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The Cognitive Predictors of Worry in a Non-Clinical Population

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Research Article

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Abstract

Although worry is considered to be the key feature of generalised anxiety disorder, it has its own unique properties. The study aimed to investigate the extent to which intolerance of uncertainty, poor problem solving confidence, positive beliefs about worry and negative thinking style, predicted worry, both individually and in combination, once the effects of trait anxiety were removed. Ninety-six university students participated in the study by completing a battery of questionnaires. Results, showed trait anxiety to be the strongest predictor. Further, negative thinking, intolerance of uncertainty and positive beliefs about worry contributed to the prediction of worry individually, beyond the effects of trait anxiety. However, when examined collectively, intolerance of uncertainty and a negative thinking were shown to be superior predictors of worry. The findings support the cognitive processing models of worry and generalised anxiety. The implications of these findings are discussed with reference to future research.

Worry is a very common experience. Despite its unpleasantness, moderate worry can be a normal adaptive process often useful in problem-solving (Davey, Hampton, Farrell, & Davidson, 1992). This function of worry allows the individual to anticipate and plan for future problems. On the other hand, excessive and out of control worry is aversive in nature. The Diagnostic and Statistical Manual of Mental Disorders, (*DSM-IV-TR*; American Psychiatric Association, 2000) recognises excessive and uncontrollable worry as a principal diagnostic criterion of generalised anxiety disorder (GAD). This excessive worry is considered pathological, distressing, and can severely impair functioning. The boundaries of worry are not clear and it also appears to be associated with other anxiety disorders (Wells & Morrison, 1994). Further, worry is not restricted to those with anxiety disorders. It is also a normally occurring phenomenon in almost all people, with up to 38% of the general population worry at least once daily (Tallis, Davey, & Capuzzo, 1994).

Research on worry is relatively new and has taken place in the last twenty years (Davey et al., 1992). This was mainly due to ambiguity in its definition and lack of reliable instrument (Eysenck, 1992). One of the initial comprehensive investigations of worry was conducted by Borkovec and colleagues (Borkovec, Robinson, Pruzinsky, & DePree, 1983). They defined worry as a "chain of thoughts and images, negatively affect-laden and relatively uncontrollable". Further, it was considered to represent an attempt to engage in mental problem solving on issue whose outcome is uncertain but contains the possibility of one or more negative outcomes (Borkovec et al., 1983). Similarly, Mathews (1990) described worry as a thwarted problem solving attempt where danger is constantly being rehearsed without a solution ever being found. Generally, there is a consensus among theorists that worry is a cognitive phenomenon, which is uncontrollable and revolves around future events and potential catastrophes (Borkovec et al., 1983; MacLead, Williams, & Bekerian, 1991; Mathews, 1990).

In the past worry has been confused with trait anxiety. For many years the terms "worry" and "trait anxiety" were used synonymously. Although worry is not synonymous with trait anxiety, research has highlighted the overlap between trait anxiety and worry. Correlations between the two have been reported to be in the .70's (e.g., Davey, 1993). Given the high correlation between trait anxiety and worry some researchers have postulated that worry may be the cognitive component of the broader construct of trait anxiety (Borkovec, 1985; Matthews, 1990), which is characterised by negative affectivity and neuroticism (Speilberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). Generally, trait anxiety has been described as a more global construct encompassing somatic sensations, cognitive components as well as behavioural components (Barlow, 1988). In contrast, worry is restricted to being cognitive, focussing on excessive or unrealistic concern about the future (Borkovec, Robinson, Pruzinsky, & DePree, 1983). Thus, trait anxiety has been regarded as a cognitive vulnerability that enhances the worry component of GAD (Eysenck, 1997). However, recently researchers (Gana, Martin, & Canouet, 2001) have contradicted earlier views (Borkovec, 1985; Matthews, 1990) of worry simply being a cognitive component of anxiety. They have emphasised worry's unique sources of variance, suggesting that it is an independent construct.

Despite growing evidence for worry's uniqueness from trait anxiety, researchers acknowledge that the distinction between the two concepts is still unclear (Zebb & Beck, 1998). Davey (1993) reported that, in spite of the overlap, the two concepts can be differentiated on the basis of the unique portion of variances they contribute to problem solving and coping. Trait anxiety may be related to avoidant coping styles and lack of problem solving ability (Davey, 1993). On the other hand, worrying is linked with negative beliefs about problems and one's own problem solving ability (Belzer, D'Zurilla, & Maydeu-Olivares, 2002).

A review of the literature supports worry as a cognitive phenomenon involving an

information-processing bias. According to Wells (1994), worry can be initiated by negative automatic thoughts. This thought process starts by selectively focusing on threatening cues and interpreting them in an unrealistic and a threatening manner (Uhlenhuth, McCarty, Paine, & Warner, 1999). Subsequently, the resulting intrusive thoughts may revolve around catastrophic and self-defeating outcomes (Watkins, 2004; Ruscio & Borkovec, 2004). Chronic worriers may find it difficult to dismiss these intrusive thoughts (Langlios, Freeston, & Ladouceur, 2000). This negative, distorted thinking style is associated with pathological worry (Wells, 1994). Further, the negative thinking style is associated with various other information processing biases, such as intolerance of uncertainty, positive beliefs about worry and poor confidence in ones problem solving ability.

Intolerance of uncertainty, emerged as a concept related to worry in 1994 (Freeston, Rheaume, Letarte, Dugas, & Ladouceur, 1994). It was originally explained as a tendency to perceive ambiguous situations as threatening. Individuals with a low tolerance to ambiguous situations were considered to have negative perceptions, interpretations and reactions toward ambiguity, which subsequently affected their behaviour. Recent research has refined the concept by referring to it as an individual's tendency to react negatively on an emotional, conative and cognitive level to uncertain situations or events in life (Dugas, Buhr, & Ladoucer, 2004). Individuals who have a low tolerance to uncertainty find uncertain events stressful and are hypervigilant toward such events (Dugas, Gagnon, Ladouceur, & Freeston, 1998). They evaluate such situations as distressing independent of their probability of occurrence and associated consequences. According to these individuals, unexpected events are negative and should be avoided (Dugas et al., 2005). Further, those who have a low tolerance to uncertainty, manage uncertain and unexpected situations poorly (Grenier, Barrette, & Ladouceur, 2005).

Uncertainty is associated with future events. Tolerance towards future unpredictable

events is poor amongst those with a low tolerance of uncertainty (Grenier et al., 2005). Not only do studies suggest that intolerance of uncertainty is a significant factor in the acquisition and maintenance of worry (Freeston et al., 1994; Ladouceur, Talbot, & Dugus, 1997), but it is also the most salient predictor of worry (Buhr & Dugas, 2006; Laugesen, Dugas, & Bukowski, 2003). The possible causal role of intolerance of uncertainty in worry has been highlighted by recent investigations (e.g., Buhr & Dugas, 2006). Furthermore, the relationship between intolerance of uncertainty and worry is observed in different types of populations. A greater intolerance of uncertainty has been associated with higher levels of worry in both non-clinical subjects (Buhr & Dugas, 2006; Laugesen et al., 2003) and GAD patients (Ladouceur, Dugas, Freeston, Rheaume, Blais, & Boisvert, 1999).

Another aspect of worry is the beliefs that an individual holds about worry. High worriers often believe that worrying is a useful coping mechanism and that there is an improved outcome if he or she follows a specific worry ritual. In this way, having positive beliefs about the usefulness of worry increases their motivation and analytical thinking and helps them solve problems and avoid unpleasant outcomes (Cartwright-Hatton & Wells, 1997; Dugas et al., 1998). Even when the event is improbable, the individual believes that worry helps them prepare for a negative outcome. For example, some GAD patients believe that worrying assists them to avoid disappointment, to protect loved ones, find better ways of doing things, and stop bad things from happening (Freeston, et al., 1994). Furthermore, when the feared event does not occur this acts to reinforce the worrying (Roemer & Borkovec, 1993). Subsequently, the beliefs about the benefits of worrying strengthen.

Worry has also been shown to be related to poor problem-solving confidence, a cognitive process that involves a tendency to doubt and deflate one's sense of mastery, efficacy and the ability to solve problems (Davey, 1994). An individual may have poor problem-solving

confidence even when he or she knows what to do to solve a problem. This ineffective problem orientation results in difficulty in applying problem-solving skills. Worriers may have the ability to actually solve the problem. However, poor problem-solving confidence hinders their achievement (Belzer et al., 2002; Dugas et al., 1998; Dugas, Letarte, Rhaeume, Freeston, & Ladouceur, 1995). This negative problem orientation is shown to be associated with worry, even when the effects of anxiety, depression and trait anxiety have been removed (Belzer et al., 2002; Dugas et al., 1995; Gana et al., 2001; Zebb & Beck, 1998).

<p align="center">Goals of the Present Study</p>

The study of worry has evolved to a stage where researchers are seeking phenomena to identify those at risk of pathological worry. In view of the profound health effects worry can have on millions of Australians within their daily lives, identifying unambiguous predictors is vital. The present study aimed to explore potential predictors of worry, beyond the effects of trait anxiety, by investigating four cognitive contributors to worry including, intolerance of uncertainty, poor problem-solving confidence, positive beliefs about worry, and a negative cognitive style within a single comprehensive study.

Keeping in consideration the link between worry and trait anxiety, it is hypothesised that trait anxiety will be related to worry. Furthermore, a negative thinking style, intolerance of uncertainty, positive beliefs about worry, and poor problem-solving confidence have also been identified as characteristics associated with higher levels of worry. Therefore, it is predicted that each of these characteristics will be related to worry independently and in combination, once the effects of trait anxiety are controlled. Finally, intolerance of uncertainty has emerged as the strongest predictor of worry in recent studies. It is therefore expected that, while controlling for trait anxiety, intolerance of uncertainty will have a stronger relationship with worry than the remaining three predictors.

Method

Participants and Procedure

Ninety-six graduate and undergraduate students (83 women and 13 men, mean age = 25.59 years), volunteered to complete a battery of self-report questionnaires. The sample consisted of 13 married, 68 single, 7 divorced/separated, 4 de facto and 4 other. All had completed a high school level eduction, 34% of those had also completed an undergraduate degree, and 3% of those had completed a post-graduate degree. Most (79%) classed their occupation as full-time students with a further 18% as part-time students, 31% were full-time workers and 6% held part-time jobs, and 8% were also primary caregivers for children.

Participants were presented with a battery of questionnaires. The battery consisted of demographic data collection form as well as other questionnaires, which were randomly arranged to overcome order effects. Confidentiality was ensured by separating all identifying information from the questionnaire responses.

Measures

Anxious Thoughts and Tendencies Scale (*ATT;* Uhlenhuth et al., 1999). The ATT is a 15 item self-report measure assessing negative thinking characterised by catastrophizing (e.g. "When I think about how things will turn out, I feel sure that worst will happen"); selective abstraction (e.g. "Even when most things are going smoothly, if one thing goes wrong, then the whole situation looks bad to me"); and intrusive thoughts (e.g. "I can't stop thinking about things that bother me"). Items are answered on a four point Likert scale (1 = rarely; 4 = most of the time). Uhlenhuth et al. (1999) reported high internal consistency with Cronbach's alpha at 0.91, test-retest reliability with r =0.75 and a moderate concurrent validity with other anxiety and depression scales. Recent evaluation has supported the high internal consistency (Cronbach's α = 0.90) and test-retest reliability (r = 0.87) (Khawaja & Dyer, 2004). Further, concurrent validity

was revealed by ATT's associations with scales that measured physiological, cognitive and phobic aspect of anxiety. This study also indicated discriminant validity on the basis of ATT's ability to discriminate between high and low anxious groups as well as anxiety patients and nonclinical samples.

Intolerance of Uncertainty Scale (*IUS;* Freeston et al., 1994). The IUS is a 27 item scale assessing uncertainty, emotional and behavioural reactions to ambiguous situations, implications of being uncertain, and attempts to control the future (e.g. "Uncertainty makes my life intolerable"). Items are answered on a five point Likert scale (1 = not at all characteristic of me; 5 = entirely characteristic of me). The English version of the IUS has high internal consistency with Cronbach alpha of 0.94 and good test-retest reliability, $r = 0.74$ (Buhr & Dugas, 2002). The convergent and divergent validity of the IUS have been supported by research assessing its relation to symptom measures of worry, depression and anxiety (Dugas et al, 2004).

Problem Solving Inventory (*PSI;* Heppner & Petersen, 1982)*.* The PSI assesses the individual's perception of his or her problem-solving abilities or style, not actual problem-solving skills. The PSI has three subscales, however only problem solving confidence (PSI-CON) was used in the analysis. A low score on this factor indicates the respondent's perception of his or her own problem-solving abilities as poor (e.g. "When confronted with a problem, I am unsure of whether I can handle the situation"). The items are responded on a six point Likert scale (1 = strongly agree; 6 = strongly disagree). Test-retest reliability of the PSI was established over a two week period with correlations for the sub-tests ranging from 0.83 to 0.88, and the total inventory total at 0.89 (Heppner & Petersen, 1982). Internal consistencies were computed using Cronbach's alpha ranging from 0.72 to 0.85 for the subsets and the total inventory at 0.90 (Heppner & Petersen, 1982). The concurrent, discriminant, and construct validity of the total PSI were satisfactory (Heppner & Petersen, 1982).

Positive Beliefs Questionnaire (PBQ). The PBQ is based on the first subscale of the Meta-Cognitions Questionnaire (MCQ; Cartwright-Hatton & Wells, 1997). The PBQ is a 19 item self-report questionnaire relating to beliefs that worry helps solve problems and avoid unpleasant situations (e.g. "Worrying helps me to solve problems"). The items are answered on a four point Likert scale (1 = do not agree to 4 = agree very much). This subscale of the MCQ has a 5-week test-retest reliability of 0.85 ($p < .001$) and correlates with measures of trait anxiety 0.26 ($p < .001$) and worry 0.41 ($p < .001$; Cartwright-Hatton & Wells, 1997). After controlling for trait anxiety, a regression analysis predicting worry indicated that the positive beliefs subscale accounted for significant variance in worry scores (Cartwright-Hatton & Wells, 1997).

Penn State Worry Questionnaire (*PSWQ;* Meyer, Miller, Metzger, & Borkovec, 1990). The PSWQ is a 16 items self-report measure for excessive worrying (e.g. "My worries overwhelm me"). Participate rate items on a five point Likert scale (1= not at all typical of me; 5 = very typical of me). It is reliable in clinical as well as non clinical populations Molina & Borkovec, 1994; van Rijsoort, Emmelkamp, & Vervaeke, 1999). It has high internal consistency with reported alphas ranging between 0.86 to 0.94 and test-retest reliability, $r = 0.92$ (Davey, 1993; Stöber, 1998). The scale has substantial convergent and divergent validity demonstrating higher correlations with measures of worry than with measures of anxiety and depression (Molina & Borkovec, 1994).

Trait Anxiety Inventory for Adults Form Y (Speilberger et al., 1983). The State-Trait Inventory for Adults (STAI) comprises two 20-item scales that independently assess state anxiety (STAI-S), and trait anxiety (STAI-T). Only the STAI-T, questions 21 to 40 have been utilised in this study (e.g. "I feel nervous and restless"). The items are answered on a four point Likert scale (0= almost never; 3= almost always). The STAI has good reliability with coefficient alphas ranging from 0.86 to 0.95, and test-retest reliability ranging from 0.65 to 0.75 (Speilberger et al.,

1983). It has shown to be a valid measure for normal and anxiety patients (Oei, Crook, & Evans, 1990).

Statistics

> After appropriate data screening and cleansing, correlations were conducted between each of the measures used. To cater for the expected high correlations between the independent variables (as measured by IUS, ATT, PBQ, and PSI-CON), individual hierarchical regressions were conducted to assess the contribution of each of the variables as predictors of worry (as measured by PSWQ). The effects of trait anxiety were accounted for by entering the STAI-T in the first block and entering the independent variable in the second block.

> A further hierarchical regression was conducted to assess the contribution of each of the independent variables (as measured by IUS, ATT, PBQ, and PSI-CON) when entered together as predictors of worry (as measured by PSWQ). The STAI-T was entered in the first block to account for trait anxiety prior to entering the other measures in the second block. Significance of all statistics was assessed at the 0.05 level.

<div align="center">Results</div>

Data Cleansing and Preliminary Analyses.

> Prior to analysis, variables were examined for accuracy of the data entry and missing values. Three participants were removed from the sample because they failed to complete the reverse side of PSI-CON. One participant failed to sign the Statement of Informed Consent and was also removed. Some participants failed to enter a response on some individual questions. There was no apparent pattern to this missing data. Except for demographic responses, where some participants failed to report their age, missing responses were replaced with the mean of the sample for the question (Tabachnick & Fidell, 2001). In all, 19 values were replaced out of a total of 15,326 values, or .12% of the data.

Preliminary examinations of the data for skewness and kurtosis showed no significant kurtosis. Totals for the ATT scale showed minor skewness and a square root transformation was applied (Tabachnick & Fidell, 2001). As the transformation improved the skewness, the transformed data was retained in subsequent analysis. The data was examined for multi-collinearity and multivariate outliers and showed no significant evidence of multi-collinearity. One case was shown to be a multivariate outlier and was removed from the data set before further analysis was undertaken. Internal consistencies of all the measures were examined by calculating Cronbach's alpha. All measures were internally consistent (Table1).

Correlations between measures. Table 1 shows the complete set of correlations between all measures with all correlations found to be significant and ranged from moderate to high; except between PBQ and PSI-CON.

Please insert Table 1 here

Individual predictors of worry. Separate hierarchical regressions were used to test the relationship between each of the four predictors (i.e., intolerance of uncertainty, problem-solving confidence, positive beliefs about worry, and negative thinking), and worry (as reported by PSWQ). Trait anxiety (as measured by STAI-T) was a significant predictor of worry. Approximately 55% of the variance in the PSWQ score was accounted for by its linear relationship to STAI-T (Model 1). The results of the set of hierarchical regressions are summarised in Table 2.

Adding IUS to STAI-T (Model 2) produced a significant improvement in the prediction of PSWQ. IUS accounted for an additional 8% of the variance (Table 2). This added prediction, though significant had a relatively small effect size (Cohen, 1988). More important, perhaps, is that the combined model accounted for a significant amount of the variability in PSWQ; STAI-T and IUS equally contributed to the variability.

Similarly, an addition of ATT to STAI-T (Model 3) led to a significant improvement in the prediction of PSWQ. As seen by Table 2, ATT accounted for an additional 8% of the variance with a nominal effect size (Cohen, 1988). Although the combined model accounted for a significant amount of the variability, STAI-T had almost trivial unique contribution. ATT had only a small unique contribution.

Adding PSI-CON to STAI-T (Model 4) did not show a significant improvement over STAI-T alone (Table 2). PSI-CON also exhibited a small unique contribution over and above STAI-T, while STAI-T had a much larger unique contribution.

Like Models 2 and 3, adding PBQ to STAI-T (Model 5) showed a significant improvement over Model 1. The combined model accounted for less of the variability than Models 2 or 3, yet was still significant with a small effect size (Cohen, 1988). PBQ accounted for 4% of the variance. However, in model 5, STAI-T uniquely accounted for a large proportion of the variability, while PBQ uniquely accounted for much less.

Please insert Table 2 here

Combined predictors of worry. A hierarchical regression analysis was conducted to evaluate the prediction of an individual's likelihood to worry (as measured by PSWQ) from their intolerance for uncertainty (as measured by IUS), their confidence in problem-solving ability (as measured by PSI-CON), their negative thinking (as measured by ATT), and their positive beliefs about worry (as measured by PBQ), after accounting for the effects of trait anxiety (as measured by STAI-T).

Approximately 68% of the variance in PSWQ score was accounted for by its linear relationship to the combined model scores. However, trait anxiety alone accounted for 55% of the variance in PSWQ. As seen by Table 3, the change in the correlation from the STAI-T model with the addition of the other variables was 13% indicating a moderate effect size (Cohen, 1988).

The regression equation indicated that the variables were linearly related such that an individual's likelihood to worry can be predicted from a combination of the variables. ATT and IUS, compared to the other variables, uniquely accounted for a larger proportion of variance. Table 3 displays the results at each of the steps in the regression.

Please insert Table 3 here

Discussion

For more than 20 years, researchers have probed the many facets of worry to uncover its latent properties, to understand its deep-rooted alliance with trait anxiety, and to identify the characteristics that leave some people vulnerable. Intolerance of uncertainty, a negative thinking style, poor problem-solving confidence, and positive belief about worry have surfaced as key players in the development and maintenance of worry. Keeping in view the correlations among the predictors, the contribution of each variable was first examined individually after controlling the effects of trait anxiety. Second, all variables were then examined collectively after accounting for the trait anxiety.

Individual predictors

As hypothesised, the results indicated that trait anxiety was the strongest predictor of worry, as it accounted for more than half of the variability. Trait anxiety evidenced a strong association with worry. This confirmed previous research showing that worry and personality variables incorporating neuroticism and negative affect are closely related (Borkovec et al., 1983; Zebb & Beck, 1998). Further, after accounting for the effects of trait anxiety, intolerance to uncertainty, negative thinking and positive beliefs towards worry individually contributed to the worry.

As expected, intolerance of uncertainty emerged as a strong predictor of worry (Buhr & Dugas, 2006; Dugas et al., 2004; Ladouceur et al., 1997). The present finding indicated that

worry is associated with a low tolerance to uncertain situations or events stressful, and a tendency to consider them as negative and upsetting. This is consistent with previous investigations (Ladouceur, Gosselin, & Dugas, 2000) deeming intolerance of uncertainty a likely causal factor in pathological worry. Further, negative thinking is shown to be an equally effective predictor of worry (Borkovec et al., 1983; Uhlenhuth et al.,

1999; Wells, 1994).

Negative thinking is a broad concept, which involves a self-defeating and irrational cognitive style associated with worry (Wells, 1994). It is important to note that consistent with previous studies a negative thinking style, reflected by a tendency to selectively focus on threatening cues as catastrophic, fully accounted for all the variance explained by trait anxiety (Watkins, 2004; Ruscio & Borkovec, 2004). That is, the results indicated that when ATT (measuring a negative thinking) is used to predict worry, predictions are unlikely to be improved by the addition of the STAI-T (measuring trait anxiety). Although, ATT and IUS overlap due to their cognitive nature, there seems to be components within both measures with little or no overlap. Negative thinking explains aspects of worry not explained by intolerance of uncertainty, and vice versa.

The findings reveal an association between worry and positive beliefs about worry. It indicates that beliefs about the usefulness of worrying and that it prepares a person for future events can effectively predict worry. This result is consistent with previous investigations which indicate that worry is largely anxiety related and moderately concerned with the belief that worrying is beneficial (Cartwright-Hatton & Wells, 1997; Freeston et al., 1994; Roemer & Borkovec, 1993). Contrary to some studies (Davey, 1994; Dugas, Freeston, & Ladouceur, 1997), poor problem solving confidence showed no significant unique contribution to the prediction beyond that of trait anxiety. One explanation may be that compared to general or clinical

populations, students may have better problem orientation and problem solving skills. Therefore, this cognitive process may not be associated with their worry.

Combined predictors

The combined model confirmed the overlap between trait anxiety and each of the predictors revealed earlier by individual hierarchical regressions. Trait anxiety in the form of negative affectivity, avoidant coping and poor problem solving ability (Davey, 1993) appeared as an excellent predictor of worry. The other cognitive concepts contributed moderately. Notably, negative thinking and intolerance of uncertainty both made considerable unique contributions. Consistent with the information processing models of worry, distorted thinking (Ruscio & Borkover, 2004; Watkins, 2004) and the tendency to react to uncertain situations in a threatening manner (Buhr & Dugas, 2006; Dugas et al., 2004) appeared to be the two factors contributing to the participants worry. The results suggested that a model containing only intolerance of uncertainty and negative thinking may be a proficient predictor of worry, after taking into account all of the variability that trait anxiety could account for. However, when drawing this conclusion, it must be realised that other combinations of the measures may also provide good predictions due to the large overlap in the measures (and their ability to account for the variability in worry as measured by PSWQ).

Limitations and future research directions: One of the limitations of the present study was that almost all measures were highly significantly correlated except for PBQ. The high correlations between cognitive measures and trait anxiety indicated that probably all of the instruments were assessing trait anxiety to some extent. Although it highlighted the strong relationship between worry and trait anxiety, it also points to the limitations of the scales. The scales are not measuring clearly defined and specific concepts. Further, high correlations among the cognitive scales revealed that they were measuring overlapping cognitive processes. The

overall high correlations among the scales employed in this study indicate a need for better measures for predicting worry, one possessing explicit features and not incorporating trait anxiety. However, it is important to note that in spite of the correlations, multicollinearity was not indicated. Therefore, there were at least some differences between the measures. Future research has to identify scales, which have a minimum overlap with other scales and measure specific aspects of worry.

The study is restricted by its sample. Most of the participants were females. Therefore, the results cannot be generalised to males. The sample is not a representative of the general population (i.e., sample size, age range, gender balance, and use of university students). The findings of the study cannot be applied to general community. To improve the generalisability, it is recommended that the study be repeated on general population by using a large gender balanced sample with an extensive age range. Further, there is a need to extend the study to clinical population.

The present study attempted to examine some cognitive aspects of worry. However, cognitive processing underlying worry is very complex and warrants increased thorough examination. For example the information processing model indicates that along with catastrophic belief systems, various other concepts such as cognitive avoidance, ruminations, intrusions and suppression are related to the phenomenon of worry (Dugas et al., 1998, Ladouceur et al., 1999, Watkin, 2004). These facets were not adequately captured by the ATT scale used in the present study to reflect the general concept of negative thinking. Although this scale measured the tendencies to catastrophize and selectively focus on danger cues as well as the intrusions, some other key components were not reflected appropriately. Future studies should examine the role of all the specific variables. Further, the study being cross sectional does not throw light of the cause and effect relationship. Future studies should investigate the causal

factors.

Summary and Conclusion

Primarily this study investigated the role of cognitive variables in predicting worry, after controlling for the effects of trait anxiety. Negative thinking and intolerance of uncertainty emerged as equally superior predictors of worry in a non-clinical student population, which predominantly consisted to females. Results indicated worry to be a related to trait anxiety. Irrespective of this finding, the large overlap of the predictors with trait anxiety must not be disregarded. This overlap suggested that some parts of worry may indeed be the cognitive component of trait anxiety. Although worry has much in common with trait anxiety, other unique contributors to worry remain to be fully investigated. Until separable concepts and instruments that measure these concepts clearly are found, the features of worry will continue to be difficult to interpret.

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Table 1. Correlations among the Measures and their Cronbach's Alphas

	PSI-CON	PSWQ	STAI	ATT	IUS	PBQ
PSI-CON	—					
PSWQ	0.56**	—				
STAI	0.68**	0.74**	—			
ATT	0.66**	0.78**	0.85**	—		
IUS	0.66**	0.74**	0.74**	0.74**	—	
PBQ	0.30	0.41**	0.32*	0.39**	0.41**	—
Cronbach's α	0.89	0.94	0.94	0.95	0.94	0.88

Note. Bonferroni adjustment applied to significance levels.

PSI-CON - Problem Solving Inventory – confidence subscale.

PSWQ - Penn State Worry Questionnaire.

STAI - State-Trait Inventory for Anxiety.

ATT- Anxious Thoughts and Tendencies Scale.

IUS - Intolerance of Uncertainty Scale.

PBQ - Positive Beliefs Questionnaire .

$* p < .05.$ $** p < .01.$

Table 2. Summary of Hierarchical Regression Analyses for Individual

Predictors of Worry Measured by PSWQ

	R^2	ΔR^2	B	$SE\ B$	β	sr_i^2
Model 1	0.55**					
STAI-T			0.98	0.09	0.74**	0.55
Model 2	0.63**	0.08**				
STAI-T			0.56	0.12	0.42**	0.08
IUS			0.32	0.07	0.43**	0.08
Model 3	0.63**	0.08**				
STAI-T			0.37	0.16	0.28*	0.01
ATT			8.67	1.95	0.54**	0.08
Model 4	0.56**	0.01				
STAI-T			0.90	0.13	0.68**	0.25
PSI-CON			0.16	0.16	0.10	0.01
Model 5	0.59**	0.04**				
STAI-T			0.90	0.09	0.68**	0.41
PBQ			0.30	0.11	0.20**	0.04

Note.

PSI-CON - Problem Solving Inventory.

PSWQ - Penn State Worry Questionnaire.

STAI - State-Trait Inventory for Anxiety.

ATT- Anxious Thoughts and Tendencies Scale.

IUS - Intolerance of Uncertainty Scale.

PBQ - Positive Beliefs Questionnaire.

* $p < .05$.   ** $p < .01$.

Table 3. Summary of Hierarchical Regression Analysis for Predictors of

Worry as Measured by PSWQ

	R^2	ΔR^2	B	$SE\ B$	β	sr_i^2
Step 1	0.55**					
STAI-T			0.98	0.09	0.74**	0.550
Step 2	0.68**	0.13**				
STAI-T			0.24	0.16	0.18	0.008
IUS			0.24	0.08	0.32**	0.037
PSI-CON			-0.12	0.15	-0.07	0.002
ATT			6.28	1.97	0.39**	0.036
PBQ			0.14	0.10	0.09	0.007

Note.

PSI-CON - Problem Solving Inventory.

PSWQ - Penn State Worry Questionnaire..

STAI - State-Trait Inventory for Anxiety

ATT- Anxious Thoughts and Tendencies Scale.

IUS - Intolerance of Uncertainty Scale.

PBQ - Positive Beliefs Questionnaire.

* $p < .05$. ** $p < .01$.