Confirmatory factor analysis of the Dutch Intolerance of Uncertainty Scale: Comparison of the full and short version

Kim Helsen [ab], Eva Van den Bussche [c], Johan W.S. Vlaeyen [ad], Liesbet Goubert [b]

[a*] Research group of Health Psychology, University of Leuven, Tiensestraat 102, B-3000 Leuven, Belgium

[b] Department of Experimental-Clinical and Health Psychology, Ghent University, Henri Dunantlaan 2, B-9000 Ghent, Belgium

[c] Vrije Universiteit Brussel, Department of Psychology, Pleinlaan 2, B-1050 Brussels, Belgium

[d] Department of Clinical Psychological Science, Maastricht University, Universiteitssingel 40, 6200 MD Maastricht, Netherlands

Correspondence: Kim Helsen, Research Group on Health Psychology, Tiensestraat 102 bus 3726, 3000 Leuven, Belgium. Tel: +32 16 325782. Fax: +32 16 325923. E-mail: Kim.Helsen@ppw.kuleuven.be

* Institution where the work was performed

E-mail addresses other authors: Eva Van den Bussche: evdbussc@vub.ac.be; Johan W.S. Vlaeyen: Johan.Vlaeyen@ppw.kuleuven.be; Liesbet Goubert: Liesbet.Goubert@UGent.be

ABSTRACT

Background and Objectives. The Intolerance of Uncertainty Scale (IUS) was developed for assessing reactions to ambiguous situations, uncertainty, and future events. The IUS has been validated in different languages, but equivocal factor structures, in combination with highly interrelated items and factors, resulted in a redundancy of the items of the English version. In the current study, the psychometric properties of the Dutch version of the IUS were examined, and compared with the shortened 12-item version (IUS-12).

Methods. Confirmatory factor analyses were used to investigate different factor structures of both the full and short version of the IUS.

Results. Results indicated that the IUS-12 model with two factors (Prospective Anxiety and Inhibitory Anxiety) provides the best fit. The reduced measure has equally good internal consistency, and is highly correlated with the full version.

Limitations. Future research could investigate whether the current findings generalize to clinical populations.

Conclusion. To summarize, the usage of the short 12-item version of the IUS should be encouraged in future research concerning intolerance of uncertainty.

Key words: Intolerance of Uncertainty, Confirmatory Factor Analysis, Worry

1. Introduction

Worry is a central characteristic of Generalized Anxiety Disorder (GAD), but also occurs frequently in other mental disorders such as obsessive compulsive disorder (Sica, Coradeschi, Sanavio, & Novara, 2004), social anxiety (Boelen & Reijntjes, 2009), depression (Yook, Kim, Suh, & Lee, 2010), panic disorder with agoraphobia (Dugas, Marchand, & Ladouceur, 2005), post-traumatic stress disorder (Boelen, 2010), eating disorders (Konstantellou, Campbell, Eisler, Simic, & Treasure, 2011; Sternheim, Startup, & Schmidt, 2011), and somatoform disorders (Deacon & Abramowitz, 2008; Boelen & Carleton, 2012). In addition, as much as 38% of the general population report to worry at least once a day (Tallis, Davey, & Capuzzo, 1994). Therefore, it is important to identify the key factors responsible for the development and maintenance of worry (Buhr & Dugas, 2002). One dispositional characteristic that is often associated to both the origin and the continuation of worry, is intolerance of uncertainty (IU) (de Bruin, Rassin, van der Heiden, & Muris, 2006; Dugas, Gagnon, Ladouceur, & Freeston, 1998; Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994), defined by Ladouceur, Gosselin, and Dugas (2000) as "the predisposition to react negatively to an uncertain event or situation, independent of its probability of occurrence and of its associated consequences" (p. 934). Worriers have difficulty enduring uncertainty (Buhr & Dugas, 2002). For instance, worriers have been shown to display more difficulties completing ambiguous tasks compared to non-worriers, operationalized by longer decision times in a categorisation task, caused by an increase in disrupting negative thoughts (Metzger, Miller, Cohen, Sofka, & Borkovec, 1990). They also tend to interpret uncertain or ambiguous situations in a more threatening way (Butler & Matthews, 1983; Hedayati, Dugas, Buhr, & Francis, 2003; Russell & Davey, 1993), needing more information before making a decision (Tallis, Eysenck, & Mathews, 1991). Given that ambiguous situations provoke uncertainty, and increase the desire for predictability, which is a typical aspect of intolerance

of uncertainty specific to worry, these findings suggest that worriers have a lower threshold for uncertainty compared to non-worriers (Buhr & Dugas, 2002). In addition, high intolerance of uncertainty may lead to impaired problem solving, resulting in inaction or even avoidance of ambiguous situations (Dugas, Freeston, & Ladouceur, 1997). Furthermore, cognitive-behavioural treatment targeting excessive worry in GAD was related to a significant decrease in IU over treatment (Ladouceur, Dugas, et al., 2000). Beneficial effects regarding both GAD symptoms and IU were still present after a 12-month follow-up period. Results of another longitudinal study by Dugas and Ladouceur (2000) showed that changes in IU preceded changes in time spent worrying, suggesting that IU might mediate changes in worry during GAD treatment. IU was also found to be a better predictor of worry than beliefs about worry, negative problem orientation, and cognitive avoidance (Laugesen, Dugas, and Bukowski, 2003). Moreover, experimental manipulation of IUS was shown to influence the number of worrying thoughts (Ladouceur, Gosselin, et al., 2000; Rosen & Knäuper, 2009). These findings seem to suggest that IU is a causal risk factor for pathological worry (Dugas, et al., 2005).

One measure that has often been used to asses IU is the Intolerance of Uncertainty Scale (IUS). The original French version of the IUS was developed to assess "emotional, cognitive, and behavioural reactions to ambiguous situations, implications of being uncertain, and attempts to control the future" (Freeston, et al., 1994, p. 791). Factor analysis yielded a five-factor solution that comprised the following factors: (1) Uncertainty is unacceptable and should be avoided, (2) Being uncertain reflects badly on a person, (3) Frustration is related to uncertainty, (4) Uncertainty causes stress, and (5) Uncertainty prevents action. IUS scores allowed to differentiate between groups of non-clinical subjects, who reported either no GAD symptoms, only somatic symptoms, or both somatic and cognitive symptoms. Additionally, partial correlation analyses showed that IU accounts for significant variance in worry scores, above and beyond the influence of anxiety and depression. Although a 5-factorstructure

emerged from psychometric analysis, high internal consistency justified the use of a single summary score of the questionnaire. With regard to the factor analysis of the English version, a four-factor structure turned out to be more suitable. These factors were (1) Uncertainty leads to the inability to act, (2) Uncertainty is stressful and upsetting, (3) Unexpected events are negative and should be avoided, and (4) Being uncertain about the future is unfair (Buhr & Dugas, 2002). Validity and reliability measures were comparable to the ones of the French version, and consistent among four racial groups (Norton, 2005). However, the factor structures in the cross-cultural study were not consistent among groups, with the considerably correlated factors suggesting that IU should best be interpreted as a unidimensional construct (Norton, 2005). Subsequently, Sexton and Dugas (2009) reinvestigated the factor structure of the English IUS, using larger samples. Exploratory factor analysis (EFA) identified two factors: (1) Uncertainty has negative behavioural and self-referent implications, and (2) Uncertainty is unfair and spoils everything, which were substantiated by confirmatory factor analysis (CFA). Finally, investigation of the Dutch translation of the 27-item IUS favoured the use of a one-factor solution, measuring overall intolerance of uncertainty (de Bruin, et al., 2006). The instability of the IUS factor structure, despite large sample sizes, in combination with high inter-factor correlations, supported redundancy of the items (Norton, 2005). Carleton, Norton, and Asmundson (2007) developed an English 12-item version of the IUS. This abridged version showed a stable two-factor structure, representing prospective as well as inhibitory components of IU. While the former component covers future-related uncertainty, the latter involves uncertainty inhibiting action or experience. Psychometric properties were similar to the full version's properties, resulting in a preference of the use of the IUS-12 to the full version.

The aim of the current study was to further examine the utility of the abbreviated version of the IUS in a sample of healthy undergraduate students and adults, using the Dutch version of the questionnaire. Confirmatory factor analyses were conducted for the unitary,

two-, four-, and five-factor structure of the full 27-item version, and compared to the fit of the one- and two-factor solutions of the abridged 12-item version. After selection and validation of the optimal model, invariance across gender was examined, and psychometric properties of this model were investigated. We hypothesized that IU was uniquely related to worry, over and above levels of anxiety and depression.

2. Method

2.1 Participants

Participants were 967 healthy undergraduate students and adults with a mean age of 19.55 (*SD* = 3.65, median = 18, range 14-65). In this sample, 176 were male (18.2%), 784 were female (81.1%), and seven participants chose not to specify their gender or age (0.7%). In the current study, participants only completed the full version of the IUS. Relevant IUS-12 items were derived afterwards to include in the analyses. In order to investigate validation of the IUS, a subsample completed the Beck Depression Inventory (BDI-II, *N* = 470), the Penn State Worry Questionnaire (PSWQ, *N* = 521), and the trait version of the State Trait Anxiety Inventory (STAI-T, *N* = 626). Participants signed the informed consent form after being informed about the procedure of the study. Ethical approval was obtained from the Ethics Committee of the Faculty of Psychology and Educational Sciences of the University of Leuven (Belgium).

2.2 Measures

2.2.1 Intolerance of uncertainty

IUS-27. The full version of the Intolerance of Uncertainty Scale (IUS) (Buhr & Dugas, 2002; de Bruin, et al., 2006; Freeston, et al., 1994) consists of 27 items considering different propositions regarding uncertain or ambiguous situations (e.g., 'I always want to know what the future has in store for me', 'When it's time to act, uncertainty paralyses me'). Participants

were requested to indicate to what extent they agreed with these propositions (1 = *Not at all representative*; 5 = *Completely representative*) (see Appendix A). The original French version, as well as the translated English and Dutch variations on the IUS, have shown satisfactory psychometric properties, with internal consistency ranging from .88 to .94, and test-retest reliability scores varying from $r = .74$ to $r = .79$ over a four (de Bruin, et al., 2006) or five week period (Buhr & Dugas, 2002; Dugas, et al., 1997; Freeston, et al., 1994). The IUS has been used in clinical as well as non-clinical populations (Boelen & Reijntjes, 2009; de Bruin, et al., 2006), most commonly summed as a total scale score (Roemer, 2001), with higher scores representing greater intolerance of uncertainty.

IUS-12. The abbreviated version of the IUS was developed by Carleton et al. (2007) (see Appendix B), as a response to the inconsistent findings of several factor analyses using different languages (Buhr & Dugas, 2002; de Bruin, et al., 2006; Freeston, et al., 1994) and cross-cultural comparisons (Norton, 2005). The abbreviation of the IUS occurred as follows: CFA of the different factor structures of the IUS-27 did not provide an adequate fit. Consequently, Carleton et al. (2007) selected two factors, one factor of the four-factor model (i.e. Uncertainty leading to inability to act) and one of the five-factor structure (i.e. Unacceptability and avoidance of uncertainty) based on the principle of item-independence (each model had one factor for which the items where shared between all but one of the factors in the other model (Carleton, et al., 2007, p. 110)). This resulted in a 17-item questionnaire. Subsequently, two items were dropped because of strong correlations with another item. The item with the highest factor loading and superior face validity was preserved. Finally, three more items were deleted by the authors because they were considered to be more strongly related to self-esteem and indecision than to their parent factors, yielding a 12-item questionnaire.

The IUS-12 is highly correlated with the full version ($r = .96$), and has high internal consistency ($\alpha = .85$) (Carleton, et al., 2007). Two factors can be distinguished: Prospective

Anxiety (PA: Future-related fear and anxiety; item 1-7; α = .87), and Inhibitory Anxiety (IA: Uncertainty inhibiting action or experience; item 8-12; α = .90) (Carleton, Collimore, & Asmundson, 2010).

2.2.2 Worry

The Penn State Worry Questionnaire (PSWQ) (Meyer, Miller, Metzger, & Borkovec, 1990; van Rijsoort, Emmelkamp, & Vervaeke, 1999) is a 16-item questionnaire, developed to measure trait worry. The items deal with the inclination, intensity and uncontrollability of worrying (e.g., 'Many situations make me worry', 'My worries overwhelm me', 'Once I start worrying, I can't stop'). Participants are requested to indicate how well the 16 statements describe themselves on a 5-point Likert scale, ranging from 1 (not typical at all) to 5 (very typical). Items 1, 3, 8, 10, and 11 need to be reverse-scored before computing the total score. In most studies worry is considered a unidimensional construct (Brown, Antony, & Barlow, 1992; Meyer, et al., 1990; van Rijsoort, et al., 1999), although confirmatory factor analysis in a student population (Fresco, Heimberg, Mennin, & Turk, 2002) indicated that a two factor structure, with Worry engagement and Absence of worry as factors, provides a better fit. The PSWQ has proven to have good test-retest reliability over an 8-10 week period (Meyer, et al., 1990). Moreover, high internal consistency of the PSWQ was found for both clinical (α = .86 - .93) (Brown, et al., 1992) and non-clinical samples (α = .90 - .95) (Davey, 1993; Meyer, et al., 1990; Molina & Borkovec, 1994). Cronbach's alpha in the current study was excellent (α = .92). The PSWQ significantly correlates with depression (Beck Depression Inventory: r = .36 - .62) (Meyer, et al., 1990; van Rijsoort, et al., 1999) and anxiety (Trait version of the State Trait Anxiety Inventory: r = .64 - .75) (Davey, 1993; Meyer, et al., 1990; van Rijsoort, et al., 1999).

2.2.3 Depression

The Beck Depression Inventory (BDI-II) (Beck, Steer, & Brown, 1996; Van der Does, 2002) comprises 21 four-choice statements assessing the severity of depressive symptoms such as anhedonia, indecisiveness, and feelings of guilt. Participants indicate which of the four sentences describes them the best, considering the previous two week period, including the day of testing. The total score of the 21 items ranges from 0 to 63, with higher scores indicating higher levels of depression. Internal consistency of the Dutch version has been shown to be excellent in both clinical (α = .92) and student samples (α = .93). In the current study, Cronbach's alpha was .85.

2.2.4 Anxiety

Dispositional anxiety was measured by the trait version of the State-Trait Anxiety Inventory (STAI-T) (Spielberger, Gorsuch, & Luschene, 1970; Van der Ploeg, 1980, 1999). Participants are required to specify to what extent they generally experience the 20 emotions presented (e.g., 'I feel calm', 'I am worried'). Items are scored on a 4-point Likert scale, ranging from A *(hardly ever)* to D *(almost always)*, yielding a total score between 20 and 80. Higher scores on the STAI-T represent higher anxiety levels. Test-retest reliability ranges from .73 to .86, and the STAI-T has good internal consistency in both students (α = .81) (Belzer, D'Zurilla, & Maydeu-Olivares, 2002), and anxiety disorder patients (α = .89) (Bieling, Antony, & Swinson, 1998). However, internal consistency in the current study was limited (α = .40).

2.3 Statistical strategy

The statistical analyses were performed using Amos version 19.0 (Arbuckle, 2010) and SPSS 17.0 (SPSS Inc.). We randomly split the full sample of cases into two subsamples, a calibration sample (N = 483) and a validation sample (N = 484). The split-sample strategy (Browne & Cudeckk, 1993; Cudeck & Browne, 1983) was used for cross-validation. The

calibration sample was used to assess the different IUS models. The validation sample was used to validate the final best fitting model. First, confirmatory factor analyses were used to select the optimal model of the IUS based on the factor structures. Six alternative models, which have been previously proposed in the literature (Buhr & Dugas, 2002; Carleton, et al., 2007; de Bruin, et al., 2006; Freeston, et al., 1994; Sexton & Dugas, 2009), were tested using the calibration sample. Standardized scores on the constructs were estimated. The Maximum Likelihood algorithm was used to assess the fit of the model. In line with theoretical recommendations (Bollen & Long, 1993; Byrne, 2001), several fit indices were used to assess the model fit: χ^2, root mean square error of approximation (RMSEA), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI) and the Consistent Akaike Information Criterion (CAIC). A non-significant χ^2 value indicates an acceptable model (Marsch, Balla, & McDonalds, 1988). Values of RMSEA up to .08 (Browne & Cudeckk, 1993), GFI > .90 and AGFI >.85 (Jöreskog & Sörbom, 1984) and CFI >.90 (Bentler, 1990) indicate proper fit. The CAIC can be used to compare non-hierarchical as well as hierarchical (nested) models, with lower values on the CAIC measure indicating better fit (Burnham & Anderson, 1998).

After selecting the optimal model and validating it using the validation sample, we examined whether it was invariant across gender by conducting a multi-sample analysis across the full sample (calibration and validation sample). A very restrictive model was tested by equating the number of factors, the factor loadings, and the correlations between the factors. Internal consistency of the derived optimal model was examined using Cronbach's alpha in the full sample. The construct validity of the derived optimal model was confirmed by examining the association with worry (PSWQ), trait anxiety (STAI-T), and depression (BDI-II) in the full sample using Pearson correlations and hierarchical multiple regression analysis.

3. Results

3.1 Confirmatory factor analysis

Using the calibration sample, the model fit of the six IUS models was assessed. Table 1 summarizes the goodness-of-fit indices of all six models of the IUS. The indices suggest that the optimal fit is obtained for a two-factor model of the 12-item version of the IUS (Carleton, et al., 2007). This model shows an acceptable fit ($\chi^2(53)=155.89$, $p<.001$; GFI= .95; AGFI= .92; CFI= .92; RMSEA= 0.064 (90% CI: 0.053–0.076)). All other models have a poorer fit to the data (Table 1), which is also indicated by the CAIC values. Using the validation sample, the model of Carleton et al. (2007) was cross-validated. Goodness-of-fit indices again indicate a reasonable fit ($\chi^2(53)=127.78$, $p<.001$; GFI= .96; AGFI= .94; CFI= .94; RMSEA= 0.055 (90% CI: 0.042–0.067). This indicates that the model was robust across two similar samples of healthy undergraduate students and adults. Table 2 shows the standardized factor loadings for the validation and the calibration sample. The correlation between the two factors was .74 in the calibration sample and .75 in the validation sample.

3.2 Test of stability of the two-factor model of Carleton et al. (2007) across gender

To examine whether the two-factor model of Carleton et al. (2007) was invariant across gender, a multi-sample analysis was conducted separately for men (N = 171) and women (N = 772). The results of the multi-sample analysis showed that the model adequately fitted the data: $\chi^2(119)=307.66$, $p<.001$; GFI= .95; AGFI= .93; CFI= .93; RMSEA= 0.041 (90% CI: 0.035–0.047. This indicates that the model is stable in both samples for the number of factors (invariant factor numbers), the intercorrelations between factors (invariant factor intercorrelations), and for the contribution of all items to their respective factors (invariant factor loadings).

3.3 Psychometric properties of the model with the best fit

3.3.1 Descriptive data

Descriptive statistics, the internal consistency, and Pearson inter-correlations for the different questionnaires and subscales for the total sample are summarized in Table 3. Internal consistency of the IUS-12 for the entire sample was excellent (α = .83). Overall, no gender differences were found regarding intolerance of uncertainty, $F(1,958) = 0.22$, $p = .64$. Regarding the subscales, no gender difference was found with respect to Prospective Anxiety, $F(1,958) = 0.83$, $p = .36$, but women scored significantly higher on Inhibitory Anxiety, $F(1,958) = 5.44$, $p = .02$. Both factors showed satisfactory internal consistency (α = .72 - .78).

3.3.2 Construct validity

Correlations between the IUS-12 and the other questionnaires were all highly significant (Table 3). Moreover, scores on the reduced IUS-12 were highly correlated with the 27-item version of the questionnaire ($r = .92$). The correlation between the IUS-12 and the PSWQ was significantly higher than the correlation between the IUS-12 and the STAI-T ($r_{IUS12\_PSWQ} > r_{IUS12\_STAI\text{-}T}$, Steiger $Z = 6.60$, $p < .01$). Both factors were more strongly associated with worry compared to anxiety (Prospective Anxiety: $r_{PA\_PSWQ} > r_{PA\_STAI\text{-}T}$, Steiger $Z = 5.03$, $p < .01$; Inhibitory Anxiety: $r_{IA\_PSWQ} > r_{IA\_STAI\text{-}T,}$ Steiger $Z = 4.64$, $p < .01$). No difference was found between r_{IUS12_PSWQ} and $r_{IUS12\_BDI\text{-}II}$ (Steiger $Z = 1.03$, *ns*), although Prospective Anxiety showed a stronger correlation with worry compared to depression ($r_{PA\_PSWQ} > r_{PA\_BDI\text{-}II}$, Steiger $Z = 2.04$, $p < .05$; Inhibitory Anxiety: $r_{IA\_PSWQ} = r_{IA\_BDI\text{-}II}$, Steiger $Z = -1.34$, *ns*).

A hierarchical regression analysis was performed to investigate the unique contribution of the IUS in the explanation of worry (PSWQ) (Table 4). In a first step, gender and age were included to control for demographical variables. Next, depression and anxiety scores were entered. Finally, either IUS-12 or IUS-27 scores were added to the regression

model. Results showed that intolerance of uncertainty significantly contributes to worry, above and beyond demographical variables and levels of anxiety and depression. Moreover, both versions of the IUS accounted for a similar proportion of the variance in worry scores (IUS-12: $\beta = .27$, $p < .001$, $R^2 = .51$, $\Delta R^2 = .06$; IUS-27: $\beta = .28$, $p < .001$, $R^2 = .50$, $\Delta R^2 = .05$).

Discriminant validity of the two subscales of the IUS-12 was investigated using multiple hierarchical regression analyses, successively using symptom measures for worry (PSWQ), anxiety (STAI-T), and depression (BDI-II) as criterion variables. In a first step, gender and age were entered to control for demographic variables. In a second step, the two other symptom measures were included. In a third step, PA and IA were added to the model. Results showed that PA explained unique variance in worry ($\beta = .23$, $p < .001$), whereas IA was uniquely associated with anxiety ($\beta = .12$, $p < .05$) and depression ($\beta = .34$, $p < .001$).

4. Discussion

Previous studies investigating the validity of the IUS did not reveal univocal factor solutions. Hence, the purpose of the current study was to compare the different proposed factor structures of both the full and shortened Dutch version of the IUS in a sample of healthy undergraduate students and adults. Next, psychometric properties of the model with the best fit were investigated. Finally, invariance of this model across gender was examined.

CFA indicated that the IUS-12 model with the two factors Prospective Anxiety and Inhibitory Anxiety provided the best fit, corroborating earlier findings (Carleton, et al., 2007; McEvoy & Mahoney, 2011). Furthermore, the reduced measure had equally good internal consistency, accounted for similar proportion of the variance in worry scores, and was highly correlated with the 27-item version of the IUS. Internal consistency of both factors was good, providing support for the use of the two subscales separately. Considering the high internal consistency of the total score, however, the use of a total IU score is also justified.

Since intolerance of uncertainty is conceptualized as 'cognitive, emotional and behavioural reactions to uncertainty in everyday life situations' (Freeston, et al., 1994, p.792), it is likely that IU inherently consists of different dimensions, which are represented by different factors or subscales. Previous research (Carleton, Mulvogue, Thibodeau, McCabe, Antony, & Asmundson, 2012) suggested that Prospective Anxiety tends to focus on the cognitive dimension of IU, whereas Inhibitory Anxiety captures the more behaviourally focused aspects of IU. The subscales are also considered to measure approach and avoidance tendencies respectively (Birrell, Meares, Wilkinson, & Freeston, 2011). The PA subscale comprises items that represent active seeking for information to reduce unpredictability (e.g. 'I should be able to organize everything in advance'), while the IA subscale includes items referring to paralysis of cognition and action in uncertain situations (e.g. 'When it's time to act uncertainty paralyses me'). Results of the current study indicated that both Prospective and Inhibitory Anxiety, as well as general IU (IUS-12) showed a stronger relation with worry (PWSQ) compared to trait anxiety (STAI-T). This suggests that IU is a more important factor for worry than for trait anxiety, and that it might even be a cognitive vulnerability factor for the development of persistent worry. These results differed from previous research (de Bruin, et al., 2006), using the total score of the IUS-27, in which no evidence was found for a difference between these correlations. Additionally, IU seemed to be equally related to worry (PSWQ) as to depression (BDI-II). However, when considering both factors separately, PA showed a stronger correlation with worry compared to depression, which is not surprising as PA comprises future-related fear and anxiety, whereas people suffering from depressive symptoms mainly tend to ruminate about the past or present (Ehring & Watkins, 2008; Nolen-Hoeksema, 1991). IA, on the other hand, might display considerable overlap with diminished activity, as observed in depression. In other words, worry, depression, and anxiety are all related to the IU construct, but the strongest overlap with IU was found for worry and depression. Another important finding with respect to the subscales in the current study was

that PA turned out to explain unique variance in worry, whereas IA was uniquely associated with anxiety and depression, supporting prior research (McEvoy & Mahoney, 2011). These findings may yield implications for differentiated treatment.

The current study found that intolerance of uncertainty contributes to the prediction of worry, over and above demographical variables and levels of anxiety and depression, emphasizing its unique contribution concerning the prediction of worry. These findings are in line with previous research, which has demonstrated that IU is associated with worry and GAD (Laugesen, et al., 2003), and might even be a *causal* risk factor for pathological worry and GAD (Dugas, Marchand, & Ladouceur, 2005). IU enables to distinguish GAD patients from non-GAD anxious individuals (Dugas, Freeston, et al., 1998; Ladouceur, et al., 1999), panic disorder patients with agoraphobia (Dugas, et al., 2005), and non-clinical controls (Ladouceur, et al., 1999). Several processes have been proposed concerning the mechanisms through which IU would give rise to pathological worry (Birrell et al., 2011; Dugas, Buhr, et al., 2004; Dugas, Gagnon, et al., 1998). First, IU might increase levels of positive beliefs about worry (e.g., worrying will lead to a solution), which in turn results in increased levels of worrying (Bredemeier & Berenbaum, 2008). Second, IU might give rise to negative problem orientation, disturbing appraisals of the problem (Koerner & Dugas, 2008) and problem solving abilities, due to lack of confidence. Subsequently, negative problem orientation interferes with actual problem solving, thereby increasing levels of worry and anxiety (Dugas, Buhr, et al., 2004). A third putative process accounting for the association between IU and worry is cognitive avoidance (Dugas, Gagnon, et al., 1998). When focusing on linguistic thoughts, one can avoid presentation of mental images, which are considered unpleasant, and are shown to cause somatic arousal. However, this avoidance strategy might prevent emotional processing of the threatening situation, further increasing threat value of the images. This in turn may lead to the maintenance of worry. A fourth possible mediating mechanism is through an increase of perceived threat, which can be translated into

overestimation of both the likelihood and negative consequences of negative outcomes (Bredemeier & Berenbaum, 2008; Chen & Hong, 2010; Dugas, Buhr, et al., 2004).

However, IU is found be related to other pathologies as well. Research including clinical (Sica, et al., 2004; Steketee, Frost, & Cohen, 1998; Tolin, Abramowitz, Brigidi, & Foa, 2003) as well as non-clinical samples (Boelen & Reijntjes, 2009; Dugas, Gosselin, & Ladouceur, 2001; Holaway, Heimberg, & Coles, 2006) has shown that IU may also be involved in obsessive compulsive disorder (OCD). Steketee et al. (1998) demonstrated that IU was a strong predictor for the severity of OCD symptoms. Tolin and colleagues (2003) argued that the relationship between IU and OCD was most prominent in patients displaying checking and repeating compulsions. Pathological doubt, being one of the core features of OCD, is most pronounced in individuals displaying checking rituals. Whereas decreased memory confidence might reflect the more cognitive component of pathological doubt, IU may represent the more emotional feature of pathological doubt in OCD patients (Tolin, et al., 2003). Furthermore, Boelen and Reijntjes (2009) reported that IU is not only related to symptoms of GAD and OCD, but that IU is also associated with social anxiety (SA). This corroborates findings by Carleton, Collimore, et al. (2010), who particularly demonstrated the importance of the relationship between the Inhibitory Anxiety component of the IU construct and SA. Other pathologies that have been associated with IU are panic disorder (PD) (Dugas, Gagnon, et al., 1998; Dugas, et al., 2001; Tolin, et al., 2003), state anxiety (Chen & Hong, 2010; Greco & Roger, 2001), obsessive compulsive personality disorder (Gallagher, South, & Oltmanns, 2003), eating disorders (Konstantellou, et al., 2011; Sternheim, et al., 2011), and somatoform disorders (Deacon & Abramowitz, 2008; Boelen & Carleton, 2012). However, IU does not seem to be critical for depressive disorders (Boelen & Reijntjes, 2009; Dugas, Schwartz, & Francis, 2004).

Given that IU plays a central role in both the development and maintenance of several disorders (Carleton, Collimore, et al., 2010; Holaway, et al., 2006; Tolin, et al., 2003),

targeting IU is likely to reduce symptoms as well. For instance, increasing non-clinical individuals' tolerance of uncertainty may help preventing the development of GAD (Dugas, et al., 2001). Moreover, research has indicated that cognitive-behavioural treatment targeting IU is effective in reducing excessive worry in GAD patients (Dugas & Ladouceur, 2000; Dugas, et al., 2003; Ladouceur, Dugas, et al., 2000), but also results in relief of SAD symptoms (Carleton, Collimore, et al., 2010; Mahoney and McEvoy, 2012), as many social-evaluative situations comprise a great deal of uncertainty (Boelen & Reijntjes, 2009). As mentioned earlier, individuals' scores on the subscales of the IUS may indicate which treatment strategies are most appropriate for a particular person (McEvoy & Mahoney, 2011). Individuals scoring high on Prospective Anxiety might benefit most from re-evaluation of erroneous beliefs about worry, whereas individuals with high Inhibitory Anxiety may profit more from specific cognitive-behavioural techniques such as problem orientation training and exposure to uncertainty (Birrell et al, 2011; Dugas & Ladouceur, 2000; Ladouceur, Dugas, et al., 2000). The former technique implies focusing on the core issues of one's problems, as individuals with high intolerance of uncertainty often lose themselves in irrelevant details in an attempt to reduce uncertainty. Subsequently, participants are stimulated to proceed with the problem-solving process even if the outcome is unsure in advance. The latter technique involves exposure to threat-related and uncertain situations. Imaginary exposure can be used in addition to exposure in vivo in order to maintain therapeutic gains (Foa, Steketee, Turner, & Fischer, 1980). Application of such exercises might result in habituation to feelings of uncertainty, and enhancement of (perceived) self-efficacy to tolerate feelings of uncertainty (Tolin, et al., 2003). Furthermore, IU can be used as an outcome measure for treatment of several anxiety disorders (Carleton, Collimore, et al., 2010; Carleton, Gosselin, & Asmundson, 2010), since previous research has demonstrated that treatment outcome is highly associated with changes in intolerance of uncertainty (Dugas & Ladouceur, 2000; Ladouceur, Dugas, et al., 2000).

Although the results of this study are promising, a few limitations need to be considered. First, the sample largely consisted of women (81.1%). Although no gender differences were found for IU in general, and factor solutions were consistent among both genders, women reported more Inhibitory Anxiety than men. Additionally, gender differences were found for the other measures (PSWQ, and BDI-II), with women scoring higher than men, supporting earlier findings (Bender, et al., 2006; Dugas, et al., 1997; Dugas, et al., 2001; Haba-Rubio, 2005; Stavosky & Borkovec, 1988). Second, only healthy individuals participated in the study. Consequently, the current findings may not generalize to clinical samples, although previous studies suggested that psychometric properties of the IUS were comparable in clinical and non-clinical samples (Dugas & Robichaud, 2007; McEvoy & Mahoney, 2011). Finally, one might consider adjusting the names of the subscales into Prospective and Inhibitory Intolerance of Uncertainty, as IU is proven to be a transdiagnostic concept, not specific to anxiety (Boelen et al., 2012; Carleton et al., 2012; McEvoy & Mahoney, 2011). Other possible labels arising from a recent review study (Birrell et al, 2011) are Desire for predictability and an active engagement in seeking certainty, and Paralysis of cognition and action in the face of uncertainty respectively.

To summarize, the current study provided evidence for the utility of the shortened version of the IUS. These findings are in line with the results of Carleton et al. (2007), who examined the English version of this questionnaire. Additionally, the use of the two separate subscales might provide a steppingstone for successful treatment of different mental disorders. As a consequence, the application of the psychometrically sound IUS-12 should be encouraged in future research regarding intolerance of uncertainty.

5. Acknowledgements

The authors wish to thank Ali Khatibi, Ann Meulders, Martien Schrooten, Nele Vandebroek, and Stéphanie Volders for their assistance in collecting the data.

The contribution of Kim Helsen and Johan Vlaeyen was supported by the Odysseus Grant “the Psychology of Pain and Disability Research Program” funded by the Research Foundation – Flanders (FWO Vlaanderen, Belgium). All authors declare that there are no conflicts of interest that may arise as a result of this research.

6. References

Arbuckle, J. L. (2010). *IBM SPSS Amos 19 user's guide*. Chicago: SPSS.

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Manual for Beck Depression Inventory-II*. San Antonio, TX: Psychological Corporation.

Belzer, K. D., D'Zurilla, T. J., & Maydeu-Olivares, A. (2002). Social problem solving and trait anxiety as predictors of worry in a college student population *Personality and Individual Differences, 33*(4), 573-585.

Bender, C. M., Sereika, S. M., Berga, S. L., Vogel, V. G., Brufsky, A. M., Paraska, K. K., et al. (2006). Cognitive impairement associated with adjuvant therapy in breast cancer. *Psycho-Oncology, 15*, 422-430.

Bentler, P. M. (1990). Comparative fit indices in structural models. *Psychological Bulletin, 107*, 238-246.

Bieling, P. J., Antony, M. M., & Swinson, R. P. (1998). The State-Trait Anxiety Inventory, Trait version: structure and content re-examined. *Behaviour Research and Therapy, 36*, 777-788.

Birrell, J., Meares, K., Wilkinson, A., & Freeston, M. H. (2011). Toward a definition of intolerance of uncertainty: A review of factor analytical studies of the Intolerance of Uncertainty Scale. *Clinical Psychology Review, 31*, 1198-1208.

Boelen, P. A. (2010). Intolerance of uncertainty and emotional distress following the death of a loved one. *Anxiety, Stress, and Coping, 23(4)*, 471-478.

Boelen, P. A., & Carleton, R. N. (2012). Intolerance of uncertainty, hypochondriacal concerns, obsessive-compulsive symptoms, and worry. *The Journal of Nervous and Mental Disease, 200(3),* 208-213.

Boelen, P. A., & Reijntjes, A. (2009). Intolerance of uncertainty and social anxiety. *Journal of Anxiety Disorders, 23*, 130-135.

Bollen, K. A., & Long, J. S. (Eds.). (1993). *Testing structural equation models*. Newbury Park, CA: Sage.

Bredemeier, K., & Berenbaum, H. (2008). Intolerance of uncertainty and perceived threat. *Behaviour Research and Therapy, 46*, 28-38.

Brown, T. A., Antony, M. M., & Barlow, D. H. (1992). Psychometric properties of the Penn State Worry Questionnaire in a clinical anxiety disorder sample. *Behaviour Research and Therapy, 30*, 33-37.

Browne, M. W., & Cudeckk, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136-162). Newbury Park, CA: Sage.

Buhr, K., & Dugas, M. J. (2002). The intolerance of uncertainty scale: psychometric properties of the English version. *Behaviour Research and Therapy, 40*, 931-945.

Burnham, K. P., & Anderson, D. R. (1998). *Model selection and inference: a practical information-theoretic approach*. New York: Springer-Verlag.

Butler, G., & Matthews, A. (1983). Cognitive processes in anxiety. *Advances in Behavior Research and Therapy, 5*, 551-565.

Byrne, B. M. (2001). *Structural equation modelling with AMOS: Basic concepts, applications, and programming*. Mahwah, NJ: Lawrence Erlbaum.

Carleton, R. N., Collimore, K. C., & Asmundson, G. J. G. (2010). ‘‘It’s not just the judgements—It’s that I don’t know’’: Intolerance of uncertainty as a predictor of social anxiety. *Journal of Anxiety Disorders, 24*, 189-195.

Carleton, R. N., Gosselin, P., & Asmundson, G. J. G. (2010). The Intolerance of Uncertainty Index: Replication with an English sample. *Psychological Assessment, 22*(2), 396-406.

Carleton, R. N., Mulvogue, M. K., Thibodeau, M. A., McCabe, R. E., Antony, M. M., & Asmundson, G. J. G. (2012). Increasingly certain about uncertainty: Intolerance of uncertainty across anxiety and depression. *Journal of Anxiety Disorders, 26*, 468-479.

Carleton, R. N., Norton, M. A. P. J., & Asmundson, G. J. G. (2007). Fearing the unknown: A short version of the Intolerance of Uncertainty Scale. *Journal of Anxiety Disorders, 21*, 105-117.

Chen, C. Y., & Hong, R. Y. (2010). Intolerance of uncertainty moderates the relation between negative life events and anxiety. *Personality and Individual Differences, 49*, 49-53.

Cudeck, R. B., & Browne, M. W. (1983). Cross-validation of covariance structures. *Multivariate Behavioral Research, 18*, 147-167.

Davey, G. C. L. (1993). A comparison of three worry questionnaires. *Behaviour Research and Therapy, 31*, 51-56.

Deacon, B., & Abramowitz, J. S. (2008). Is hypochondriasis related to obsessive-compulsive disorder, panic disorder, or both? An empirical evaluation. *Journal of Cognitive Psychotherapy, 22(2)*, 115-127.

de Bruin, G. O., Rassin, E., van der Heiden, C., & Muris, P. (2006). Psychometric properties of a Dutch version of the Intolerance of Uncertainty Scale. *Netherlands Journal of Psychology, 62*, 91-97.

Dugas, M. J., Buhr, K., & Ladouceur, R. (2004). The role of intolerance of uncertainty in etiology and maintenance. In R. G. Heimberg, C. L. Turk & D. S. Mennin (Eds.), *Generalized anxiety disorder: Advances in research and practice* (pp. 143-163). New York: Guilford.

Dugas, M. J., Freeston, M. H., & Ladouceur, R. (1997). Intolerance of uncertainty and problem orientation in worry. *Cognitive Therapy and Research*, 593-606.

Dugas, M. J., Freeston, M. H., Ladouceur, R., Rhéaume, J., Provencher, M., & Boisvert, J.-M. (1998). Worry themes in primary GAD, secondary GAD, and other anxiety disorders. *Journal of Anxiety Disorders, 12*, 253-261.

Dugas, M. J., Gagnon, F., Ladouceur, R., & Freeston, M. H. (1998). Generalized anxiety disorder: A preliminary test of a conceptual model. *Behaviour Research and Therapy, 36*, 215-226.

Dugas, M. J., Gosselin, P., & Ladouceur, R. (2001). Intolerance of uncertainty and worry: Investigating specificity in a nonclinical sample. *Cognitive Therapy and Research, 25*, 551-558.

Dugas, M. J., & Ladouceur, R. (2000). Treatment of GAD: Targeting intolerance of uncertainty in two types of worry. *Behavior Modification, 24*, 635-657.

Dugas, M. J., Ladouceur, R., Léger, E., Freeston, M. H., Langlois, F., & Provencher, M. D. (2003). Group cognitive-behavioral therapy for generalized anxiety disorder: Treatment outcome and long-term follow-up. *Journal of Consulting and Clinical Psychology, 71*, 821-825.

Dugas, M. J., Marchand, A., & Ladouceur, R. (2005). Further validation of a cognitive-behavioral model of generalized anxiety disorder: diagnostic and symptom specificity. *Anxiety Disorders, 19*, 329-343.

Dugas, M. J., & Robichaud, M. (2007). *Cognitive-behavioral treatment for generalized anxiety disorder: From science to practice*. New York: Routledge.

Dugas, M. J., Schwartz, A., & Francis, K. (2004). Intolerance of Uncertainty,Worry, and Depression. *Cognitive Therapy and Research, 28*(6), 835-842.

Ehring, T., & Watkins, E. R. (2008). Repetitive negative thinking as a transdiagnostic process. *International Journal of Cognitive Therapy, 1*, 192-205.

Foa, E. B., Steketee, G., Turner, R. M., & Fischer, S. C. (1980). Effects of imaginal exposure to feared disasters in obsessive-compulsive checkers. *Behaviour Research and Therapy, 18*, 449-455.

Freeston, M. H., Rhéaume, J., Letarte, H., Dugas, M. J., & Ladouceur, R. (1994). Why do people worry? *Personality and Individual Differences, 17*, 791-802.

Fresco, D. M., Heimberg, R. G., Mennin, D. S., & Turk, C. L. (2002). Confirmatory factor analysis of the Penn State Worry Questionnaire. *Behaviour Research and Therapy, 40*(3), 313-323.

Gallagher, N. G., South, S. C., & Oltmanns, T. F. (2003). Attentional coping style in obsessive-compulsive personality disorder: a test of the intolerance of uncertainty hypothesis. *Personality and Individual Differences, 34*, 41-57.

Greco, V., & Roger, D. (2001). Coping with uncertainty: The construction and validation of a new measure *Personality and Individual Differences, 31*, 519-534.

Haba-Rubio, J. (2005). Psychiatric aspects of organic sleep disorders. *Dialogues in Clinical Neuroscience, 7*, 335-346.

Hedayati, M., Dugas, M. J., Buhr, K., & Francis, K. (2003). *The relationship between intolerance of uncertainty and the interpretation of ambiguous and unambiguous information*. Paper presented at the Annual Convention of the Association for Advancement of Behaviour Therapy.

Holaway, R. M., Heimberg, R. G., & Coles, M. E. (2006). Acomparison of intolerance of uncertainty in analogue obsessive-compulsive disorder and generalized anxiety disorder. *Anxiety Disorders, 20*, 158-174.

Jöreskog, K. G., & Sörbom, D. (1984). Lisrel IV User's Guide. Mooresville, IL.

Koerner, N., & Dugas, M. J. (2008). An investigation of appraisals in individuals vulnerable to excessive worry: The role of intolerance of uncertainty. *Cognitive Therapy and Research, 32*, 619-638.

Konstantellou, A., Campbell, M., Eisler, I., Simic, M., & Treasure, J. (2011). Testing a cognitive model of generalized anxiety disorder in the eating disorders. *Journal of Anxiety Disorders, 25,* 864-869.

Ladouceur, R., Dugas, M. J., Freeston, M. H., Léger, E., Gagnon, F., & Thibodeau, N. (2000). Efficacy of a new cognitive-behavioral treatment for generalized anxiety disorder: Evaluation in a controlled clinical trial. *Journal of Consulting and Clinical Psychology, 68*, 957-964.

Ladouceur, R., Dugas, M. J., Freeston, M. H., Rhéaume, J., Blais, F., Boisvert, J.-M., et al. (1999). Specificity of generalized anxiety disorder symptoms and processes. *Behavior Therapy, 30*(2), 191-207.

Ladouceur, R., Gosselin, F., & Dugas, M. J. (2000). Experimental manipulation of intolerance of uncertainty: A study of a theoretical model of worry. *Behaviour Research and Therapy, 38*, 933-941.

Laugesen, N., Dugas, M. J., & Bukowski, W. M. (2003). Understanding adolescent worry: The application of a cognitive model. *Journal of Abnormal Child Psychology, 31*(1), 55-64.

Mahoney, A. E. J., & McEvoy, P. M. (2012). Changes in intolerance of uncertainty during cognitive behavior group therapy for social phobia. *Journal of Behavior Therapy and Experimental Psychiatry, 43*, 849-854.

Marsch, H. W., Balla, J. R., & McDonalds, R. P. (1988). Goodness of fit indexes in confirmatory factor analysis: the effect of sample size. *Psychological Bulletin, 103*, 391-410.

McEvoy, P. M., & Mahoney, A. E. J. (2011). Achieving certainty about the structure of intolerance of uncertainty in a treatment-seeking sample with anxiety and depression. *Journal of Anxiety Disorders, 25,* 112-122.

Metzger, R. L., Miller, M. L., Cohen, M., Sofka, M., & Borkovec, T. D. (1990). Worry changes decision making: The effect of negative thoughts on cognitive processing. *Journal of Clinical Psychology, 46*(1), 78-88.

Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the Penn State Worry Questionnaire. *Behaviour Research and Therapy, 28*(6), 487-495.

Molina, S., & Borkovec, T. D. (1994). The Penn State Worry Questionnaire: psychometric properties and associated characteristics. In G. C. L. Davey & F. Tallis (Eds.), *Worrying. Perspectives on Theory, Assessment and Treatment*. New York: McGraw-Hill.

Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology, 100*(4), 569-582.

Norton, P. J. (2005). A psychometric analysis of the Intolerance of uncertainty scale among four racial groups. *Journal of Anxiety Disorders, 19*, 699-707.

Roemer, L. (2001). Measures for anxiety and related constructs. In M. M. Antony, S. M. Orsillo & L. Roemer (Eds.), *Practitioner's guide to empirically-based measures of anxiety*. New York: Kluwer Academic/ Plenum.

Rosen, N. O., & Knäuper, B. (2009). A little uncertainty goes a long way: State and trait differences in uncertainty interact to increase information seeking but also increase worry. *Health Communication, 24*, 228-238.

Russell, M., & Davey, G. C. L. (1993). The relationship between life events measures and anxiety and its cognitive correlates. *Personality and Individual Differences, 14*, 317-322.

Sexton, K. A., & Dugas, M. J. (2009). Defining Distinct Negative Beliefs About Uncertainty: Validating the Factor Structure of the Intolerance of Uncertainty Scale. *Psychological assessment, 21*(2), 176-186.

Sica, C., Coradeschi, D., Sanavio, E., & Novara, C. (2004). A study of the psychometric properties of the Obsessive Beliefs Inventory and Interpretations of Intrusions Inventory on clinical Italian individuals. *Anxiety Disorders, 18*, 291-307.

Spielberger, C. D., Gorsuch, R. L., & Luschene, R. (1970). *Test manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.

SPSS Inc. Chicago, IL, USA.

Stavosky, J. M., & Borkovec, T. D. (1988). The phenomenon of worry: Theory, research, treatment and its implications for women. *Women and Therapy, 6*, 77-95.

Steketee, G., Frost, R. O., & Cohen, I. (1998). Beliefs in Obsessive-Compulsive Disorder. *Journal of Anxiety Disorders, 12*(6), 525-537.

Sternheim, L., Startup, H., & Schmidt, U. (2011). An experimental exploration of behavioral and cognitive-emotional aspects of intolerance of uncertainty in eating disorder patients. *Journal of Anxiety Disorders, 25*, 806-812.

Tallis, F., Davey, G. C. L., & Capuzzo, N. (1994). The phenomenology of non-pathological worry: A preliminary investigation. In G. C. L. Davey & F. Tallis (Eds.), *Worrying: Perspectives on Theory, assessment and treatment*. Chichester, England: John Wiley.

Tallis, F., Eysenck, M. W., & Mathews, A. (1991). Elevated evidence requirements in worry. *Personality and Individual Differences, 12*, 21-27.

Tolin, D. F., Abramowitz, J. S., Brigidi, B. D., & Foa, E. B. (2003). Intolerance of uncertainty in obsessive-compulsive disorder. *Anxiety Disorders, 17*, 233-242.

Van der Does, A. J. W. (2002). *Handleiding bij de Nederlandse bewerking van de BDI-II (Manual of the Dutch version of the BDI-II)*. San Antonio, TX/ Lisse, The Netherlands: The Psychological Cooperation/ Swets Test Publishers.

Van der Ploeg, H. M. (1980). Validity of the Zelf-Beoordelings-Vragenlijst (a Dutch version of the Spielberger State-Trait Anxiety Inventory). *Nederlands Tijdschrift Voor de Psychologie En Haar Grensgebieden, 35*, 243-249.

Van der Ploeg, H. M. (1999). *Handleiding bij de Zelf-Beoordelings Vragenlijst, ZBV*. Lisse, the Netherlands: Swets & Zeitlinger.

van Rijsoort, S., Emmelkamp, P., & Vervaeke, G. (1999). The Penn state worry questionnaire and the worry domains questionnaire: Structure, reliability and validity. *Clinical psychology & psychotherapy, 6*(4), 297-307.

Yook, K., Kim, K.-H., Suh, S. Y., & Lee, K. S. (2010). Intolerance of uncertainty, worry, and rumination in major depressive disorder and generalized anxiety disorder. *Journal of Anxiety Disorders, 24*, 623-628.

Appendix A: Dutch items and instructions of the IUS-27

De onderstaande vragen gaan over hoe u tegen onzekerheden aankijkt. Beantwoord de vragen door steeds het betreffende getal te omcirkelen. Er zijn geen goede of foute antwoorden. Het gaat steeds om uw mening.

De getallen hebben de volgende betekenis:

1 = sterk mee oneens

2 = mee oneens

3 = eens noch oneens

4 = mee eens

5 = sterk mee eens

		sterk mee oneens	*mee oneens*	*eens noch oneens*	*mee eens*	*sterk mee eens*
1.	Onzekerheid belet mij om een uitgesproken mening te hebben.	1	2	3	4	5
2.	Onzeker zijn duidt op ongeorganiseerdheid.	1	2	3	4	5
3.	Onzekerheid maakt het leven ondragelijk.	1	2	3	4	5
4.	Het is oneerlijk om geen garanties in het leven te hebben.	1	2	3	4	5
5.	Ik kan niet tot rust komen als ik niet weet wat er morgen gaat gebeuren.	1	2	3	4	5
6.	Door onzekerheid voel ik me ongemakkelijk, angstig, of gespannen.	1	2	3	4	5
7.	Onvoorziene gebeurtenissen brengen mij ernstig van slag.	1	2	3	4	5
8.	Ik vind het frustrerend om niet over alle benodigde informatie te beschikken.	1	2	3	4	5
9.	Onzekerheid belet mij om het beste uit het leven te halen.	1	2	3	4	5
10.	Men moet altijd vooruitkijken om verrassingen te voorkomen.	1	2	3	4	5
11.	De kleinste onvoorziene gebeurtenis kan alles verpesten, ondanks de beste planning.	1	2	3	4	5
12.	Als ik in actie moet komen, voel ik me verlamd door onzekerheid.	1	2	3	4	5

13.	Onzeker zijn duidt erop dat ik niet ‘eerste klasse’ ben.	1	2	3	4	5
14.	Als ik onzeker ben, kan ik niet vooruit.	1	2	3	4	5
15.	Als ik onzeker ben, kan ik niet goed functioneren.	1	2	3	4	5
16.	In tegenstelling tot mijzelf, lijken andere mensen te weten waar ze naar toe gaan met hun leven.	1	2	3	4	5
17.	Onzekerheid maakt me kwetsbaar, ongelukkig, of verdrietig.	1	2	3	4	5
18.	Ik wil altijd weten wat de toekomst in petto heeft voor me.	1	2	3	4	5
19.	Ik kan er niet tegen om verrast te worden.	1	2	3	4	5
20.	Zelfs de kleinste twijfel kan mij ervan weerhouden tot actie over te gaan.	1	2	3	4	5
21.	Ik zou in staat moeten zijn om alles vooraf te organiseren.	1	2	3	4	5
22.	Onzeker zijn duidt erop dat ik een gebrek aan zelfvertrouwen heb.	1	2	3	4	5
23.	Ik vind het oneerlijk dat andere mensen zeker lijken te zijn over hun toekomst.	1	2	3	4	5
24.	Onzekerheid weerhoudt me van een goede nachtrust.	1	2	3	4	5
25.	Ik moet alle onzekere situaties vermijden.	1	2	3	4	5
26.	De dubbelzinnigheden in het leven stresseren me.	1	2	3	4	5
27.	Ik kan er niet tegen om besluitloos te zijn over mijn toekomst.	1	2	3	4	5

Appendix B: Dutch items and instructions of the short version IUS-12

De onderstaande vragen gaan over hoe u tegen onzekerheden aankijkt. Beantwoord de vragen door steeds het betreffende getal te omcirkelen. Er zijn geen goede of foute antwoorden. Het gaat steeds om uw mening.

De getallen hebben de volgende betekenis:

1 = sterk mee oneens

2 = mee oneens

3 = eens noch oneens

4 = mee eens

5 = sterk mee eens

		sterk mee oneens	*mee oneens*	*eens noch oneens*	*mee eens*	*sterk mee eens*
1.	Onvoorziene gebeurtenissen brengen mij ernstig van slag.	1	2	3	4	5
2.	Ik vind het frustrerend om niet over alle benodigde informatie te beschikken.	1	2	3	4	5
3.	Men moet altijd vooruitkijken om verrassingen te voorkomen.	1	2	3	4	5
4.	De kleinste onvoorziene gebeurtenis kan alles verpesten, ondanks de beste planning.	1	2	3	4	5
5.	Ik wil altijd weten wat de toekomst in petto heeft voor me.	1	2	3	4	5
6.	Ik kan er niet tegen om verrast te worden.	1	2	3	4	5
7.	Ik zou in staat moeten zijn om alles vooraf te organiseren.	1	2	3	4	5
8.	Onzekerheid belet mij om het beste uit het leven te halen.	1	2	3	4	5
9.	Als ik in actie moet komen, voel ik me verlamd door onzekerheid.	1	2	3	4	5
10.	Als ik onzeker ben, kan ik niet goed functioneren.	1	2	3	4	5
11.	Zelfs de kleinste twijfel kan mij ervan weerhouden tot actie over te gaan.	1	2	3	4	5
12.	Ik moet alle onzekere situaties vermijden.	1	2	3	4	5

Table 1. Confirmatory factor analyses fit indices for the different IUS versions

	χ^2(df), *p*	GFI	AGFI	CFI	RMSEA (90% CI)	CAIC
IUS-27[a], 1 factor	χ^2(324)=1262,94, *p*<.001	.80	.76	.75	.079 (.074-.084)	1648.61
IUS-27[a], 2 factors	χ^2(323)=1023.37, *p*<.001	.85	.82	.81	.068 (.064-.073)	1416.18
IUS-27[a], 4 factors	χ^2(318)=1090.33, *p*<.001	.84	.80	.79	.072 (.068-.077)	1518.85
IUS-27[a], 5 factors	χ^2(286)=769.01, *p*<.001	.88	.85	.86	.060 (.055-.065)	1233.24
IUS-12[a], 1 factor	χ^2(54)=236.96, *p*<.001	.91	.87	.86	.085 (.074-.096)	408.93
IUS-12[a], 2 factors	χ^2(53)=155.89, *p*<.001	.95	.92	.92	.064 (.053-.076)	334.92
IUS-12[b], 2 factors	χ^2(53)=127.78, *p*<.001	.96	.94	.94	.055 (.042-.067)	306.92

Note. [a] = Calibration sample (*N*=483), [b] = Validation sample (*N*=484).

GFI = goodness-of-fit index, AGFI = adjusted goodness-of-fit index, CFI = comparative fit index, RMSEA = root mean square error of approximation, and CAIC = the Consistent Akaike Information Criterion.

Table 2. Standardized factor loadings of the two-factor model for the 12-item IUS (Carleton, Norton, and Asmundson, 2007) as obtained with confirmatory factor analysis shown for the validation sample and the calibration sample (between parentheses)

Item	Item content	prospective anxiety	inhibitory anxiety
1	Unforeseen events upset me greatly.	.62 (.63)	
2	It frustrates me not having all the information I need.	.50 (.60)	
3	One should always look ahead so as to avoid surprises.	.62 (.52)	
4	A small unforeseen event can spoil everything, even with the best planning.	.51 (.53)	
5	I always want to know what the future has in store for me.	.63 (.62)	
6	I can't stand being taken by surprise.	.60 (.54)	
7	I should be able to organize everything in advance.	.57 (.68)	
8	Uncertainty keeps me from living a full life.		.58 (.57)
9	When it's time to act, uncertainty paralyses me.		.68 (.59)
10	When I am uncertain, I can't function very well.		.49 (.44)
11	The smallest doubt can stop me from acting.		.66 (.67)
12	I must get away from all uncertain situations.		.57 (.56)

Table 3. Means (*M*), Standard Deviations (*SD*), Cronbach's alpha (α), number of participants (*N*), and Pearson inter-correlations of the Questionnaires

Variable	*M*	*SD*	α	*N*	2.	3.	4.	5.	6.	7.
1. IUS-12_PA	17.85	5.00	.78	967	.55**	.92**	.78**	.38**	.46**	.22**
2. IUS-12_IA	11.57	3.56	.72	967	1	.83**	.86**	.51**	.46**	.24**
3. IUS-12_total score	29.41	7.56	.83	967		1	.92**	.48**	.52**	.26**
4. IUS-27_total score	67.77	15.20	.90	967			1	.57**	.55**	.25**
5. BDI-II	10.44	7.05	.85	470				1	.54**	.12**
6. PSWQ	50.74	12.61	.92	521					1	.39**
7. STAI-T	48.92	4.81	.40	626						1

Note. IUS-12_PA = Prospective anxiety, IUS-12_IA = Inhibitory anxiety, IUS-12_total score = Intolerance of Uncertainty Scale short 12-item version, IUS-27_total score = Intolerance of Uncertainty Scale (full 27-item version), BDI-II = Beck Depression Inventory, PSWQ = Penn State Worry Questionnaire, STAI-T = trait version of the State Trait Anxiety Inventory.

** $p < .01$.

Table 4. Hierarchical regression analysis: Intolerance of Uncertainty significantly contributes to worry (PSWQ) above and beyond demographical variables and levels of depression and anxiety

Variables	R^2	ΔR^2	*B*	*SE B*	β
Step 1	.09***	.09***			
Gender			9.63	1.47	.30***
Age			0.14	0.16	.04
Step 2	.45***	.37***			
BDI-II			0.84	0.06	.47***
STAI-T			0.87	0.09	.33***
Step 3	.51***	.06***			
IUS-12			0.46	0.06	.27***
Step 3	.50***	.05***			
IUS-27			0.23	0.03	.28***

Note. IUS-12 = Intolerance of Uncertainty Scale (short 12-item version), IUS-27 = Intolerance of Uncertainty Scale (full 27-item version), BDI-II = Beck Depression Inventory, PSWQ = Penn State Worry Questionnaire, STAI-T = trait version of the State Trait Anxiety Inventory. R^2 = The proportion of variance accounted for by the model, ΔR^2 = Additional change in the proportion of variance accounted for by the model, *B* = regression coefficient ,*SE B* = standard error of *B*, *β* = standardized regression coefficient.

*** $p<.001$.