	Sometimes I throw myself into an activity so as not to think about certain things. *Manchmal stürze ich mich in eine Aktivität, um nicht über bestimmte Dinge nachzudenken.*	III	.71
13.	To avoid thinking about subjects that upset me, I force myself to think about something else. *Um zu vermeiden über Themen nachzudenken, die mich verstören, zwinge ich mich an etwas anderes zu denken.*	III	.76
21.	Sometimes I keep myself occupied just to prevent thoughts from popping up in my mind. *Manchmal sorge ich dafür beschäftigt zu bleiben, nur um zu verhindern, dass Gedanken in meinen Kopf schießen.*	III	.78

Table 10 *continued*

No	Item	FA	ldg
7.	I sometimes avoid objects that can trigger upsetting thoughts. *Ich vermeide manchmal Dinge, die verstörende Gedanken auslösen können.*	IV	.88
9.	I avoid people who make me think about things that I do not want to think about. *Ich vermeide Personen, die mich dazu bringen über Dinge nachzudenken, über die ich nicht nachdenken will.*	IV	.82
16.	Sometimes I avoid places that make me think about things I would prefer not to think about. *Manchmal vermeide ich Orte, die mich zum nachdenken über Dinge bringen, über die ich lieber nicht nachdenke.*	IV	.75
18.	I avoid actions that remind me of things I do not want to think about. *Ich vermeide Tätigkeiten, die mich an Dinge erinnern, über die ich nicht nachdenken will.*	IV	.86
22.	I avoid situations that involve people who make me think about unpleasant things. *Ich vermeide Situationen, in denen ich Personen treffe, die mich über unangenehme Dinge nachdenken lassen.*	IV	.84
3.	I replace threatening mental images with things I say to myself in my mind. *Ich ersetze bedrohliche gedankliche Bilder mit Dingen, die ich mir selber in Gedanken sage.*	V	.62
15.	I keep saying things to myself in my head to avoid visualizing scenarios (a series of mental images) that frighten me. *Ich sage in Gedanken unablässig Dinge zu mir selbst, um lebhafte Erinnerungen an Situationen, die mich erschrecken, zu vermeiden.*	V	.92
19.	When I have mental images that are upsetting, I say things to myself in my head to replace the images. *Wenn verstörende Bilder in mir hochkommen, sage ich mir in meinem Kopf Dinge, um die Bilder zu ersetzen.*	V	.71
23.	Rather than having images of upsetting events form in my mind, I try to describe the events using an internal monologue (things that I say to myself in my head). *Ich versuche eher die Ereignisse in einem inneren Selbstgespräch zu beschreiben als zuzulassen, dass sich mir Bilder von verstörenden Ereignissen aufdrängen.*	V	.87
24.	I push away the mental images related to a threatening situation by trying to describe the situation using an internal monologue. *Ich schiebe die gedanklichen Bilder in Zusammenhang mit bedrohlichen Situationen weg, indem ich versuche die Situation in einem inneren Selbstgespräch zu beschreiben.*	V	.85

Note. *All factor loadings significant at $p < .05$. CAQ-D = Cognitive Avoidance Questionnaire, German version; FA = Factor; Factor I = CAQ-D thought suppression subscale; Factor II = CAQ-D thought substitution subscale; Factor III = CAQ-D distraction subscale; Factor IV = CAQ-D avoidance of threatening stimuli subscale; Factor V = CAQ-D transformation of images into thoughts subscale; ldg = factor loading. Comparative Fit Index (CFI) = .95; Root Mean-square Error of Approximation (RMSEA) = .07; The German CAQ in italics.*

The fit indices of the CFA indicate a moderate to good model fit for the CAQ-D. The following indices were computed: the RMSEA was .073, which indicates a reasonable fit (Browne & Cudeck, 1992), the CFI was .950 and the TLI was .944, which are indicative of an acceptable model fit, since Hu and Bentler (1999) recommend a cutoff value close to .95 for the CFI and TLI indices.

4.3.3. Psychometric properties

As a measure of internal consistency Cronbach's Alpha was computed for the CAQ-D and its five subscales. The internal consistency of the total scale was α = .94. The following internal consistency values were observed for the subscales: α = .86 for thought suppression, α = .75 for thought substitution, α = .86 for the distraction, α = .87 for avoidance of threatening stimuli, and α = .82 for transformation of images into thoughts. Means, standard deviations, Cronbach's Alpha, item-total correlations and facility index for the five CAQ-D subscales are presented in Table 11.

Table 11 *Means, standard deviations, range, Cronbach's alpha, item-total correlations and facility index for the CAQ-D subscales*

	I	II	III	IV	V
M	13.59	10.18	12.49	10.64	9.37
SD	4.86	4.23	4.90	4.95	4.26
Range	20	18	20	20	20
α	.86	.75	.86	.87	.82
r_{it}	.58-.73	.21-.70	.59-.72	.61-.77	.46-.70
p	.46-.63	.33-.46	.45-.54	.39-.48	.32-.41

Note. α = Cronbach's Alpha; r_{it} = corrected item-total correlation; p = facility index; Factor I = CAQ-D thought suppression subscale; Factor II = CAQ-D thought substitution subscale; Factor III = CAQ-D distraction subscale; Factor IV = CAQ-D avoidance of threatening stimuli subscale; Factor V = CAQ-D transformation of images into thoughts subscale.

4.3.4. Construct and discriminant validity

All questionnaires (i.e. BDI-V, MKF-30, PSWQ, RSQ-D) correlated significantly with the CAQ-D total score and its five subscales, which can be seen in the correlation matrix presented in Table 12. Taking Alpha adjustment into consideration, Alpha was set to $p < .008$ for this analysis.

Table 12 *Correlation matrix for study measures*

	CAQ-D	I	II	III	IV	V	BDI	MKF	PSWQ	RSQ
CAQ-D	-	.85*	.79*	.84*	.83*	.77*	.55*	.48*	.45*	.53*
I		-	.54*	.65*	.68*	.55*	.46*	.42*	.46*	.42*
II			-	.61*	.56*	.54*	.51*	.40*	.35*	.49*
III				-	.59*	.56*	.43*	.40*	.35*	.45*
IV					-	.53*	.45*	.38*	.39*	.40*
V						-	.40*	.38*	.27*	.41*
BDI							-	.58*	.60*	.52*
MKF								-	.61*	.56*
PSWQ									-	.39*
RSQ										-

Note. CAQ-D = Cognitive Avoidance Questionnaire total score, German version; Factor I = CAQ-D thought suppression subscale; Factor II = CAQ-D thought substitution subscale; Factor III = CAQ-D distraction subscale; Factor IV = CAQ-D avoidance of threatening stimuli subscale; Factor V = CAQ-D transformation of images into thoughts subscale; BDI-V = simplified Becks Depression Inventory; MKF = Metacognition Questionnaire 30; PSWQ = Penn State Worry Questionnaire; RSQ-D = Response Styles Questionnaire. * $p < .008$.

For the analysis of discriminant validity, two regression analyses were performed to examine the association of the CAQ-D subscales with (1) negative metacognitive beliefs (MKF-30, uncontrollability and danger) and (2) positive metacognitive beliefs (MKF-30, positive beliefs about worry). The CAQ-D subscales accounted for 25% of variance in the MKF-30 subscale uncontrollability and danger

(R^2 = .25, p < .001). Separately considered, only two of the five subscales contributed significantly for the prediction of negative metacognitive beliefs, namely the subscale thought suppression (β = .31, p < .001) and thought substitution (β = .12, p < .05). For the prediction of the MKF-30 subscale positive beliefs about worry, the CAQ-D subscales did not contribute significantly (R^2 = .03, n.s.). Results for the regression analyses are presented in Table 13 and Table 14.

Table 13 *Summary of regression analysis for CAQ-D subscales predicting the MKF-30 subscale negative beliefs about uncontrollability of thoughts and danger*

Variables	B	SE B	β	r	pr
(constant)	5.08	.66			
I Thought suppression	.30	.07	.31***	.47	.23
II Thought substitution	.13	.07	.12*	.38	.10
III Distraction	.07	.06	.07	.40	.06
IV Avoidance of threatening stimuli	.05	.06	.06	.39	.05
V Transformation of images into thoughts	.03	.06	.03	.33	.03

Note. CAQ-D = Cognitive Avoidance Questionnaire, German version; MKF-30 = Metacognition Questionnaire 30; r = zero-order correlation; pr = partial correlation. R^2 = .25***; * p < .05; ** p < .01; *** p < .001.

Table 14 *Summary of regression analysis for CAQ-D subscales predicting the MKF-30 subscale positive beliefs about worry*

Variables	B	SE B	β	r	pr
(constant)	9.34	.65			
I Thought suppression	-.06	.06	-.07	.08	-.05
II Thought substitution	.09	.07	.10	.15	.07
III Distraction	.07	.06	.09	.14	.06
IV Avoidance of threatening stimuli	.01	.06	.01	.10	.01
V Transformation of images into thoughts	.05	.06	.05	.12	.04

Note. CAQ-D = Cognitive Avoidance Questionnaire, German version; MKF-30 = Metacognition Questionnaire 30; r = zero-order correlation; pr = partial correlation. R^2 = .03 (n.s.); * p < .05; ** p < .01; *** p < .001.

In addition, two hierarchical regression analyses were performed to determine the unique association of the CAQ-D subscales with (1) worrying (PSWQ) and (2) with level of depressive symptoms (BDI-V). For the prediction of worry, measured by the PSWQ, gender and age were entered in a first step, the MKF-30 in a second step, whereas the five subscales of the CAQ-D were entered in the third and last step. For the prediction of depressive symptoms, measured by the BDI-V, only step two differed, where the RSQ-D was entered. After controlling for demographic variables and for metacognitions or for responding to feelings of depression, the CAQ-D subscales all together still accounted for significant additional 4% of variance in the PSWQ scores and 11% of variance in the BDI-V scores and therefore account for more incremental variance. For the prediction of worry only the subscale thought suppression of the CAQ-D contributed significantly (β = .20, p < .001). For the prediction of depressive symptoms two subscales, namely thought suppression (β = .13, p < .05) and thought substitution (β = .23, p < .001), had a significant effect.

Results for both hierarchical regression analyses are presented in Table 15 and Table 16.

Table 15 *Summary of hierarchical regression analysis for variables predicting scores of the PSWQ*

Variables	R^2	ΔR^2	B	SE B	β	r	pr
Prediction of worry (PSWQ)							
Step 1: Demographic	**.08**	**.08*** **					
(constant)			48.88	4.45			
Gender[a]			9.91	1.75	.27***	.28	.28
Age			-.24	.17	-.07	-.09	-.07
Step 2: Related process	**.46**	**.38*** **					
(constant)			13.80	4.00			
Gender[a]			10.38	1.34	.29***	.78	.36
Age			-.29	.13	-.08*	-.09	-.11
MKF-30			.63	.04	.62***	.61	.55
Step 3: Cognitive Avoidance	**.50**	**.04*** **					
(constant)			11.35	3.91			
Gender[a]			9.33	1.31	.26***	.78	.34
Age			-.26	.13	-.08*	-.09	-.11
MKF-30			.54	.04	.53***	.61	.55
I Thought suppression			.58	.16	.20***	.46	.18
II Thought substitution			.20	.16	.06	.35	.06
III Distraction			-.09	.15	-.03	.35	-.03
IV Avoidance of threatening stimuli			.16	.15	.06	.39	.05
V Transformation of images into thoughts			-.29	.15	-.09	.27	-.10

Note. MKF-30 = Metacognition Questionnaire 30; r = zero-order correlation; pr = partial correlation.

[a] Gender coding: 0 = male; 1 = female. * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 16 *Summary of hierarchical regression analysis for variables predicting scores of the BDI-V*

Variables	R^2	ΔR^2	B	SE B	β	r	pr
Prediction of depressive symptoms (BDI-V)							
Step 1: Demographic	**.02**	**.02****					
(constant)			41.39	5.61			
Gender[a]			6.35	2.20	.14**	.14	.14
Age			.28	.21	.07	.06	.07
Step 2: Related process	**.29**	**.27*****					
(constant)			-6.20	6.19			
Gender[a]			4.88	1.88	.11*	.14	.13
Age			.25	.18	.06	.06	.07
RSQ-D			.96	.08	.52***	.52	.32
Step 3: Cognitive Avoidance	**.40**	**.11*****					
(constant)			-4.15	5.77			
Gender[a]			3.97	1.75	.09*	.14	.11
Age			.22	.17	.05	.06	.07
RSQ-D			.58	.09	.31***	.52	.32
I Thought suppression			.46	.21	.13*	.46	.11
II Thought substitution			.91	.22	.23***	.51	.20
III Distraction			-.09	.20	-.03	.43	-.02
IV Avoidance of threatening stimuli			.33	.20	.10	.45	.08
V Transformation of images into thoughts			.17	.21	.04	.40	.04

Note. BDI-V = simplified Becks Depression Inventory; RSQ-D = Response Styles Questionnaire; r = zero-order correlation; pr = partial correlation. [a] Gender coding: 0 = male; 1 = female. * $p < .05$; ** $p < .01$; *** $p < .001$.

4.4. Discussion

The aim of study two was to translate and evaluate the German version of a validated questionnaire measuring different cognitive avoidance strategies, especially with regard to GAD specificity and its association to metacognitive beliefs. The

confirmatory factor-analysis employing methodology for ordinal data supported the five-scale structure of the instrument, replicating the findings of the original French version (Gosselin et al., 2002) and of the English version (Sexton & Dugas, 2008). The models overall goodness-of-fit was slightly lower than commonly recommended (Tabachnick & Fidell, 2007). The fit indices were almost identical with those found in the English validation study. There were no considerable indications for necessary model adjustments according to the model modification indices. Furthermore, the model was structurally and theoretically coherent. After examination of additional contributing pathways for the model, it can be concluded, that the five-factor structure is the most economical and clinically useful solution (compare Sexton & Dugas, 2008).

Noteworthy are the quite high correlations of the five subscales with the total score. The five scales clearly overlap substantially. This leads to the question of the subscales justification and there clinical utility, which clearly needs to be further examined in future studies. The five scales nevertheless hold additional diagnostic potential and the option of a more differentiated perspective on cognitive avoidance strategies as well in an individual as in a group context. In a therapeutic setting, the differentiated perspective on the used avoidance strategies may help addressing and challenging them precisely. Certain avoidance strategies may be characteristic for certain mental disorders, which of course still needs to be further exanimated. The question of the subscales clinical utility requires further exploration.

Reliability can be seen as acceptable based on its acceptable to good internal consistency of the total scale and its subscales. Item-total correlation was medium to high with the exception of item 4 with a low item-total correlation. Facility indices of the CAQ-D items lie within the usually recommended range.

Since standardized instructions with online-support were used, performance objectivity can be considered as given. Notably, it was not controlled when and where participants filled out the questions.

The results concerning the CAQ-Ds construct validity are clearly satisfying. Correlations with depressive symptoms, metacognitions, worry and rumination all were high. This is in line with the assumption that the CAQ-D measures a transdiagnostically relevant aspect of psychopathology and is not GAD specific. The highest correlations of the CAQ-D total score are with measures related depressive symptoms. This is surprising since the questionnaire and its subscales were designed within the research context of GAD based on the theoretical importance of avoidance in the anxiety disorders. Surprisingly, correlations with GAD measurements are likewise high. The assumption of a GAD specific mental avoidance process, therefore, seems unsustainable. Following the presented correlations the CAQ-Ds relevance for depressive symptoms and worry nearly seems to be equipollent.

The CAQ-D subscales are significantly associated with negative metacognitions, but not with positive metacognitions, both measured with the MKF-30 subscales. In a combined model, especially thought suppression and thought substitution were significantly associated with negative metacognitions towards worrying. This finding clearly supports the notion of different etiological models of GAD, claiming that negative metacognitive beliefs about the danger or uncontrollability of worry should be closely related to cognitive avoidance, or thought control strategies, especially thought suppression and thought substitution. These results provide support of the questionnaires discriminant validity, since positive metacognitions were, as expected, not significantly associated with cognitive avoidance strategies. Taking a closer look at the items of the MKF-30 subscales

negative metacognitions and positive metacognitions this is reasonable: The items for uncontrollability and danger beliefs on the one hand deal with the unwanted effects worrying could have (e.g., going mad or sick, losing control), which rather is in favor of cognitive avoidance strategies. The items for positive beliefs about worry on the other hand, are about the possible benefits of worrying (e.g., get things sorted, solve problems), which suggests not to apply cognitive avoidance strategies.

The further examination of the construct validity by use of multiple regression analyses showed that the CAQ-D subscales altogether are significantly associated with worry, even after controlling for demographic variables and for metacognition in the magnitude of an additional 4% of variance. In previous research a somewhat higher magnitude of explanatory power was found. Given the substantial zero order correlations, it can be suggested that the CAQ-D shares substantial variance with the MKF-30. Only the subscale thought suppression was significantly associated with the PSWQ. This further supports the specific role of thought suppression in worry related processes. The contribution of the other subscales, measuring thought substitution, distraction, avoidance of threatening stimuli and transformation of images into thoughts seems to be negligible for worry in contrast to thought suppression.

For the understanding of depressive symptoms, after controlling for demographic variables and for common responses to feelings of depression (ruminative tendencies), the five CAQ-D subscales explained significantly additional 11% of variance. Two subscales were significantly associated with the BDI-V, namely thought suppression and thought substitution. Worry and depressive symptoms are both closely related to the CAQ-Ds first subscale measuring thought suppression. The second scale, however, predicts significantly depressive symptoms. In other words, individuals with higher depression scores are more likely to

concentrate on trivial details and specific aspects of past events rather than on more important or future oriented goals. This subscale was expected to be significantly associated with the PSWQ, since previous research showed GAD patients to have a proneness to worry about daily hassles (e.g., Hoyer et al., 2001). The close association of the subscale thought substitution with depression is in line with the recent literature regarding thought suppression in depression (Wenzlaff & Bates, 1998). As described by Rachman (1980), emotional processing of negative events or fears can be impeded by different avoidance behaviors in general. If the processing, initiated after the occurrence of an emotional experience, is interrupted or blocked or prevented persisting signs of the incomplete process will likely appear afterwards (e.g., ruminations). The use of thought substitution may have a similar impact as the effect of thought suppression on depressive symptoms.

In summary, cognitive avoidance processes, particularly thought suppression and thought substitution, add significantly and transdiagnostically to the comprehension of two highly relevant psychopathological symptoms (worry and depression) over and beyond already established maintaining mechanisms (i.e. metacognitions concerning worrying and rumination, rumination as a common symptom of depression). Therefore, cognitive avoidance likely is a further risk factor for GAD and MD.

Some study limitations should be highlighted. The sample consists of students, which implies a relative homogeneity concerning intelligence, education and age. This fact certainly limits the generalizability of the results. Moreover, retest-reliability was not measured. Finally, study two is based on cross-sectional data and therefore the data cannot be interpreted as being causal.

Nevertheless the CAQ-D is a relevant construct concerning different psychopathological conditions (i.e., depression and generalized anxiety). The CAQ-D is a reliable and valid instrument for assessing different cognitive avoidance strategies, which may lead to maintenance of different psychopathological conditions, is now available in German as well as in English and French and should therefore be considered.

5. GENERAL DISCUSSION

The current work underlines the relevance of metacognitions and cognitive avoidance for the assessment of GAD symptoms in adults and children and contributes to the understanding of the examined constructs regarding the etiology and maintenance of worries and GAD across the lifespan. In children, metacognitions, especially negative metacognitions, are closely related to worry, already at the age of eight, but also contribute significantly to the explanation of other anxiety symptoms. For the assessment of metacognitions in childhood the presented MKF-K shows good psychometric properties and a satisfying factor structure. For the understanding of worry in adulthood, cognitive avoidance is a relevant factor linked to worrying, but also to negative metacognitive beliefs and rumination. For the assessment of cognitive avoidance in adults the presented CAQ-D shows good reliability and validity and can therefore be applied for the diagnostic and treatment process.

Relation to existing theory and research

The relevance of both, metacognitions and cognitive avoidance, have been developed within the two most relevant cognitive models developed to inform cognitive behavioral treatment of GAD. The metacognitive model of GAD by Wells (1995) and the cognitive model of GAD by Dugas and colleagues (1998) both draw from the avoidance models of GAD by Borkovec (2004). Importantly, the current work is in line with the literature suggesting that both constructs are highly relevant for other psychopathological conditions, as well (Cartwright-Hatton & Wells, 1997; Dickson et al., 2012; Ottenbreit & Dobson, 2004; Papageorgiou & Wells, 2001, 2003; Wegner & Zanakos, 1994; Wells & Carter, 2001). Consequently, the question arises, how relevant metacognitions and cognitive avoidance are for the diagnosis of GAD. Note that both cognitive processes are not directly mentioned as part of the diagnostic

criteria of GAD, neither in the DSM-IV-TR nor in the ICD-10 (see 1.1.2 for diagnostic criteria). Partially, the B criterion for GAD in DSM-IV-R, "difficult to control the worry" indicates the presence of negative metacognitions in individuals with GAD. However, coping strategies for "excessive anxiety and worry" (A criterion in DSM-IV-R), like the use of cognitive avoidance behavior, are not part of the diagnostic criteria. In contrast, the diagnosis of obsessive-compulsive disorder in DSM-IV-TR (APA, 2000) lists "the persons attempt to ignore or suppress such thoughts" as a relevant criterion. Although this work reveals both constructs to be relevant for GAD across the lifespan, their specificity for GAD remains unclear, as both aspects were also relevant for other anxiety symptoms and rumination.

This is in line with former research, showing cognitive avoidance to consist of different strategies, used by individuals who suffer from recurring and persistent intrusive thoughts (Gosselin et al., 2002). These strategies can be understood as an attempt to cope with negative emotions such as depression or anxiety, since avoidance causes immediate relief (J. S. Beck, 2011) but contributes to the maintenance of anxiety and depression in the long run. Accordingly, the use of cognitive avoidance strategies is associated with higher levels of depressive symptoms, anxiety and obsession (Dickson et al., 2012; Ottenbreit & Dobson, 2004; Wegner & Zanakos, 1994).

Previous research, in accordance with this work, has also found metacognitions to be closely related to psychopathological conditions like obsessions, depression and anxiety in adults (Cartwright-Hatton & Wells, 1997; Papageorgiou & Wells, 2001, 2003; Wells & Carter, 2001). In children and adolescents, there is only little evidence available supporting the association between metacognitions and

symptoms of worry, anxiety, depression and obsession (Bacow et al., 2009; Cartwright-Hatton et al., 2004; Mather & Cartwright-Hatton, 2004).

Consistent with these previous research findings, the presented studies open up a transdiagnostic view of metacognitions and cognitive avoidance across the lifespan. The constructs may serve as an important information source in terms of a transdiagnostic risk factor for different psychopathological conditions, rather than a GAD specific diagnostic criterion.

Since disorder specific approaches pose a number of challenges and inherently limit the likelihood of easy dissemination, recent research increasingly considers transdiagnostic approaches (e.g., Farchione et al., 2012; McLaughlin & Nolen-Hoeksema, 2011; Titov et al., 2011). As illustrated by Dudley and colleagues (2011), limited reliability of diagnosis, missing robust evidence for some disorder specific approaches, a substantial number of non-responders to disorder specific manualized treatment programs, and finally high comorbidities are some of the unresolved problems of disorder specific approaches. Transdiagnostic approaches, targeting general etiological risk and maintenance factors, may provide some practical and clinical advantages. Transdiagnostic treatment might lead to a simplified treatment planning, greater efficiency, better treatment effects, and the prevention of further comorbid disorders (McLaughlin & Nolen-Hoeksema, 2011). Still, research on transdiagnostic treatment approaches is limited and needs to be further examined and compared to disorder specific approaches.

Thus, the underlying models, the metacognitive model (Wells, 1995), the avoidance models of GAD by Borkovec (2004), and the cognitive model (Dugas et al., 1998) of both in this presented studies analyzed constructs provide a framework not only for the understanding of worrying across the lifespan, but also for the

understanding of other emotional disorders in the sense of a vicious circle: the attempts of controlling recurring and persistent intrusive thoughts leads to a reinforcement of these thoughts as well as of dysfunctional metacognitions, which for in turn result in more controlling attempts. Since to date research, linking cognitive avoidance and negative metacognitions is missing, the current data provides preliminary support for the suggested relationship of cognitive avoidance strategies and negative metacognitive beliefs, as stated in etiological models of GAD. It appears likely, that both constructs contribute to the exacerbation of worry in the sense of a vicious circle: Since negative metacognitions signal danger or threat within worries, consecutive control attempts lead to rebound effects, which thereby increase negative metacognitions about uncontrollability.

Implications for clinical practice and treatment evaluation

In clinical practice both presented questionnaires could add important information for the treatment process as well as its empirical evaluation.

First, regarding anxiety disorder treatment for younger children, well-validated interventions are missing. Following Cartwright-Hatton (2006), this is to a great extent due to missing developmentally appropriate models, explaining development and maintenance of anxiety disorders in childhood. The extension of the well-validated and fruitful adult metacognitive model (Wells, 1995) for the younger ages seems promising (Ellis & Hudson, 2010). The structural assessment of the models key component metacognitive beliefs is essential for the application of the metacognitive framework in the implementation of the metacognitive therapy to children. Metacognitive processes in children are a key feature of worrying and other anxiety symptoms in children. As it was shown in study 1, negative metacognitions, as a key factor in the psychopathology of GAD, are closely related to worrying also

within eight-year-old children. Future investigations of treatment outcomes in anxiety disorders in children should add the MKF-K to their diagnostic procedures as an informative and useful tool. This is in line with preliminary research, which underscores the importance of metacognitions in the treatment of children with anxiety disorders (Ellis & Hudson, 2010; Esbjorn et al., 2014; Simons, Schneider, & Herpertz-Dahlmann, 2006). Consequently, the specific assessment of negative metacognitions by means of the MKF-K may help to further understand a key factor, which might contribute to successful anxiety treatment in children.

Second, in the treatment of adults, the clinical implication for behavioral avoidance in general is well understood, pointing to the relevance of inhibitory learning during exposure therapy in feared anxiety relevant situations (Butler, Fennell, & Hackmann, 2008). For effective exposure based treatments, recognizing avoidance strategies is a crucial first step in Cognitive Behavioral Therapy (Butler et al., 2008). Structured assessment of patients' behavioral avoidance behaviors is therefore necessary. Arguably, cognitive avoidance presumable limits the success of exposure therapy (Powers, Smits, & Telch, 2004) and requires as much attention as behavioral avoidance strategies do.

Especially for further investigations of the treatment of anxiety disorders and depression, the application of the CAQ-D is useful. Future research should further examine the influence of cognitive avoidance on treatment processes and outcomes. The CAQ-D provides the option of a differentiated analysis of the impact of psychotherapeutic interventions, which target the handling of unwanted or uncomfortable cognitions (e.g., metacognitive therapy). It can also serve as a useful diagnostic tool in clinical practice and research for a differentiated perspective on cognitive avoidance strategies, which likely functions as an important transdiagnostic

maintaining factor in anxiety and depression (Dickson et al., 2012; Dugas, Marchand, et al., 2005; Ottenbreit & Dobson, 2004; Wegner & Zanakos, 1994).

Future research directions

Of course, both presented measures need replication studies, including different samples, most importantly clinical samples with different affective disorders. Moreover, research using longitudinal and experimental designs for the validation of etiological and maintaining models, especially examining risk factors for the development of anxiety disorders in children, is needed (e.g., Zinbarg et al., 2010). The causal role of metacognitions and cognitive avoidance in the development of psychopathological conditions across the lifespan needs to be further tested. Additionally, age differences as well as gender differences are not sufficiently understood for both presented cognitive constructs.

Regarding children's self-reports in terms of worrying, metacognitions or other anxiety related constructs, it cannot be assumed that the construct aimed to assess is understood in the same way as intended. Content validity of childhood measures is much more complex than in adult measures, which requires more caution in the practical application of these questionnaires. Considering and assessing developmental issues in future studies is highly recommended.

Finally, future studies should assess the specificity of metacognitions and cognitive avoidance for certain mental disorders and its transdiagnostic value, in the sense of a risk factor for different psychopathological conditions. Therefore, different clinical samples (i.a. MD, Anxiety Disorders, OCD) are needed. Transdiagnostic approaches and models across the lifespan may contribute to the understanding and treatment of mental disorders, characterized by recurring and persistent intrusive thoughts. Increasing the understanding of the role of metacognitions and cognitive

avoidance in these disorders across the lifespan may lead to more efficient and effective treatment options.

Limitations

Both samples of the current studies are non-clinical, which leads to restricted generalizability. Nevertheless both instruments measure constructs which are considered to represent a continuum, thus non-clinical samples may also provide reasonable and valid information in the evaluation process of the constructs. Also, within the studies no diagnostic status was assessed, which limits the transferability to GAD patients. Also notable, the sample used in study two consists of students and generalizability to other populations therefore is limited. For example, the sample is thus highly educated.

Further, both studies used self-reported measures for the assessment of different constructs, such as worrying, rumination, and anxiety. External observer rating of these internal processes is not possible; hence self-reports are the best information source available. In study one, parent ratings could have gained additional interesting information for the validation of the MKF-K. However, previous research often showed these two information sources (children and parents) to correspond only very little concerning anxiety symptoms (Adornetto et al., 2012; Birmaher et al., 1997; Ellis & Hudson, 2010; Muris, Meesters, et al., 1998).

As mentioned, since both study had cross sectional, correlational research designs, conclusions about cause-effect relationships are not appropriate. Interpretations should be drawn very carefully.

Conclusion

The German version of the MKF-K and the CAQ-D are reliable and valid diagnostic instruments for assessing metacognitions in children and cognitive

avoidance in adults. In line with existing models and empirical data, both presented studies add further evidence for the relevance of the underlying cognitive constructs and their transdiagnostic relevance for pathological conditions, such as worrying, anxiety and rumination. The MKF-K and the CAQ-D are useful tools for future research, examining the role of these two constructs in the etiology and maintenance of worrying and GAD, as well as in other mental disorders.

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APPENDICES

I Study One: Material and measures

A. Front page
B. Demographic questions
C. MKF-K
D. PSWQ-C

II Study Two: Material and measures

A. Instruction I and demographic questions
B. Instruction II
C. CAQ-D

I Study One: Material and measures

A. Front page

B. Demographic questions

Hallo!

Bevor es losgehen kann, sind hier noch ein paar allgemeine Fragen an dich. Fülle diese bitte aus!

Alter: _____ Jahre **Geburtsjahr: _____** (bitte eintragen)

Geschlecht: **1** ☐ **Mädchen**

2 ☐ **Junge**

Muttersprache: **1** ☐ **Deutsch**

2 ☐ **andere: _____** (bitte eintragen)

Wenn du eine andere Muttersprache hast, wie gut kannst du Deutsch?

sehr gut sehr schlecht
1 ------- 2 ------- 3 ------- 4 ------- 5 ------- 6

So, nun kannst du starten! ☺

C. MKF-K

Metakognitionsfragebogen für Kinder (MKF – K)

Überlege, wie es bei Dir ist. **Ist es gut für Dich, Dich zu sorgen oder nicht?** Kreise das Viereck ein, das angibt, wie stark es bei Dir zutrifft:

Stimmt es	gar nicht	ein wenig	ziemlich	völlig	*?*

1	Wenn ich mich jetzt sorge, dann habe ich später weniger Probleme.	gar nicht	ein wenig	ziemlich	völlig
2	Es ist schlecht für mich, wenn ich mich sorge.	gar nicht	ein wenig	ziemlich	völlig
3	Ich denke viel über meine Gedanken nach.	gar nicht	ein wenig	ziemlich	völlig
4	Vom Sorgen kann ich krank werden.	gar nicht	ein wenig	ziemlich	völlig
5	Während ich über ein Problem nachdenke, verstehe ich, was in meinem Kopf vorgeht.	gar nicht	ein wenig	ziemlich	völlig
6	Wenn ich eine Sorge nicht in den Griff bekomme, und es tatsächlich passiert, ist es meine Schuld.	gar nicht	ein wenig	ziemlich	völlig
7	Wenn ich mich sorge, dann kann ich besser einen Schritt nach dem anderen planen.	gar nicht	ein wenig	ziemlich	völlig
8	Ich glaube, ich kann mir Wörter und Namen nicht gut merken.	gar nicht	ein wenig	ziemlich	völlig
9	Wenn ich mich einmal sorge, kann ich nicht mehr damit aufhören.	gar nicht	ein wenig	ziemlich	völlig
10	Wenn ich mich sorge, kann ich klarer denken.	gar nicht	ein wenig	ziemlich	völlig
11	Ich kann meine Sorgen nicht unbeachtet lassen.	gar nicht	ein wenig	ziemlich	völlig

		gar nicht	ein wenig	ziemlich	völlig
12	Ich überwache, was ich denke.	▫	□	▢	■
13	Ich muss jederzeit bestimmen können, was ich denke.	▫	□	▢	■
14	Ich kann mir nicht immer alles richtig merken.	▫	□	▢	■
15	Wenn ich mich weiter sorge, dann kann ich verrückt werden.	▫	□	▢	■
16	Ich achte immer darauf, was ich denke.	▫	□	▢	■
17	Ich kann mir schlecht etwas merken.	▫	□	▢	■
18	Ich achte genau darauf, wie mein Kopf arbeitet.	▫	□	▢	■
19	Wenn ich mich sorge, komme ich besser zurecht.	▫	□	▢	■
20	Wenn ich nicht aufhören kann, an etwas zu denken, dann bin ich schwach.	▫	□	▢	■
21	Wenn ich anfange, mich zu sorgen, kann ich nicht mehr aufhören.	▫	□	▢	■
22	Wenn ich bestimmte Gedanken nicht in den Griff bekomme, werde ich bestraft.	▫	□	▢	■
23	Wenn ich mich sorge, kann ich meine Probleme besser lösen.	▫	□	▢	■
24	Ich glaube, ich kann mir Orte nicht gut merken.	▫	□	▢	■
25	Es ist schlecht, bestimmte Gedanken zu denken.	▫	□	▢	■
26	Ich glaube, ich kann mir schlecht etwas merken.	▫	□	▢	■
27	Wenn ich meine Gedanken nicht im Griff habe, kann ich nicht alles schaffen.	▫	□	▢	■
28	Ich muss mich sorgen, um gut klar zu kommen.	▫	□	▢	■
29	Ich glaube, ich kann mir nicht gut merken, was gemacht wurde.	▫	□	▢	■
30	Ich denke ständig über meine Gedanken nach.	▫	□	▢	■

D. PSWQ-C

Penn State Sorgen Fragebogen – K+J

Anweisung: Dieser Fragebogen handelt vom Sorgen. Sorgen findet statt, wenn Du dich wegen etwas ängstigst und viel darüber nachdenkst. Menschen sorgen sich manchmal über die Schule, ihre Familie, ihre Gesundheit, Dinge, die in der Zukunft passieren werden oder andere Dinge. Kreuze für jeden Satz die Antwort an, die am besten ausdrückt, wie häufig der Satz über dich zutrifft.

1.	Meine Sorgen belasten mich sehr	Stimmt nie	Stimmt manchmal	Stimmt meistens	Stimmt immer
2.	Ich sorge mich nicht wirklich über Dinge	Stimmt nie	Stimmt manchmal	Stimmt meistens	Stimmt immer
3.	Viele Dinge bringen mich zum Sorgen	Stimmt nie	Stimmt manchmal	Stimmt meistens	Stimmt immer
4.	Ich weiß, ich sollte mich nicht sorgen, aber ich kann es nicht ändern.	Stimmt nie	Stimmt manchmal	Stimmt meistens	Stimmt immer
5.	Wenn ich unter Druck bin, sorge ich mich sehr viel	Stimmt nie	Stimmt manchmal	Stimmt meistens	Stimmt immer
6.	Ich sorge mich immer über etwas	Stimmt nie	Stimmt manchmal	Stimmt meistens	Stimmt immer
7.	Ich finde es einfach, mit dem Sorgen aufzuhören, wenn ich will	Stimmt nie	Stimmt manchmal	Stimmt meistens	Stimmt immer
8.	Wenn ich eine Sache beende, beginne ich mich über etwas anderes zu sorgen	Stimmt nie	Stimmt manchmal	Stimmt meistens	Stimmt immer
9.	Ich sorge mich nie über irgendetwas	Stimmt nie	Stimmt manchmal	Stimmt meistens	Stimmt immer
10.	Ich habe mich immer schon viel gesorgt	Stimmt nie	Stimmt manchmal	Stimmt meistens	Stimmt immer
11.	Ich merke, dass ich mir über Dinge sorgen gemacht habe	Stimmt nie	Stimmt manchmal	Stimmt meistens	Stimmt immer
12.	Wenn ich mich zu sorgen begonnen habe, kann ich nicht mehr stoppen.	Stimmt nie	Stimmt manchmal	Stimmt meistens	Stimmt immer
13.	Ich sorge mich die ganze Zeit	Stimmt nie	Stimmt manchmal	Stimmt meistens	Stimmt immer
14.	Ich sorge mich wegen Dingen, bis diese alle erledigt sind.	Stimmt nie	Stimmt manchmal	Stimmt meistens	Stimmt immer

II Study Two: Material and measures

A. Instruction I and demographic questions

Willkommen bei unserer Online-Befragung!

Im Folgenden bitten wir Sie zunächst darum, die unten stehenden Angaben auszufüllen. Die Angabe dieser Daten ist vollkommen unverbindlich.

Gerne würden wir einige Personen, die jetzt an der Online-Befragung teilnehmen, im Laufe des Jahres zu einer weiteren psychologischen Untersuchung einladen. Wir planen sowohl Personen mit als auch ohne die uns interessierenden Merkmale zu untersuchen. Die Teilnahme an eventuellen späteren Untersuchungen ist natürlich freiwillig und Sie können diese selbstverständlich auch dann noch ablehnen, wenn wir Sie diesbezüglich kontaktieren.

Ihre Daten unterliegen dem Datenschutzgesetz und werden keinesfalls an Dritte weitergegeben. Für die Teilnahme an der Verlosung des Amazon-Gutscheins benötigen wir Ihre E-mail Adresse; falls Sie an der Teilnahme unserer Studien interessiert sind, geben Sie bitte zusätzlich Ihre Telefonnummer an.

Bei Rückfragen wenden Sie sich bitte an die Leiterin der Studie unter: lena.naumann@uni-koeln.de

Alter

Geschlecht

○ männlich ○ weiblich

Familienstand

ledig
ledig, zusammenlebend
verheiratet, zusammenlebend
verheiratet, getrennt lebend
geschieden
verwitwet

Muttersprache

Welches ist Ihr höchster erreichter Schulabschluss?

kein Abschluss
Sonderschulabschluss
Hauptschul-/Volksschulabschluss
Realschulabschluss/Polytechnische Oberschule
(Fach-)Abitur
Hochschulabschluss
anderer Schulabschluss

Welches Studienfach studieren Sie?

In welchem Semester sind Sie?

An welcher Universität studieren Sie?

Welches ist derzeit Ihre Haupterwerbstätigkeit?

Auszubildende(r)
Angestellte(r), Beamte(r)
Arbeiter(in), Facharbeiter(in)
Selbstständige(r), Freiberufler(in)
Arbeitslose(r)
Student(in)
Hausmann/Hausfrau
Sonstige

E-mail Adresse

Telefonnummer

Ich bin einverstanden, dass man mich für eine mögliche Teilnahme an weiteren Untersuchungen unter der o.g. Telefonnummer kontaktieren kann.

○ Ja ○ Nein

Ich habe die Information über den Ablauf der Online-Befragung durchgelesen. Ich habe verstanden, dass ich jederzeit aus der Untersuchung ausscheiden kann, ohne dass mir persönliche Nachteile entstehen. Ich bin darüber informiert, dass meine Daten unter Einhaltung des Datenschutzgesetzes erhoben, gespeichert und verarbeitet werden, und dass die UntersucherInnen der Verschwiegenheitsverpflichtung nach § 40 Bundesdatenschutzgesetz unterliegen. Durch Klicken auf "Weiter" erkläre ich außerdem, dass ich das Vorhaben und die Informationen verstanden habe und freiwillig und aus eigenem Entschluss an der Online-Befragung teilnehme.

B. Instruction II

Im Folgenden werden Ihnen eine Reihe von Fragebögen zur Beantwortung dargeboten. Für alle Fragen gilt hierbei, dass es keine richtigen und falschen Antworten gibt. Antworten Sie also ohne lange zu überlegen "aus dem Bauch heraus".

Bitte beantworten Sie immer alle Fragen, indem Sie die Alternative auswählen, die für Sie am zutreffendsten ist.

C. CAQ-D

Personen reagieren unterschiedlich auf bestimmte Arten von Gedanken. Bitte geben Sie mit Hilfe der folgenden Skala an, in welchem Ausmaß die folgenden Aussagen typisch für die Art sind, in der Sie auf bestimmte Gedanken reagieren.

	Überhaupt nicht typisch	Ein wenig typisch	Etwas typisch	Sehr typisch	Völlig typisch
1. Es gibt Dinge, über die ich lieber nicht nachdenken würde.	○	○	○	○	○
2. Ich vermeide bestimmte Situationen die mich dazu bringen auf Dinge zu achten, über die ich nicht nachdenken will.	○	○	○	○	○
3. Ich ersetze bedrohliche gedankliche Bilder mit Dingen, die ich mir selber in Gedanken sage.	○	○	○	○	○
4. Ich denke über Dinge die mich betreffen so nach, als ob Sie bei jemand Anderem auftreten würden.	○	○	○	○	○
5. Ich habe Gedanken die ich zu vermeiden versuche.	○	○	○	○	○
6. Ich versuche über die verstörendsten Aspekte mancher Situationen nicht nachzudenken, um nicht zu ängstlich zu sein.	○	○	○	○	○
7. Ich vermeide manchmal Dinge, die verstörende Gedanken auslösen können.	○	○	○	○	○
8. Ich lenke mich selber ab, um Gedanken über bestimmte beunruhigende Themen zu vermeiden.	○	○	○	○	○
9. Ich vermeide Personen die mich dazu bringen über Dinge nachzudenken, über die ich nicht nachdenken will.	○	○	○	○	○
10. Ich mache oft Sachen, um mich von meinen Gedanken abzulenken.	○	○	○	○	○
11. Ich denke über unbedeutende Details nach, um nicht über wichtige Themen nachzudenken, über die mich sorge.	○	○	○	○	○
12. Manchmal stürze ich mich in eine Aktivität, um nicht über bestimmte Dinge nachzudenken.	○	○	○	○	○
13. Um zu vermeiden über Themen nachzudenken, die mich verstören, zwinge ich mich an etwas anderes zu denken.	○	○	○	○	○
14. Es gibt Dinge, über die ich nicht nachzudenken versuche.	○	○	○	○	○
15. Ich sage in Gedanken unablässig Dinge zu mir selbst, um lebhafte Erinnerungen an Situationen, die mich erschrecken, zu vermeiden.	○	○	○	○	○
16. Manchmal vermeide ich Orte, die mich zum nachdenken über Dinge bringen, über die ich lieber nicht nachdenke.	○	○	○	○	○
17. Ich denke über vergangene Ereignisse nach, um nicht über zukünftige Ereignisse nachzudenken, die mich dazu bringen mich unsicher zu fühlen.	○	○	○	○	○
18. Ich vermeide Tätigkeiten, die mich an Dinge erinnern, über die ich nicht nachdenken will.	○	○	○	○	○
19. Wenn verstörende Bilder in mir hochkommen, sage ich mir in meinem Kopf Dinge, um die Bilder zu ersetzen.	○	○	○	○	○
20. Ich denke über viele kleine Dinge nach, um nicht über wichtigere Angelegenheiten nachzudenken.	○	○	○	○	○
21. Manchmal sorge ich dafür beschäftigt zu bleiben, nur um zu verhindern, dass Gedanken in meinen Kopf schießen.	○	○	○	○	○
22. Ich vermeide Situationen, in denen ich Personen treffe, die mich über unangenehme Dinge nachdenken lassen.	○	○	○	○	○
23. Ich versuche eher die Ereignisse in einem inneren Selbstgespräch zu beschreiben, als zuzulassen, dass sich mir Bilder von verstörenden Ereignissen aufdrängen.	○	○	○	○	○
24. Ich schiebe die gedanklichen Bilder in Zusammenhang mit bedrohlichen Situationen weg, indem ich versuche die Situation in einem inneren Selbstgespräch zu beschreiben.	○	○	○	○	○
25. Ich denke lieber über Dinge nach, über die sich andere Personen sorgen, als über meine eigenen Sorgen.	○	○	○	○	○