Pergamon

0191-8869(94)00108-1

Person. individ. Diff. Vol. 17, No. 6, pp. 791–802, 1994

0191-8869/94 $7.00 + 0.00

WHY DO PEOPLE WORRY?

MARK H. FREESTON, JOSÉE RHÉAUME, HÉLÈNE LETARTE, MICHEL J. DUGAS and ROBERT LADOUCEUR

École de psychologie, Université Laval, Québec, Canada G1K 7P4 and Centre de Recherche Université Laval/Robert-Giffard, 2601, chemin de la Canardière, Beauport, Québec, Canada G1J 2G3

(Received 4 January 1994)

Summary—Over the last few years there has been increased interest in worry. Most assessment up until now has been concerned with what people worry about and how much they worry rather than exploring reasons for worrying. Two questionnaires were developed to go beyond the content and intensity of worry. The first questionnaire, Why Worry?, contains 20 items and assesses reasons why people say they worry. Two types of reasons were found. First, subjects believe that worrying can prevent negative outcomes from happening, minimize the effects of negative events by decreasing guilt, avoiding disappointment, or provide distraction from thinking about things that are even worse. Second, people believe worrying has positive effects such as finding a better way of doing things, increasing control, and finding solutions. The second questionnaire, Intolerance of Uncertainty, consists of 27 items that assesses emotional, cognitive and behavioral reactions to ambiguous situations, implications of being uncertain, and attempts to control the future. The second study demonstrates the instruments' properties by distinguishing between levels of worry, by factor analysis describing the dimensions underlying the constructs, and by establishing appropriate relationships with measures of worry and emotional distress. The implications for current models of worry are discussed.

INTRODUCTION

Over the last few years there has been increased interest in worry. As Mathews (1990) observed, one of the surprising features is that worriers continue to worry even though it is a negative experience associated with a stream of negative thoughts and images, loss of mental control, and unpleasant affect. Most questionnaires up until now have been concerned with what people worry about and how much they worry (e.g. Davey, 1993; Dugas, Freeston, Doucet, Lachance & Ladouceur, in press) rather than exploring reasons for worrying. Clinical observation suggests that although many people can accept that worry is ultimately pointless, they still believe that worry can be useful. At Albany, Barlow and colleagues report clinical observations that worry helps to reduce the likelihood of negative events occurring (Brown, O'Leary & Barlow, 1993). Likewise, the Penn State group has some preliminary evidence suggesting that both clinical and non-clinical worriers hold beliefs about the usefulness of worry as a distraction from more disturbing things or superstitiously to have control over events (Borkovec & Lyonfields, 1993; Roemer, Borkovec, Posa & Lyonfields, 1991). The present study explores how people explain why they worry by developing an inventory of reasons for worrying.

The last few years has seen a marked increase in the study of worry and a number of phenomena have been observed. Worriers are characterized by hypervigilance (see Mathews, 1990), the tendency to define ambiguous events as threatening (Butler & Mathews, 1983, 1987; Russell & Davey, 1993), elevated subjective estimates of risk (Butler & Mathews, 1983, 1987; Vasey & Borkovec, 1992), and the increased availability of negative scenarios (Macleod, Williams & Bekerian, 1991; Tallis, Eysenck & Mathews, 1991b; Vasey & Borkovec, 1992). Further, three studies indicated that worriers were slower on decision tasks when the stimuli were ambiguous and the correct response was unclear (Metzger, Miller, Cohen, Sofka & Borkovec, 1990; Tallis, 1989; Tallis, Eysenck & Mathews, 1991a). These results were interpreted as showing that worriers have elevated evidence requirements and have difficulty solving ambiguous real-life problems because of the inability to satisfy high evidence requirements due to the uncertainty. Difficulties in problem solving have been linked to worry, especially to problem-solving orientation where it is the person's cognitive, emotional, and behavioral approach to the problem that is in play, rather than knowledge of how problems should be solved (Davey, Hampton, Farrell & Davidson, 1992; Dugas, Letarte, Rhéaume, Freeston & Ladouceur, in press). Likewise, a recent longitudinal study on depressed affect among college students suggests that "when individuals are able to tolerate ambiguity and thus manage uncertainty, they may more

effectively respond to negative life events" (Anderson & Schwartz, 1992, p. 294). Based on this evidence and clinical observations of GAD patients, we have previously postulated that an intolerance of uncertainty underlies different phenomena associated with worry (Dugas *et al.*, in press).

The role of uncertainty in worry stated here is coherent with a recent theoretical model of anxiety that states that:

> Those individuals who are highly intolerant of both arousal and uncertainty are able to withstand neither the uncertainty nor the emotional arousal induced by cues in aversive situations. . . . they are faced with a conflict which should lead to coping actions of just a short duration and, consequently, a fluctuating coping behaviour . . . . This should then hinder the employment of situation-related, particularly instrumental, coping behavior. (Krohne, 1993, p. 26.)

This theoretical position taken by Krohne (1989, 1993) posits a similar role for intolerance of uncertainty as we have outlined above. Further, the second part of this bipartite account of anxiety, namely intolerance of arousal, has already been applied to worry. Worry is seen as a shift to linguistic-verbal material that has the effect of removing fearful images and decreasing the accompanying somatic sensations (Borkovec & Lyonfields, 1993; Freeston, Dugas & Ladouceur, submitted). Thus the theoretical approach to anxiety proposed by Krohne may well apply to excessive worry where the act of worrying would play a double role. First, worry may deal with the intolerance of uncertainty component if the person believes that worrying increases control over uncertain events or their consequences. Second, worry may deal with the intolerance of arousal component when switching from images to a verbal-linguistic mode decreases physiological activation.

Intolerance of uncertainty would lead to problems being perceived when none objectively exists and to ineffective problem-solving where problems objectively exist. For example, intolerance of uncertainty would interfere with problem solving by leading to impulsive behavior that decreases uncertainty but does not address the problem, generating dysfunctional emotional states, inhibiting problem-focused behavior, and requiring high degrees of evidence before a decision can be made. Intolerance to uncertainty is thus defined as a relatively broad construct representing cognitive, emotional, and behavioral reactions to uncertainty in everyday life situations. Although there is an extensive literature on the intolerance of ambiguity (see Furnham, 1994), it is a broader concept than the intolerance of uncertainty postulated here and the various existing scales measure highly divergent behavior and attitudes. In fact separate factor analysis of four established scales identified 21 separate factors and a higher order factor analysis of the factors resulted in five higher-order factors (Furnham, 1994), of which only the first corresponds somewhat to the putative intolerance of uncertainty defined above.

This article presents two studies using two independent samples to develop and evaluate questionnaire measures of reasons why people worry and intolerance of uncertainty. The approach to scale development used here ensures that validity is built in at each step (see Anastasi, 1986). The first study describes the original development and item selection for instruments. Face valid items are drafted and then rated by clinicians familiar with GAD according to a specific definition of the construct to be measured. Those reaching consensus are retained for selection against empirical criteria. The reasoning underlying the approach used here is that high worriers should differ from moderate worriers on rationally developed face-valid items referring to the two constructs. The successful identification of items that distinguish the two groups thus confirms the pertinence of the constructs to worry. The second study examines the instruments' properties by replicating the ability to distinguish between levels of worry (criterion related validity), by factor analysis to describe the dimensions underlying the construct (factor validity), and by relationships to measures of worry and emotional distress (convergent and discriminant validity). The second study thus represents a first step in demonstrating the validity of these instruments.

EXPERIMENT ONE

This study describes the development of two self-report scales developed to try to understand why people worry. The first scale consists of reasons why a person worries and the second contains statements about intolerance of uncertainty. It was hypothesized that a group of non-clinical worriers

meeting DSM-III-R criteria for GAD would more strongly endorse statements about (a) reasons why people worry, and (b) uncertainty and its consequences than a group not meeting GAD criteria.

Method

Subjects and procedure. The *S*s were recruited in a large introductory psychology class ($N = 216$). There were 114 men and 102 women. The mean aged was 22.2 yr (SD = 3.44). *S*s were invited to participate in the study at the start of a regular course. Participation was voluntary and all *S*s signed a separate informed consent form. Each *S* received one of the two experimental questionnaires described below (determined at random) and two other questionnaires measuring worry. The *Penn State Worry Questionnaire* [PSWQ (Meyer, Miller, Metzger & Borkovec, 1990)] is a 16-item questionnaire measuring the tendency to worry. It shows good validity and reliability in both English and French (Brown, Antony & Barlow, 1992; Davey, 1993; Ladouceur, Freeston, Dumont, Letarte, Rhéaume, Gagnon & Thibodeau, 1992; Meyer *et al.*, 1990). The *Questionnaire on Generalized Anxiety Disorder* (Roemer, Posa & Borkovec, 1991b), developed by the Penn State group and modified by Keortge and Burns (QGAD-M, 1992), consist of a series of questions that correspond to DSM-III-R criteria (American Psychiatric Association, 1987). Studies have shown that it can identify *S*s within a normal population who would meet DSM-III-R criteria by structured interview with few false negatives but a fairly high rate of false positives of about 30% (Roemer *et al.*, 1991b). We will follow the Penn State terminology in calling *S*s thus identified as "GAD by questionnaire". A study of the properties of a French translation of the QGAD-M showed adequate reliability (Doucet, Lachance, Freeston, Ladouceur & Blais, 1993; Lachance, Doucet, Freeston & Ladouceur, 1993).

Why worry? A pool of face-valid items was written based on the authors' clinical experience with worriers and GAD patients, items formulated by the Penn State group (Roemer *et al.*, 1991b), as well as reasons based on current accounts of worry. These items were scrutinized, corrected, and those judged as face valid by four independent judges were retained. The 30 items that were retained were presented along with two other questionnaires (PSWQ, QGAD-M) to a group of 108 students in an introductory psychology class. The sample was divided into three groups according to whether they met DSM-III-R criteria for GAD based on the QGAD-M. The cognitive criterion required that *S*s indicate that (1) they worry excessively, (2) they worried about at least two things, and (3) worried more than one day out of two for the last six months. The somatic criteria required that *S*s endorse at least six items out of 18 at a level of two or more on a scale from 0 (not at all) to 4 (incapacitating). There were 22% who met both cognitive and somatic GAD criteria by questionnaire, 32% who met somatic criteria only, and 45% who met neither cognitive or somatic criteria. A series of one way ANOVAs with planned contrasts was used to detect which items distinguished the GAD-criteria group from the group that did not meet GAD criteria. Twenty items met this condition and were retained for further analysis.

Intolerance of uncertainty. A pool of 74 items was written to correspond to six themes representing different aspects of intolerance of uncertainty: the emotional and behavioral consequences of being uncertain, how being uncertain reflects on a person's character, expectations that the future be predictable, frustration when it is not, attempts to control the future, and all-or-nothing responses in uncertain situations. The items were collated, redundant items were eliminated and the remaining items were scrutinized, corrected, and judged for their pertinence on a three-point scale. Items that were considered relevant or highly relevant by a majority of the authors were retained.

The 44 items that were retained were presented along with two other questionnaires to a group of 110 students in an introductory psychology class. The items were rated on a five-point Likert scale varying from 1, *Not at all representative*, to 5, *Completely representative*. The sample was divided into three groups according to whether they met DSM-III-R criteria for GAD based on the QGAD-M. There were 17% who met both cognitive and somatic GAD criteria by questionnaire, 49% who met somatic criteria only, and 36% who met neither cognitive or somatic criteria. A series of one way ANOVAs with planned contrasts was used to detect which items distinguished the GAD-criteria groups from the no GAD-criteria group. Twenty-three items met this criteria, a further four showed moderately high correlations with the PSWQ. These items were retained for further analysis.

Table 1. Means and standard deviations for the index sample

	QGAD-M Criteria Groups					
	None		Somatic		Somatic + Cognitive	
			Uncertainty			
n	39		53		18	
Uncertainty*	43.8	10.8	51.1	14.9	63.3	14.8
PSWQ*	39.3	9.0	47.8	9.8	57.3	12.4
QGAD-M						
Worry interference†	2.9	1.4	3.7	1.7	5.5	1.0
Somatic symptoms‡	2.8	1.6	8.6	2.5	9.8	3.5
			Why Worry?			
n	49		35		24	
Why Worry?*	30.4	6.9	39.4	12.2	46.2	17.7
PSWQ*	37.3	7.6	48.9	10.0	54.9	9.9
QGAD-M						
Worry interference*	2.4	1.4	3.9	1.4	5.6	1.3
Somatic symptoms‡	2.9	1.7	8.9	2.2	9.7	3.0

*Somatic + Cognitive > Somatic > None.
†Somatic + Cognitive > Somatic, None.
‡Somatic + Cognitive, Somatic > None.

Results

Why worry? Internal consistency for the retained items was high (0.91). The Measure of Sampling Adequacy for the intercorrelation matrix was 0.88 suggesting that factor analysis was appropriate. Exploratory factor analysis suggested a one factor structure based on the scree plot and the amount of variance explained by the first factor (69%). A two factor solution was also interpretable but there were several complex items with several second factor items also loading on the first factor.

An analysis of variance showed that the groups differed significantly [F (2, 105) = 15.8, $P < 0.0001$] and contrasts indicated that the GAD cognitive and somatic criteria group scored significantly higher than the group meeting no criteria [F (1, 105) = 29.2, $P < 0.0001$] and the somatic criteria only group [F (1, 105) = 4.8, $P < 0.05$] (Table 1).

Intolerance of uncertainty. Internal consistency for the retained items was high (0.91). The Measure of Sampling Adequacy for the intercorrelation matrix was 0.80 suggesting that factor analysis was appropriate. Exploratory factor analysis suggested a three-factor structure based on the scree plot, mineigen rule, and variance explained (76%). There were no hyperplane items so all were retained for study on the validation sample. The total score was calculated for the 27 items and the three groups used to select the items were compared. An analysis of variance showed that the groups differed significantly [F (2, 107) = 12.8, $P < 0.0001$] and contrasts indicated that the GAD group (cognitive and somatic criteria) scored significantly higher than the no criteria [F (2, 107) = 28.5, $P < 0.0001$] and somatic criteria groups [F (2, 107) = 9.3, $P < 0.005$] (Table 1).

Discussion

Study one describes the development of two face-valid self-report scales. The method used to construct the two scales was identical and aims to build validity into the scales at each step of the process. First, item pools were developed for each construct and each item was then rated against the construct definition in order to ensure the face-validity of the items. As predicted it was possible to identify items for both constructs that distinguished between GAD and non-GAD by questionnaire *Ss*. The items that distinguished between the groups were retained. Thus an empirical selection criterion was used to obtain items that covary with worry phenomena rather than using an item selection strategy that maximizes internal consistency. Note that a high rate of false positives in the GAD by questionnaire group would probably have the result of minimizing differences between the groups because some of them would not be pathological worriers. Thus, the results become quite conservative as far as between group differences are concerned. Internal consistency was excellent in both cases. As may be expected, the total scale distinguished between the three groups used to select the items. Thus, both instruments show levels of reliability and criterion-related validity with the index sample that indicate further use is appropriate.

EXPERIMENT TWO

This study uses the self-report scales developed in study one to examine the relationships between the reasons why a person worries and intolerance of uncertainty on the one hand, and measures of worry, anxiety, and depression on the other. It was predicted that both questionnaires as well as measures of worry, anxiety, and depression would distinguish a group meeting GAD criteria by questionnaire from groups not meeting GAD criteria. Likewise it was predicted that Why Worry? and Intolerance of Uncertainty would be correlated with measures of worry, and to a lesser extent, with measures of somatic anxiety and depression which covary with worry (Butler & Booth, 1991; Mathews, 1990). To show that the correlations between worry and the two new scales are not due solely to common variance with general negative affect (Smith & Allred, 1986), it is important to show that a significant proportion of the variance is explained once measures of negative affect are partialled out. Thus, it was predicted that the relation between worry and the two new instruments would remain once somatic anxiety and depression symptoms were partialled out. Finally, the factor structure was studied to understand the nature of the constructs measured.

Method

Subjects and procedure. The *S*s were recruited in an introductory psychology class ($N = 154$). There were 45 men and 109 women. The mean age was 23.0 (SD = 5.7). Participation was voluntary and all *S*s signed a separate informed consent form. Each *S* received the two questionnaires developed above, three questionnaires measuring worry, two questionnaires measuring anxiety and depressive symptoms, and an experimental questionnaire on intrusive thoughts that is not discussed here. The questionnaires were presented in random order. The worry questionnaires were the *Penn State Worry Questionnaire*, the *Questionnaire on Generalized Anxiety Disorder*, and the *Worry Domains Questionnaire* [WDQ (Tallis, Eysenck & Mathews, 1992)]. The WDQ is a 30-item questionnaire measuring the tendency to worry about six different themes, each represented by five questions. Studies on the French adaptation show excellent internal consistency, good test–retest reliability, and preliminary evidence of validity (Dugas *et al.*, in press). The *Beck Anxiety Inventory* [BAI (Beck, Epstein, Brown & Steer, 1988); translation (Freeston, Ladouceur, Gagnon, Thibodeau & Rhéaume, 1994)] is a 21-item checklist of anxiety symptoms that has good psychometric properties. The abridged 13-item version of the *Beck Depression Inventory* [BDI (Beck, Rush, Shaw & Emery, 1979); translation (Bourque & Beaudette, 1982)] assesses the principal depressive symptoms and has proven psychometric properties.

Results

The internal consistency was 0.87 for Why Worry? and 0.91 for Intolerance of Uncertainty. Both are excellent. Preliminary *t*-tests were conducted to see whether gender differences existed on any measure. Although there was a tendency for women to score higher on the Penn State Worry Questionnaire, Worry Domains Questionnaire, Beck Depression Inventory, and QGAD-M somatic symptoms, no differences remained significant once a Bonferroni correction was applied.

Analyses of variance were conducted on all questionnaire measures using the same group formation used in study one. There were 68 *S*s who did not meet any GAD criteria (44%), 53 (35%) who met somatic criteria only, and 32 (21%) who met both somatic and cognitive criteria (Table 2). Significant group effects were observed for all measures: Why Worry [$F(2, 151) = 25.7, P < 0.0001$]; Intolerance of Uncertainty [$F(2, 151) = 13.6, P < 0.0001$], PSWQ [$F(2, 151) = 23.8, P < 0.0001$], QGAD-M worry interference [$F(2, 151) = 29.3, P < 0.0001$] and somatic symptoms [$F(2, 151) = 125.4, P < 0.0001$], WDQ [$F(2, 151) = 27.1, P < 0.0001$], BAI [$F(2, 151) = 48.4, P < 0.0001$] and BDI [$F(2, 151) = 16.9, P < 0.0001$]. All measures except the Worry Domains Questionnaire significantly distinguished the three groups. For the WDQ, the GAD by questionnaire and somatic criteria group scored significantly higher than the no criteria group. It should be noted that the WDQ is a measure of normal rather than pathological worry (Davey, 1993) and confounds the breadth of worries across six domains with the intensity of the worries and thus may lack sensitivity and/or specificity at the top end of the range.

Correlation coefficients were calculated between the two new scales and the other questionnaire measures (Table 3). Correlations were between 0.42 and 0.58 for Why Worry? and between 0.52 and

Table 2. Means and standard deviations for the validation sample

	QGAD-M Criteria Groups					
	None		Somatic		Somatic + Cognitive	
n	68		53		32	
Why Worry*	32.8	7.9	38.2	9.7	43.3	7.9
Uncertainty*	44.3	10.5	54.6	11.5	63.3	18.3
PSWQ*	38.7	9.2	47.2	9.7	51.8	10.4
QGAD-M						
Worry interference*	2.6	1.4	3.9	1.4	4.8	1.5
Somatic symptoms*	2.8	1.9	8.8	2.6	10.2	3.0
Worry domains†	23.9	15.1	40.1	16.3	47.4	20.4
Beck anxiety*	5.0	3.4	11.5	6.4	17.4	8.5
Beck depression*	3.1	3.2	5.8	3.5	8.4	6.9

*Somatic + Cognitive > Somatic > None.
†Somatic + Cognitive, Somatic > None.

Table 3. Zero-order correlations between questionnaires

	Why Worry	Uncertainty
PSWQ	0.58	0.63
QGAD-M		
Worry interference	0.47	0.53
Somatic symptoms	0.45	0.56
Worry domains	0.56	0.57
Beck anxiety	0.55	0.57
Beck depression	0.42	0.52
Uncertainty	0.60	—

Note: All correlations significant at $P < 0.0001$.

0.63 for Intolerance of Uncertainty. As predicted, the highest correlations were observed with the worry measures, especially with the PSWQ which measures the extent of worry. However, these are all interrelated constructs: worry, anxious and depressive symptoms normally occur together in GAD patients and people suffering from chronic worry (see Barlow & Di Nardo, 1991; Butler & Booth, 1991). Note also that there is a substantial correlation between the two new questionnaires that accounts for a 36% overlap in variance.

It is important to show that the new questionnaires account for some unique variance in worry scores and that this contribution is not due to shared variance with general negative affect. Therefore a series of partial correlation analyses were conducted, first partialling out each of the two new questionnaires in turn and then partialling out the BAI and BDI scores (Table 4). All correlations between the two new questionnaires and the Worry Domains Questionnaire and the Penn State Worry Questionnaire remained significant and accounted for between 7 and 12% of the variance once either the other questionnaire or mood state was partialled out. Note that the WDQ and the PSWQ, the first measuring the breadth of worry across six domains and the second measuring the tendency to worry excessively, were correlated at 0.57 showing that different aspects of worry were measured (see Davey, 1993; Dugas *et al.*, in press). These results show that although related, the two new constructs have unique predictive power and account for appreciable variance in different measures of worry.

Separate factor analyses were conducted on the intercorrelation matrices for both questionnaires.

Table 4. Partial correlations between questionnaires

	Penn State	Worry domains
Why Worry?		
Uncertainty partialled	0.33	0.33
Mood partialled	0.35	0.32
Uncertainty		
Why Worry? partialled	0.45	0.35
Mood partialled	0.38	0.26

Note: All correlations significant at $P < 0.006$.

Table 5. Factor structure for Why Worry?

No.	Item	I	II
6.	I worry because if the worst happens, I would feel guilty if I hadn't worried	0.68	0.35
10.	If I don't worry and the worst happens, it would be my fault	0.66	
19.	Even if I know that it's not true, I feel that worrying helps to decrease the likelihood that the worst will happen	0.65	
4.	I worry because I am accustomed to worrying	0.63	
15.	I worry in order to avoid disappointment	0.61	
14.	I worry because if the worst happens, I wouldn't be able to cope	0.58	
17.	I worry about lots of little things so I won't think about more important things	0.57	
12.	When I worry, I think that life seems much easier for others than for me	0.56	
1.	When I worry, I feel that I am the only one to have difficulties	0.51	
2.	Worrying about less important things distracts me from more emotional subjects that I don't want to think about	0.47	
7.	I worry to try to protect the world	0.34	
5.	I worry because I was taught to always expect the worst	0.33	
8.	If I worry I can find a better way to do things		0.74
20.	If I worry less, I have less chance of finding a better solution		0.56
18.	By worrying, I can stop bad things from happening		0.54
13.	I worry to try to have better control over my life		0.52
9.	I worry to try to better protect myself	0.37	0.49
3.	If I worry, I can find a better way to be as a person		0.46
16.	When I worry, I tell myself that there must always be a solution to every problem		0.45
11.	I worry about the past in order to learn from my mistakes		0.35

$N = 151$.

For Why Worry?, the Kaiser Measure of Sampling Adequacy was 0.81. The Scree test and mineigen criteria both indicated a two factor structure. After rotation, there were 10 items loading at 0.40 or greater on the first factor and seven on the second. Three items loaded between 0.30 and 0.40, two on the first factor and one on the second. There were no complex or hyperplane items. The first factor contained items related to the idea that worry can prevent or minimize negative outcomes. The second factor contained items related to the idea that worry is a positive action for finding a solution.

For Intolerance of Uncertainty, the Kaiser Measure of Sampling Adequacy was 0.89. The Scree test indicated a five-factor structure. After rotation, there was one hyperplane item and four complex items. Factor 1 consisted of nine items loading at 0.40 or more that represented the idea that uncertainty is unacceptable and should be avoided. Factor 2 consisted of nine items which refer to the idea that being uncertain reflects badly on a person. Next, Factor 3 consisted of four items about frustration related to uncertainty. Factor 4 consisted of four items suggesting that uncertainty causes stress. Finally, Factor 5 consisted of three items stating that uncertainty prevents action.

Discussion

The results confirm the predictions. Both new constructs distinguished between groups of non-clinical *Ss* who, based on their answers to questionnaires, met respectively both cognitive and somatic criteria for GAD, somatic criteria only, and neither cognitive nor somatic criteria. As expected, the GAD by questionnaire group scored higher than the other groups whereas the somatic criteria group scored higher than the no-criteria group. Although the somatic criteria group do not report worrying sufficiently to meet GAD criteria, they do worry more than the no-criteria group as evidenced by the scores on the PSWQ, WDQ, and QGAD-M interference score. Thus, it is not surprising that they also score higher on the two new questionnaires than the no-criteria group, since they are generally anxious rather than being worriers. These results then support the criterion related (known groups) validity.

Table 6. Factor structure for intolerance of uncertainty

No.	Item	I	II	III	IV	V
21.	I should be able to organize everything in advance	0.68				
10.	One should always look ahead so as to avoid surprises	0.64				
20.	The smallest doubt can stop me from acting	0.62				0.41
19.	I can't stand being taken by surprise	0.57				
7.	Unforeseen events upset me greatly	0.55				
18.	I always want to know what the future has in store for me	0.52			0.34	
11.	A small unforeseen event can spoil everything, even with the best of planning	0.49				
27.	I can't stand being undecided about my future	0.44				
8.	It frustrates me not having all the information I need	0.43				
25.	I must get away from all uncertain situations	0.33	0.33			
2.	Being uncertain means that a person is disorganized		0.64			
13.	Being uncertain means that I am not first rate		0.61			
14.	When I am uncertain, I can't go forward		0.60			
9.	Uncertainty keeps me from living a full life		0.57			
15.	When I am uncertain I can't function very well	0.35	0.53			
3.	Uncertainty makes life intolerable		0.49			
22.	Being uncertain means that I lack confidence		0.44			0.32
17.	Uncertainty makes me vulnerable, unhappy, or sad		0.43	0.37	0.33	
23.	I think its unfair that other people seem sure about their future			0.71		
16.	Unlike me, others always seem to know where they are going with their lives			0.64		
4.	Its unfair not having any guarantees in life			0.47		
26.	The ambiguities in life stress me	0.37		0.41	0.41	0.31
5.	My mind can't be relaxed if I don't know what will happen tomorrow		0.32		0.45	
6.	Uncertainty makes me uneasy, anxious, or stressed		0.43		0.44	
24.	Uncertainty keeps me from sleeping soundly			0.35	0.42	
12.	When its time to act, uncertainty paralyses me	0.34				0.57
1.	Uncertainty stops me from having a firm opinion					0.56

$N = 151$.

The correlation matrix showed that both measures were most strongly correlated with measures of worry. This supports the convergent validity for both instruments. The correlations with measures of somatic anxiety were also quite strong, but this is not surprising because worry rarely occurs without some level of somatic activation. The correlations with depressive symptoms are also relatively high but depressed mood and demoralization, the latter referring to fatigue, withdrawal from pleasant activities, and loss of confidence and self-esteem are typically associated with GAD and chronic anxiety (e.g. Butler & Booth, 1991; Rapee; 1991). However, the partial correlations which control for the shared variance with depressed and anxious symptoms showed that the relationship between worry and the two new questionnaires goes beyond a link to negative affect associated with worry. Thus, the partial correlations provide support for the questionnaires' discriminant validity. Finally, the partial correlations between worry and the new scales when controlling for each in turn support the idea that both questionnaires measure separate constructs related to worry. Results also show that both scales have excellent internal consistency.

The factor analyses will be discussed separately. First, the two factors identified for Why Worry? reflect two types of reasons that worriers endorse. The first factor includes several different types of belief. First, *S*s seem aware of the role of worry as cognitive avoidance when they endorse statements such as "Worrying about less important things distracts me from more emotional subjects that I do not want to think about" (item 2, see also item 26). Likewise, worrying is perceived, even in the face of appropriate insight, as a way of avoiding negative outcomes, that is, decreasing uncertainty: "Even if I know that its not true, I have the impression that worrying can help decrease the chance that the worst will happen" (item 19). The consequences of negative outcomes can also be avoided when worry is perceived as a way of avoiding disappointment (item 15), guilt (6), or self-blame (item 10) if or when the worst happens. Next, there are beliefs that see worry as inevitable when unable to cope (item 14) or is simply the normal course of events (item 4). Finally, two beliefs about worrying reflect the idea that the person is the only one to experience problems (items 1 and 12).

The second factor suggests that worriers believe that worrying has positive effects such as finding a better way (items 3 and 8), increasing control (items 9, 13 and 18), and finding solutions (items 16 and 20). If worriers hold one or other of these types of belief, it is not surprising that they would continue to worry, especially when reinforced by the non-occurrence of the feared event (Mathews, 1990) or by the times that worrying did in fact appear to generate an effective solution. In the last case it does not mean that worry was essential to finding a solution, but even if worry is generally inefficient, enough time and energy worrying can sometimes produce or coincide with solutions thus, by confirmatory bias, reinforce the idea that worrying is a positive action.

For the Intolerance of Uncertainty questionnaire, the five factors identified cover a wide range of reactions as was originally intended. There are behavioral attempts to control the future and avoid uncertainty, inhibition of action, emotional reactions such as frustration and stress, and cognitive interpretations that being uncertain reflects badly on a person. No subscales are proposed at this stage: the factor analysis serves to show that the items covary in a meaningful way. The high internal consistency and the difference between the eigenvalues for the first and subsequent factors suggest that despite the emergence of interpretable factors a single summary score is appropriate. Other studies will be needed to identify the origin of these reactions but clinical experience would suggest that some form of perfectionism is likely to be involved.

GENERAL DISCUSSION

The development and initial validation of two complementary questionnaires for studying worry show that both have excellent internal consistency and demonstrate evidence of criterion, convergent, discriminant, and factor validity. These questionnaires measure constructs that are postulated as playing different roles in the development and maintenance of worry. Intolerance of uncertainty as measured here is conceptualized as the manifestation of a basic dysfunctional schema in that it guides information processing and contributes to the development and maintenance of worry through both direct and indirect effects. Direct effects result from biased processing which lead to faulty appraisals of threat and coping. Indirect effects are related to the negative mood generated as a result of biased processing and can have various cognitive, behavioral, and emotional consequences. Thus, faced with ambiguous situations, the uncertainty schema will be activated and could lead to the perception of difficulties where problems do not really exist, leading to non-reality based worries. When problems exist, uncertainty may lead to inefficient initial reactions to the problems. As the person attempts to mobilize problem-solving resources, a variety of reactions may impede effective problem solving, corresponding largely to the orientation component of problem solving.

We will speculate here on the different ways that intolerance of uncertainty could contribute to poor orientation towards life problems and provide examples from the literature. First, the emotional state engendered by stress and frustration when faced with an ambiguous situation could cause cognitive interference and decrease the processing resources available (e.g. Mathews, 1990), decrease confidence in problem solving skills (Davey *et al.*, 1992; Dugas *et al.*, in press), and increase self-focused attention and thus activate other dysfunctional schemas (e.g. Letarte, Freeston, Rhéaume & Ladouceur, submitted). Second, attributing certain negative personal characteristics to being uncertain will lead to self-devalorization and demoralization (see Butler & Booth, 1991) and to task

irrelevant thoughts that have been associated with performance deficits on a number of cognitive tasks (e.g. Sarason, Sarason, Keefe, Hayes & Sherin, 1986). Finally, lacking confidence as to knowing which course of action is the best can lead either to premature or impulsive reactions (e.g. Furnham, 1994) or to behavioral inhibition such as avoidance coping (Davey, 1993), rumination (Wood, Saltzberg, Neale, Stone & Rachmiel, 1990), and indecision (e.g. Tallis *et al.*, 1991a).

On the other hand, the beliefs expressed in Why Worry? can contribute to people using worry as a preferential way of dealing with situations despite the negative consequences of worrying. First, worrying gives the person a sense of control if it is believed that worrying can prevent negative outcomes from happening or minimize the effects if or when the event does happen. Minimizing effects refers to decreased guilt, avoiding disappointment, or not worrying about things that are even worse. Second, the beliefs that worry is positive are based on the idea that worrying can lead to finding a better way, increasing control, and finding solutions. The two types of beliefs identified here will be reinforced differentially. The beliefs that worry can in some way decrease the possibility and consequences of negative outcomes will of course be reinforced negatively by the non-occurrence of the feared outcome. On the other hand, the belief that worry has merit and is effective for solving problems will be intermittently reinforced by occasional perceived successes. This can occur either by the problem resolving itself and attributing its resolution to worry, or, due to the time and cognitive effort involved, some solutions may in fact be generated. However, the solution may not maximize advantages and minimize costs (see D'Zurilla, 1986), and the perceived success may in fact be due to a decrease in uncertainty and its associated negative emotional state rather than optimal solutions.

Thus, non-clinical worriers endorse a variety of beliefs showing worry is seen as having some power over negative events or the consequences of the events, and also as an effective option for increasing control and problem solving. The beliefs may go some way to explaining why worriers continue to worry even though it is a negative experience associated with a stream of negative thoughts and images, and unpleasant affect. The illusion of control is very powerful, subject to both negative and intermittent positive reinforcement, leading to a confirmatory bias that would be difficult to modify without using a different heuristic to generate alternative explanations.

The correlational nature of these studies does not allow the question of causality to be assessed. Intolerance of uncertainty may be an effect of worry or an epiphenomenon and the reasons may be *post hoc* rationalizations that have no independent validity. In the first case a number of different strategies may be adopted to clarify this issue. For example, a treatment specifically targeting intolerance of uncertainty among worriers would provide a convincing demonstration if worry was reduced. Likewise, manipulating uncertainty in a laboratory situation should lead to increased worry among those highly intolerant of uncertainty. In the second case, the reasons would belong to a class of cognitions analagous to those proposed in models of depression (e.g. Beck *et al.*, 1979) or obsessive-compulsive disorder (e.g. Salkovskis, 1985). The role of such beliefs has been widely discussed over the last decade (see Ingram & Kendall, 1992) but current cognitive models and treatment packages rely heavily on this type of belief. Thus the Why Worry? questionnaire should be considered for its heuristic value in the development of specific models and treatments for GAD. The second study does show that the association between worry and these reasons goes beyond general negative affect and thus satisfies a basic condition that other similar instruments have not always shown (e.g. Smith & Allred, 1986). The ultimate utility of both constructs and their corresponding measures can only be judged when a comprehensive research program has put them to the test in terms of both the theory and treatment of GAD. Such a program is currently underway.

It will be essential to link the questionnaire measure of intolerance of uncertainty to behavioral measures. There are a number of potential tasks available. The classic ambiguity task using lotteries with known and unknown probabilities for the winning outcome represents one paradigm (see Curley, Yates & Abrams, 1986). The probabilistic inference task assessing belief formation and persistence used by Garety, Helmsley and Wessely (1991) is another that may be adapted to assess reactions to uncertainty by changing the probabilities (under more ambiguous conditions, uncertainty intolerant *Ss* should be less confident, more anxious, and either be more impulsive or more conservative in making inferential decisions). Tasks related to decisions about ambiguous visual stimuli already exist such as the Zaslow task using circles and triangles (see Tallis, 1989), the "Lubnicks" (complex intersecting geometrical forms) used by Metzger *et al.* (1990), or the dog–cat series reported by Eysenck (1954). There have already been studies with Obsessive-Compulsive Disorder patients on

the categorization of OCD-relevant and non-threatening situations (Freeston, Letarte, Ladouceur & Rhéaume, 1993; Frost, Lahart, Dugas & Sher, 1988; Persons & Foa, 1984) and this type of task could be reformulated for everyday ambiguous situations relevant to worry. Problem-solving tasks could be used for both neutral and threatening material where dependent variables would involve the number of steps used to seek information, generate solutions, and make and implement decisions. Several of these tasks could manipulate the degree of uncertainty for a given stimulus according to the instruction set where in reality the level of ambiguity provided by the task remains constant. Finally, a state by trait examination of intolerance of uncertainty would be most informative where people scoring high and those scoring low on the questionnaire measure would be expected to react differentially to degrees of uncertainty on some of the tasks described above.

Specific predictions can be made about these constructs and worry. Intolerance of uncertainty should be related to defective problem solving, especially inadequate orientation, elevated evidence requirements, and the tendency to overestimate the risk of negative events. The beliefs that worry can decrease the chance of highly-probable negative events and minimize their outcomes should be related to low problem-solving confidence and a low sense of personal control. However, beliefs that worry is positive may vary according to levels of worry: among low worriers the belief that worry is positive will probably be related to active cognitive coping (information seeking, logical analysis, problem solving) whereas among high worriers, the belief that worry is positive will probably be related to passive coping styles where it becomes a substitute for active coping. The two instruments presented here can contribute to testing these hypotheses and thus contribute to the development of specific treatments for worry.

Acknowledgements—This research was partially supported by grants from les Fonds de Recherche en Santé de Québec and the Medical Research Council of Canada. The study was completed while the first author was supported by the Medical Research Council of Canada. The authors gratefully acknowledge the help of France Blais, Céline Doucet, Stella Lachance, and Martin Provencher in recruiting subjects and entering data.

REFERENCES

American Psychiatric Association (1987). *Diagnostic and statistical manual of mental disorders* (3rd edn, rev.). Washington, DC: American Psychiatric Association.

Anastasi, A. (1986). Evolving concepts of test evaluation. *Annual Review of Psychology, 37*, 1–15.

Anderson, S. M. & Schwartz, A. H. (1992). Intolerance of ambiguity and depression: A cognitive vulnerability factor linked to hopelessness. *Social Cognition, 10*, 271–298.

Barlow, D. H. & Di Nardo, P. A. (1991). The diagnosis of generalized anxiety disorder: Development, current status, and future directions. In Rapee, R. M. & Barlow, D. H. (Eds), *Chronic anxiety: Generalized anxiety disorder and mixed anxiety-depression* (pp. 95–118). New York, London: Guilford Press.

Beck, A. T., Epstein, N., Brown, G. & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology, 56*, 893–897.

Beck, A. T., Rush, A. J., Shaw, B. F. & Emery, G. (1979). *Cognitive therapy of depression*. New York: Guilford.

Borkovec, T. D. & Lyonfields, J. D. (1993). Worry: Thought suppression of emotional processing. In Krohne, H. W. (Ed.), *Vigilance and avoidance* (pp. 100–117). Seattle: Hogrefe & Huber Publishers.

Bourque, P. & Beaudette, D. (1982). Etude psychométrique du questionnaire de dépression de Beck auprès d'un échantillon d'étudiants universitaires francophones. [Psychometric Study of Beck Depression Inventory in a French University student sample.] *Revue canadienne des Sciences de comportement, 14*, 211–218.

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.

Brown, T. A., O'Leary, T. A. & Barlow, D. H. (1993). Generalized Anxiety Disorder. In Barlow, D. H. (Ed.), *Clinical handbook of psychological disorders* (pp. 137–189). New York: Guilford Press.

Butler, G. & Booth, R. G. (1991). Developing psychological treatments for generalized anxiety disorder. In Rapee, R. M. & Barlow, D. H. (Eds), *Chronic anxiety: Generalized anxiety disorder and mixed anxiety-depression*. New York: Guilford Press.

Butler, G. & Mathews, A. (1983). Cognitive processes in anxiety. *Advances in Behavior Research and Therapy, 5*, 51–62.

Butler, G. & Mathews, A. (1987). Anticipatory anxiety and risk perception. *Cognitive Therapy and Research, 11*, 551–565.

Curley, S. P., Yates, J. F. & Abrams, R. A. (1986). Psychological sources of ambiguity avoidance. *Organizational Behavior and Human Decision Processes, 38*, 230–256.

D'Zurilla, T. J. (1986). *Problem-solving therapy: A social competence approach to clinical intervention*. New York: Springer.

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

Davey, G. C. L., Hampton, J., Farrell, J. & Davidson, S. (1992). Some characteristics of worrying: Evidence for worrying and anxiety as separate constructs. *Personality and Individual Differences, 13*, 133–147.

Doucet, C., Lachance, S., Freeston, M. H., Ladouceur, R. & Blais, F. (1993, November). Stabilité temporelle des thèmes d'inquiétudes. [Stability of worry topics over time.] *Communication presented at the XVIth Congress of the Société Québécoise de la Recherche en Psychologie*, Québec.

Dugas, M. J., Freeston, M. H., Doucet, C., Lachance, S. & Ladouceur, R. (in press) Structured versus free-recall measures: Effect on report of worry themes. *Personality and Individual Differences*.

Dugas, M. J., Letarte, H., Rhéaume, J., Freeston, M. H. & Ladouceur, R. (In press). Worry and problem-solving: Evidence of a specific relationship. *Cognitive Therapy and Research*.

Eysenck, H. (1954). *The psychology of politics*. London: Routledge.

Freeston, M. H., Dugas, M. J. & Ladouceur, R. (submitted) *Images, thoughts, worry, and anxiety*. Manuscript submitted for publication.

Freeston, M. H., Ladouceur, R., Gagnon, F., Thibodeau, N. & Rhéaume, J. (1994). The Beck Anxiety Inventory: Psychometric properties of a French translation. *Encéphale, XX*, 47–55.

Freeston, M. H., Letarte, H., Ladouceur, R. & Rhéaume, J. (1993). Category formation in OCD. I. Latency, number and frequency. *Canadian Psychology, 34*, 240.

Frost, R. O., Lahart, C. M., Dugas, K. M. & Sher, K. J. (1988). Information processing among non-clinical compulsives. *Behaviour Research and Therapy, 26*, 275–277.

Furnham, A. (1994). A content, correlational and factor analytic study of four tolerance of ambiguity questionnaires. *Personality and Individual Differences, 16*, 403–410.

Garety, P. A., Helmsley, D. R. & Wessely, S. (1991). Reasoning in deluded schizophrenic and paranoid patients: Biases in performance on a probabilistic interference task. *Journal of Nervous and Mental Disease, 179*, 194–201.

Ingram, R. E. & Kendall, P. C. (1992). Cognitive vulnerability to psychological dysfunction [Special issue]. *Cognitive Therapy and Research, 16*.

Keortge, S. & Burns, G. L. (1992, November). Relation between worry, generalized anxiety disorder, and obsessive-compulsive disorder. *Paper presented at the 26th Annual Meeting of the Association for the Advancement of Behavior Therapy*, Boston, MA.

Krohne, H. W. (1989). The concept of coping modes: Relating cognitive person variables to actual coping behavior. *Advances in Behaviour Research and Therapy, 11*, 235–248.

Krohne, H. W. (1993). Vigilance and cognitive avoidance as concepts in coping research. In Krohne, H. W. (Ed.) *Attention and avoidance strategies in coping with aversiveness*. Seattle, MA: Hogrefe & Huber.

Lachance, S., Doucet, C., Freeston, M. H. & Ladouceur, R. (1993, November). Thèmes d'inquiétudes par questionnaire structuré et par rappel libre. [Worry topics by structured questionnaire and free recall.] *Communication presented at the XVIth Congress of the Société Québécoise de la Recherche en Psychologie*, Québec.

Ladouceur, R., Freeston, M. H., Dumont, J., Letarte, H., Rhéaume, J., Gagnon, F. & Thibodeau, N. (1992). Penn State Worry Questionnaire: Validity and reliability of a French translation. *Canadian Psychology, 33*, 236.

Letarte, H., Freeston, M. H., Rhéaume, J. & Ladouceur, R. (submitted). *Worry and self-focused attention*. Submitted for publication.

Macleod, A. K., Williams, M. G. & Bekerian, D. A. (1991). Worry is reasonable: The role of pessimism about future personal events. *Journal of Abnormal Psychology, 100*, 478–486.

Mathews, A. (1990). Why worry? The cognitive function of anxiety. *Behaviour Research and Therapy, 28*, 455–468.

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*, 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, 6*, 487–496.

Persons, J. B. & Foa, E. B. (1984). Processing of fearful and neutral information by obsessive-compulsives. *Behaviour Research and Therapy, 22*, 259–265.

Rapee, R. M. (1991). Generalized anxiety disorder: A review of clinical features and theoretical concepts. *Clinical Psychology Review, 11*, 419–440.

Roemer, L., Borkovec, M., Posa, S. & Lyonfields, J. (1991a, November). Generalized anxiety disorder in an analogue population: The role of past trauma. *Paper presented at the 25th Annual Convention of the Association for the Advancement of Behavior Therapy*, New York.

Roemer, L., Posa, S. & Borkovec, T. D. (1991b, November). A self-report measure of generalized anxiety disorder. *Paper presented at the 25th Annual Convention of the Association for the Advancement of Behavior Therapy*, New York.

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

Salkovskis, P. M. (1985). Obsessional–compulsive problems: A cognitive-behavioural analysis. *Behaviour Research and Therapy, 23*, 571–583.

Sarason, I. G., Sarason, B. R., Keefe, D. E., Hayes, B. E. & Sherin, E. N. (1986). Cognitive interference: Situational determinants and traitlike characteristics. *Journal of Personality and Social Psychology, 51*, 215–226.

Smith, T. W. & Allred, K. D. (1986). Rationality revisited: a reassessment of the empirical support for the rational-emotive model. In Kendall, P. C. (Ed.), *Advances in Cognitive-Behavioral Research and Therapy*, (Vol. 1, pp. 63–87). Orlando, FL: Academic.

Tallis, F. (1989). Worry: A cognitive analysis. Unpublished doctoral dissertation, University of London.

Tallis, F., Eysenck, M. & Mathews, A. (1991a). The role of temporal perspective and ego-relevance in the activation of worry structures. *Personality and Individual Differences, 12*, 909–915.

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

Tallis, F., Eysenck, M. & Mathews, A. (1992). A questionnaire for the measurement of nonpathological worry. *Personality and Individual Differences, 13*, 161–168.

Vasey, M. W. & Borkovec, T. D. (1992). A catastrophizing assessment of worrisome thoughts. *Cognitive Therapy and Research, 16*, 505–520.

Wood, J. V., Saltzberg, J. A., Neale, J. M., Stone, A. A. & Rachmiel, T. B. (1990). Self-focused attention, coping responses, and distressed mood in everyday life. *Journal of Personality and Social Psychology, 58*, 1027–1036.