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Should excessive worry be required for a diagnosis of generalized anxiety disorder? Results from the US National Comorbidity Survey Replication

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ABSTRACT

Background. Excessive worry is required by DSM-IV, but not ICD-10, for a diagnosis of generalized anxiety disorder (GAD). No large-scale epidemiological study has ever examined the implications of this requirement for estimates of prevalence, severity, or correlates of GAD.

Method. Data were analyzed from the US National Comorbidity Survey Replication, a nationally representative, face-to-face survey of adults in the USA household population that was fielded in 2001–2003. DSM-IV GAD was assessed with Version 3.0 of the WHO Composite International Diagnostic Interview. Non-excessive worriers meeting all other DSM-IV criteria for GAD were compared with respondents who met full GAD criteria as well as with other survey respondents to consider the implications of removing the excessiveness requirement.

Results. The estimated lifetime prevalence of GAD increases by ~40% when the excessiveness requirement is removed. Excessive GAD begins earlier in life, has a more chronic course, and is associated with greater symptom severity and psychiatric co-morbidity than non-excessive GAD. However, non-excessive cases nonetheless evidence substantial persistence and impairment of GAD, high rates of treatment-seeking, and significantly elevated co-morbidity compared with respondents without GAD. Non-excessive cases also have sociodemographic characteristics and familial aggregation of GAD comparable to excessive cases.

Conclusions. Individuals who meet all criteria for GAD other than excessiveness have a somewhat milder presentation than those with excessive worry, yet resemble excessive worriers in a number of important ways. These findings challenge the validity of the excessiveness requirement and highlight the need for further research into the optimal definition of GAD.

INTRODUCTION

Ever since generalized anxiety disorder (GAD) was first defined as a disorder of pathological worry in the revised third edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III-R; APA, 1987), researchers have debated the features that make worry pathological and that should be required for a diagnosis of GAD (Borkovec *et al*. 1991; Weems *et al*. 2000). The requirement that worry be excessive was one of few worry features introduced in DSM-III-R that was retained in DSM-IV (APA, 1994). However, in contrast to the close scrutiny received by other GAD symptoms such

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as uncontrollable worry (Craske *et al.* 1989; Borkovec *et al.* 1991) and somatic associated symptoms (Marten *et al.* 1993; Brown *et al.* 1995), very little has been written about the excessiveness criterion. This lack of attention is surprising given that the criterion has repeatedly been identified as a controversial aspect of the GAD diagnosis (Rickels & Rynn, 2001; Kessler & Wittchen, 2002) and given that ICD-10 (*International Classification of Diseases*, 10th edition; WHO, 1993), unlike DSM-IV, does not require worry to be excessive for GAD to be diagnosed.

The excessiveness criterion is based on a handful of studies that found excessive worry about minor matters to distinguish individuals with GAD from individuals with other anxiety disorders (Craske *et al.* 1989; Sanderson & Barlow, 1990; Roemer *et al.* 1997). The DSM, however, does not give privileged status to minor worries, but more broadly requires excessive worries about multiple events or activities. This broad requirement has been found to be less discriminating than most other symptoms of GAD in distinguishing threshold and subthreshold cases of the disorder (Hoyer *et al.* 2002; Ruscio, 2002; Diefenbach *et al.* 2003). Little else is known about the excessiveness requirement because existing studies of GAD, conducted primarily using DSM-III-R criteria that required worry to be 'unrealistic or excessive,' rarely evaluated the implications of excessiveness separately from those of the later-discarded requirement of unrealistic worry.

Notably, the excessiveness criterion poses many of the same assessment challenges that led to the removal in DSM-IV of the requirement that worry must be 'unrealistic' (Abel & Borkovec, 1995; Barlow & Wincze, 1998). For example, there is considerable confusion over what makes worry 'excessive,' with excessiveness variably defined as worry that is frequent and intense (Hoyer *et al.* 2002), persistent for much of the day (Campbell *et al.* 2003), focused on unimportant things (Bienvenu *et al.* 1998), out of proportion to objective life circumstances (Brown, 1997; Kessler & Wittchen, 2002), or occurring more than the individual wishes or more than others feel is warranted (Roemer *et al.* 2002). There is also uncertainty over who should determine whether worry is excessive, and whose views should take precedence in the common event that the assessor and respondent, or different assessors, disagree (Wittchen *et al.* 1995). Finally, there is the question of what leads individuals to appraise their worry as excessive (Borkovec *et al.* 1991), whether this appraisal corresponds to objective characteristics of the worry experience (Ruscio *et al.* 2003; Ruscio & Borkovec, 2004), and whether the appraisal of excessiveness is influenced by differing cultural standards for describing internal states or for defining worries as excessive (Kessler & Wittchen, 2002). Given these many ambiguities, it is perhaps not surprising that one study of DSM-III-R GAD found excessiveness to be the criterion on which assessors most often disagreed, with its elimination leading to a dramatic rise in inter-rater reliability of diagnosis (Wittchen *et al.* 1995).

In addition to these problems of conceptual confusion which decrease diagnostic reliability, concerns can be raised about the implications of the excessiveness criterion for diagnostic validity. In particular, critics have noted that the excessiveness requirement excludes from the GAD diagnosis individuals who develop clinically significant generalized anxiety in the context of chronic, objectively stressful situations (Kessler & Wittchen, 2002). This is in striking contrast to a diagnosis such as major depression, where there is no requirement that the intensity of sadness or the degree to which interest or pleasure have diminished must be excessive in relation to the objective life circumstances of the individual. Importantly, community epidemiological research has shown that a sizable group of individuals exist who are diagnosed with GAD by ICD-10, but not by DSM-IV, solely because they fail to meet the excessiveness criterion (Slade & Andrews, 2001). At present, little is known about these individuals or their likely impact on estimates of the prevalence, severity, or correlates of GAD. Although a prior study found similar demographic and co-morbidity patterns for GAD and non-GAD groups differing only in their endorsement of excessive or unrealistic worry (Bienvenu *et al.* 1998), no research has yet examined the implications of the excessiveness criterion alone for a broad range of epidemiological variables traditionally used to describe mental disorders and to help evaluate their validity (Robins & Guze, 1970). Such research has taken on renewed importance as work begins on DSM-V and

ICD-11, providing a unique opportunity to inform revision of the GAD criteria in ways that may enhance the validity of the diagnosis.

The current paper evaluates the implications of the GAD excessiveness criterion for estimates of prevalence and correlates based on data from the recently completed US National Comorbidity Survey Replication (NCS-R; Kessler & Merikangas, 2004). Non-excessive worriers meeting all other DSM-IV criteria for GAD were compared with GAD excessive worriers and with other NCS-R respondents to consider the consequences of the excessiveness requirement. Given indications that excessiveness and uncontrollability of worry are highly correlated (Brown *et al*. 2001), we also evaluated the importance of the excessiveness criterion over and above the effect of the requirement that worry be uncontrollable and the effect of other DSM-IV required features of pathological worry.

METHOD

Sample

The NCS-R is a nationally representative survey of the USA household population that was conducted from February 2001 to December 2003 (Kessler & Merikangas, 2004). Participants were aged 18 or older and were selected using a multi-stage clustered area probability sampling design. The response rate was 70·9%. Consistent with the recruitment procedures of the baseline NCS a decade earlier (Kessler *et al*. 1994), participants first received a letter and study fact brochure, then were visited by an interviewer who described the study to them and obtained verbal informed consent before scheduling an interview. Respondents received $50 for their participation.

The interview was carried out in two parts. Part I consisted of the core diagnostic assessment and was administered to all 9282 respondents. Part II consisted of measures assessing correlates of disorders and was administered to 100% of the respondents who met criteria for any disorder in Part I plus a probability subsample of other respondents. The analyses reported here were performed on this Part II sample, which included 5692 respondents. The Part II sample was weighted to adjust for differential probabilities of respondent selection within households as a function of household size, more intense recruitment of difficult-to-recruit respondents, the higher selection probabilities of Part I respondents with a lifetime disorder, and residual variation between sample distributions and population distributions on a range of geographic and sociodemographic variables in the 2000 USA Census. More detailed descriptions of NCS-R sampling design and weighting procedures are presented elsewhere (Kessler *et al*. 2004*b*).

Diagnostic measures

DSM-IV disorders were assessed using Version 3.0 of the WHO Composite International Diagnostic Interview (CIDI 3.0), a fully structured, lay-administered diagnostic interview. DSM-IV diagnostic hierarchy and organic exclusion rules were used in making diagnoses. Blind clinical re-interviews of a probability subsample of NCS-R respondents using the Structured Clinical Interview for DSM-IV (SCID) (First *et al*. 2002) found generally good concordance between SCID and CIDI 3.0 diagnoses (Kessler *et al*. 2005*a*). In particular, CIDI GAD diagnoses were found to have good individual-level concordance with SCID diagnoses (AUC = 0·83) and an acceptable kappa (0·35) in view of the low prevalence of GAD in this sample, with no significant difference in the estimated prevalence of GAD diagnosed by the CIDI and SCID (McNemar $\chi^2_1 = 1{\cdot}7$, $p = 0{\cdot}192$) (Kessler *et al*. 2004*a*). Respondents who met all other criteria for GAD were separated into those defined as having excessive worry and those not having excessive worry based on their responses to the question, 'Do you think your (worry or anxiety) was *ever* excessive or unreasonable or a lot stronger than it should have been?' Importantly, CIDI 3.0 is constructed so that all respondents continue the GAD section regardless of their response to this question, allowing us to compare respondents who meet all DSM-IV GAD criteria except excessiveness with those who meet full GAD criteria.

Other measures

In addition to co-morbid DSM-IV disorders, other correlates of GAD considered here include sociodemographic variables, parental GAD, and functional impairment. The sociodemographic variables include respondent age, sex,

race-ethnicity, education, employment status, and marital status. Parental history of GAD was reported by respondents for their biological father and mother (or the adult male and female who raised them) in response to questions designed to expand the Family History RDC interview (FH-RDC; Andreasen *et al.* 1977) to include GAD (Kendler *et al.* 1997). Functional impairment was assessed in two ways, both focused on 12-month GAD. First, the Sheehan Disability Scales (Leon *et al.* 1997) assessed the degree to which GAD interfered with home management, work, close relationships, and social life during the month in the past year when the respondent's GAD was reported to be most severe. Each domain was rated on a 0–10 scale that was divided into the categories of none (0), mild (1–3), moderate (4–6), and severe (7–10) for analyses. Second, role impairment in the past year was assessed by two variables: (1) days out of role, reflecting the number of days in the past 12 months during which the respondent was 'totally unable' to work or carry out daily activities because of GAD, and (2) role impairment in episode, reflecting the percentage of all days in the GAD episode that were spent out of role.

Analysis methods

The excessive and non-excessive GAD subgroups were compared in terms of prevalence, age of onset, persistence, severity, sociodemographic correlates, co-morbidity, impairment, treatment-seeking, and parental GAD. Age-of-onset curves were estimated using the actuarial method (Halli & Rao, 1992). Z tests were used to compare means on measures of persistence, whereas χ^2 analyses were used to compare the groups on severity. Logistic regression was used to examine associations with sociodemographics, co-morbid disorders, lifetime treatment, and parental history of GAD. To determine whether excessiveness uniquely contributes to the prediction of these variables, over and above other features of worry required for a DSM-IV GAD diagnosis, all analyses yielding statistically significant group differences were re-run controlling for five dichotomous variables representing uncontrollability of worry (two variables), distress associated with worry (one variable), and impairment caused by worry (two variables).

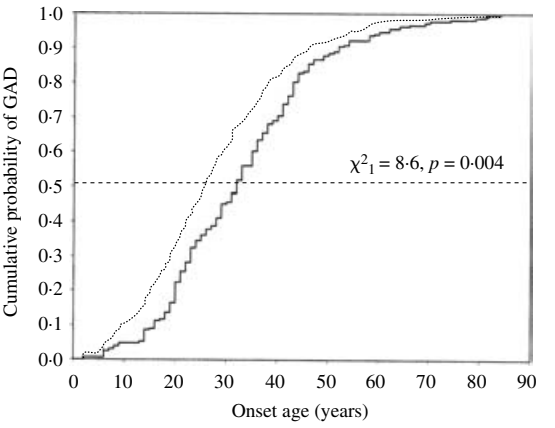

FIG. 1. Cumulative age-of-onset distribution of excessive (·····) and non-excessive (——) worriers meeting all other criteria for lifetime DSM-IV generalized anxiety disorder (GAD).

Standard errors and significance tests were estimated using the Taylor series linearization method (Wolter, 1985) implemented in the SUDAAN (2002) software system to adjust for the fact that the NCS-R sample design included clustering and for the fact that the Part II NCS-R data are weighted. Multivariate significance was estimated in logistic regression analysis using Wald χ^2 tests based on design-corrected coefficient variance–covariance matrices. Statistical significance was evaluated using two-tailed 0·05-level tests.

RESULTS

Prevalence, onset, and course

Broadly defined GAD includes more than twice as many excessive ($n=411$, 70·1%) as non-excessive ($n=172$, 29·9%) cases. When non-excessive cases meeting all other criteria are diagnosed with GAD, the prevalence of the disorder increases by ~40%, with comparable increases in lifetime (from 3·8 to 5·5%), 12-month (from 2·0 to 2·8%), and 1-month (from 1·2 to 1·7%) prevalence estimates.

Although cumulative age-of-onset curves differ significantly for excessive and non-excessive GAD, the two distributions have similar slopes (Fig. 1). The major difference between the two distributions is that excessive GAD begins significantly earlier in life ($M=26{\cdot}5$) than non-excessive GAD ($M=32{\cdot}0$, $z=3{\cdot}6$, $p=0{\cdot}001$). Excessive GAD also has a more persistent

Table 1. *Lifetime co-morbidity (OR)*[a] *of excessive and non-excessive generalized anxiety disorder with other DSM-IV disorders*[b]

	Excessive		Non-excessive		Excessive *v.* non-excessive			
							Adjusted[c]	
	OR	(95% CI)	OR	(95% CI)	χ^2_1	*p*	χ^2_1	*p*
Anxiety disorder								
Agoraphobia (without panic)	7·7*	(4·6–12·7)	0·6	(0·1–4·3)	6·5	0·011	6·2	0·013
Obsessive-compulsive disorder	5·5*	(2·8–11·1)	1·1	(0·1–9·4)	2·3	0·127	2·2	0·139
Panic disorder	9·1*	(5·8–14·3)	3·8*	(2·4–6·1)	11·8	0·001	9·1	0·002
Post-traumatic stress disorder	7·4*	(5·7–9·6)	4·3*	(2·4–7·6)	3·5	0·062	2·4	0·123
Social phobia	7·5*	(5·5–10·1)	2·2*	(1·3–3·6)	18·5	0·000	16·0	0·000
Specific phobia	4·7*	(3·8–5·7)	2·1*	(1·4–3·2)	13·7	0·000	13·1	0·000
Any anxiety disorder	8·1*	(6·3–10·4)	3·7*	(2·6–5·2)	10·9	0·001	9·0	0·003
Mood disorder								
Bipolar I or II disorder	10·1*	(7·5–13·6)	4·3*	(2·3–8·0)	10·7	0·001	8·2	0·004
Dysthymia	15·4*	(10·8–21·9)	9·5*	(6·5–13·9)	6·3	0·012	3·3	0·070
Major depressive disorder	12·7*	(9·9–16·4)	9·3*	(6·4–13·7)	2·5	0·114	0·9	0·345
Any mood disorder	14·4*	(11·2–18·7)	9·8*	(7·2–13·3)	5·2	0·023	2·0	0·159
Substance use disorder								
Alcohol abuse or dependence	3·0*	(2·3–3·9)	2·0*	(1·3–2·9)	2·7	0·101	2·1	0·146
Drug abuse or dependence	3·5*	(2·6–4·8)	1·4	(0·6–2·9)	6·4	0·012	5·9	0·015
Any substance use disorder	3·0*	(2·3–3·9)	1·9*	(1·3–2·7)	3·7	0·055	2·8	0·096
Impulse-control disorder								
Attention deficit hyperactivity disorder	3·7*	(2·4–5·6)	4·1*	(2·0–8·6)	0·1	0·751	0·1	0·705
Conduct disorder	2·9*	(2·0–4·2)	2·8*	(1·2–6·6)	0·0	0·979	0·0	0·992
Intermittent explosive disorder	3·7*	(2·4–5·7)	1·6	(0·7–3·6)	4·0	0·045	3·7	0·054
Oppositional defiant disorder	2·3*	(1·4–3·7)	3·0*	(1·2–7·3)	0·4	0·530	0·5	0·470
Any impulse-control disorder	3·6*	(2·6–5·0)	2·6*	(1·7–4·1)	1·2	0·271	1·0	0·314
Any co-morbid disorder								
Exactly one disorder	0·6*	(0·4–0·9)	1·7*	(1·2–2·5)	24·2	0·000	18·6	0·000
Exactly two disorders	2·3*	(1·6–3·2)	2·9*	(2·0–4·3)	1·1	0·286	1·1	0·297
Three or more disorders	13·5*	(9·9–18·3)	5·1*	(3·8–6·9)	27·5	0·000	18·8	0·000
(*n*)	(411)		(172)					

[a] The odds ratios (ORs) were estimated in logistic regression models with separate dummy variables for excessive and non-excessive GAD predicting a dummy variable for the co-morbid disorder, controlling for age at interview, sex, and race. Respondents in each of the two mutually exclusive GAD subgroups (411 excessive, 172 non-excessive) were compared separately with respondents having no lifetime GAD ($n=4510$).

[b] All disorders were defined using DSM-IV criteria with organic exclusion and diagnostic hierarchy rules. The definition of GAD varied the requirement of excessive worry.

[c] Based on analyses controlling for five dichotomous variables representing uncontrollability, distress, and impairment associated with worry.

* Significant at 0·05 level, two-sided test.

course than non-excessive GAD. Excessive cases experience GAD during more years of their lives ($M=9·8$) than non-excessive cases ($M=7·8$, $z=2·4$, $p=0·022$). Excessive cases also have greater annual persistence of GAD than non-excessive cases, calculated as the number of years with GAD divided by the total years between the first and last episodes (0·6 *v.* 0·5; $z=2·6$, $p=0·011$). These differences remain significant even after uncontrollability, distress, and impairment are controlled (all $z>2·0$, all $p<0·05$). By contrast, there is no difference between the two subgroups in number of months in episode in the past year among 12-month cases (7·9 *v.* 8·1, $z=0·3$, $p=0·784$).

Co-morbidity

A similarly high proportion of excessive (91·8%) and non-excessive (86·5%) GAD cases have at least one co-morbid DSM-IV disorder ($\chi^2_1=2·3$, $p=0·128$). In addition, both excessive and non-excessive GAD have significant lifetime co-morbidity with the vast majority of disorders assessed in the NCS-R after adjusting for respondent age, sex, and race (Table 1). However, excessive GAD has consistently higher

odds ratios (ORs) than non-excessive GAD, significantly so for 8 of the 15 mental disorders assessed. The median OR (inter-quartile range) is 5·5 (3·6–8·4) for excessive GAD compared with 2·8 (1·8–4·2) for non-excessive GAD. Seventy-five per cent of the statistically significant excessive *versus* non-excessive differences in ORs remain significant after worry uncontrollability, distress, and impairment are controlled.

Excessiveness as a marker of disorder severity

The greater chronicity and co-morbidity of excessive than non-excessive GAD suggest that excessiveness might be a generalized severity marker. To test this hypothesis directly, a measure of GAD severity was constructed from a set of 11 nested dichotomous variables representing uncontrollability, distress, and impairment associated with worry and generalized anxiety. These variables were submitted to an item response theory (IRT) analysis and the resulting dimensional score was trichotomized into mild, moderate, and severe categories. A significantly higher percentage of non-excessive (37·3%) than excessive (26·0%; $\chi^2_1 = 6{\cdot}7$, $p = 0{\cdot}010$) cases had mild GAD according to this classification, whereas a significantly higher percentage of excessive (42·7%) than non-excessive (32·7%; $\chi^2_1 = 6{\cdot}7$, $p = 0{\cdot}010$) cases had severe GAD. Notably, although these differences are statistically significant, they are not substantial in substantive terms. Over 60% of non-excessive cases were classified as moderate or severe. Moreover, non-excessive cases were no more likely than excessive cases to report minimally diagnostic levels of uncontrollability, distress, or impairment.

Functional impairment

There is no reliable association between excessiveness and impairment among 12-month cases (Table 2). Of the 12 nested severity responses on the Sheehan Disability Scales, only one (severe interference with close relationships) significantly distinguishes excessive and non-excessive GAD. Furthermore, linear regression analysis found no difference between the GAD subgroups either in days out of role ($t = 0{\cdot}3$, $p = 0{\cdot}565$) or in overall role impairment while in episode ($t = 0{\cdot}6$, $p = 0{\cdot}442$). In an absolute sense, non-excessive cases reported considerable functional impairment, with the vast majority (69·7–84·4%) reporting at least some impairment in household, occupational, interpersonal, or social functioning and the majority (52·2–68·2%) reporting moderate or severe impairment in these domains.

Table 2. *Sheehan Disability Scale scores*[a] *of 12-month cases of excessive and non-excessive DSM-IV generalized anxiety disorder*

	Excessive		Non-excessive		Excessive *v.* non-excessive	
	%	(S.E.)	%	(S.E.)	χ^2_1	*p*
Home management						
Severe	27·9	(3·0)	29·3	(5·8)	0·0	0·824
Severe or Moderate	57·4	(4·2)	57·8	(7·0)	0·0	0·969
Any impairment	78·1	(2·7)	74·0	(6·3)	0·4	0·527
Work						
Severe	28·0	(2·8)	25·7	(5·2)	0·2	0·695
Severe or Moderate	52·1	(3·8)	40·4	(5·6)	2·4	0·119
Any impairment	75·0	(2·5)	69·7	(4·8)	0·9	0·333
Relationships						
Severe	37·2	(3·1)	20·1	(4·7)	7·5	0·006
Severe or Moderate	66·2	(4·1)	52·2	(5·5)	3·6	0·058
Any impairment	85·2	(2·8)	78·4	(5·0)	1·7	0·195
Social life						
Severe	46·6	(3·7)	38·5	(5·5)	1·5	0·227
Severe or Moderate	70·4	(3·6)	68·2	(5·6)	0·1	0·708
Any impairment	86·9	(2·4)	84·4	(4·1)	0·5	0·481

[a] Values represent the proportions of respondents with excessive ($n = 411$) and non-excessive ($n = 172$) GAD reporting severe (score of 7–10), severe or moderate (score of 4–10), or any (score of 1–10) impairment in each of the four SDS domains of functioning.

Treatment-seeking

Excessiveness is not reliably associated with treatment-seeking (Table 3). The odds of any lifetime treatment are comparable across the two subgroups after adjusting for respondent age, sex, and race, with both excessive (85·2%) and non-excessive (80·3%) cases seeking mental health treatment at high rates. Excessiveness predicts utilization of the specialty mental health treatment sector, although this effect is not significant after worry uncontrollability, distress, and impairment are controlled. Notably, excessive (65·5%) and non-excessive (65·1%) cases seek treatment for GAD at nearly identical rates ($\chi^2_1 = 0{\cdot}0$, $p = 0{\cdot}933$).

Table 3. *Lifetime treatment (OR)*[a] *of excessive and non-excessive DSM-IV generalized anxiety disorder*

	Excessive		Non-excessive		Excessive *v.* non-excessive			
							Adjusted[b]	
	OR	(95% CI)	OR	(95% CI)	χ^2_1	*p*	χ^2_1	*p*
Treatment sector								
Mental health specialty[c]	4·8*	(3·6–6·3)	2·6*	(1·8–3·9)	5·6	0·017	3·8	0·050
General medical[d]	4·9*	(3·6–6·7)	3·0*	(2·1–4·4)	3·9	0·050	3·3	0·068
Human services[e]	4·0*	(2·9–5·7)	4·5*	(3·0–6·6)	0·2	0·678	0·2	0·659
CAM[f]	4·5*	(3·4–6·0)	3·3*	(2·2–4·9)	1·8	0·175	1·2	0·280
Any treatment	8·8*	(6·4–12·2)	6·0*	(3·7–9·5)	2·1	0·147	1·6	0·210

[a] The odds ratios (ORs) were estimated in logistic regression models with separate dummy variables for excessive and non-excessive GAD predicting treatment in each sector, controlling for age at interview, sex, and race. Respondents in each of the two mutually exclusive GAD subgroups (411 excessive, 172 non-excessive) were compared separately with respondents having no lifetime GAD ($n=4510$).

[b] Based on analyses controlling for five dichotomous variables representing uncontrollability, distress, and impairment associated with worry.

[c] Includes psychiatrist, psychologist, or other mental health professional in any setting; social worker or counselor in a mental health specialty setting; use of a mental health hotline.

[d] Includes primary care doctor, other general medical doctor, nurse, any other health professional not previously mentioned.

[e] Includes religious or spiritual advisor, social worker or counselor in any setting other than a specialty mental health setting.

[f] Complementary-alternative medicine, including any other type of healer, participation in an internet support group, or participation in a self-help group.

* Significant at 0·05 level, two-sided test.

Sociodemographic correlates

Excessive and non-excessive GAD cases have very similar sociodemographic profiles (Table 4). Both are significantly more prevalent among females than males, less prevalent among non-Hispanic Blacks and Hispanics than other respondents, positively related to years of education, more prevalent among the unemployed than the employed, more prevalent among the previously married than the married, and more prevalent among the married than the never married. Among individuals with broadly defined GAD, excessiveness is not significantly related to sex, race, marital status, educational attainment, or employment status. Excessiveness is related, though, to age, consistent with the age-of-onset differences reported earlier. Importantly, non-excessive cases are far more similar to excessive cases (significantly different on only 1 of 6 sociodemographic variables) than to non-GAD cases (significantly different on 5 of 6 sociodemographic variables).

Parental history of GAD

The association of parental GAD with respondent GAD does not vary as a function of excessiveness. Having at least one parent with a history of GAD is associated with elevated risk for both excessive (OR 4·5) and non-excessive (OR 4·1) GAD, with no significant difference in the ORs across the two subgroups ($\chi^2_1=0·1$, $p=0·744$).

DISCUSSION

Our interpretation of the results reported here must be tempered by the recognition of several study limitations, including the use of fully structured lay interviews, the assessment of excessive worry using a single self-reported item, and the retrospective reporting of lifetime symptoms and course of disorder. These aspects of the study may have reduced our ability to detect reliable differences between excessive and non-excessive subgroups. However, confidence in the assessment of GAD is increased by good concordance of GAD diagnoses based on the fully structured interview used here with independent clinician diagnoses based on blinded SCID reappraisal interviews. It is less clear how well respondents and clinicians agreed in their judgments of excessiveness, although the finding that CIDI GAD diagnoses do not differ significantly from clinical diagnoses in estimated prevalence (Kessler *et al.* 2004*a*) seems to argue against systematic over- or under-reporting of

Table 4. *Associations (OR)[a] of sociodemographic variables with lifetime DSM-IV generalized anxiety disorder (GAD) by excessiveness group*

	No GAD *v.*							
	GAD		Excessive GAD		Non-excessive GAD		Excessive *v.* Non-excessive	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Sex								
Female	1·8*	(1·5–2·2)	1·8*	(1·4–2·2)	1·9*	(1·2–3·1)	0·9	(0·6–1·6)
Male	1·0	(1·0–1·0)	1·0	(1·0–1·0)	1·0	(1·0–1·0)	1·0	(1·0–1·0)
χ^2_1 (*p*)	33·3	(0·000)	32·2	(0·000)	7·2	(0·007)	0·1	(0·782)
Age (years)								
18–29	1·0	(0·7–1·5)	1·3	(0·8–2·1)	0·6	(0·3–1·1)	2·2	(0·9–5·4)
30–44	1·9*	(1·5–2·5)	2·3*	(1·6–3·4)	1·4	(1·0–1·9)	1·7	(1·0–2·9)
45–59	2·2*	(1·6–3·0)	2·3*	(1·5–3·7)	1·9*	(1·2–2·9)	1·2	(0·6–2·4)
60+	1·0	(1·0–1·0)	1·0	(1·0–1·0)	1·0	(1·0–1·0)	1·0	(1·0–1·0)
χ^2_3 (*p*)	79·4	(0·000)	33·0	(0·000)	60·8	(0·000)	9·2	(0·027)
Race								
Hispanic	0·5*	(0·3–0·8)	0·7	(0·4–1·0)	0·3*	(0·1–0·8)	2·4	(0·8–6·7)
Black	0·5*	(0·4–0·7)	0·5*	(0·3–0·8)	0·5*	(0·3–1·0)	1·0	(0·5–2·0)
Other	1·1	(0·7–1·7)	1·2	(0·7–1·8)	0·9	(0·4–2·0)	1·3	(0·6–3·0)
White	1·0	(1·0–1·0)	1·0	(1·0–1·0)	1·0	(1·0–1·0)	1·0	(1·0–1·0)
χ^2_3 (*p*)	17·3	(0·001)	13·4	(0·004)	8·9	(0·031)	3·0	(0·395)
Education (years)								
0–11	0·7*	(0·5–0·9)	0·8	(0·6–1·2)	0·4*	(0·2–0·9)	2·1	(0·9–4·7)
12	0·7*	(0·6–0·9)	0·7*	(0·5–1·0)	0·8	(0·5–1·3)	0·9	(0·5–1·7)
13–15	1·0	(0·7–1·4)	1·0	(0·7–1·5)	1·1	(0·7–1·7)	1·0	(0·6–1·6)
16+	1·0	(1·0–1·0)	1·0	(1·0–1·0)	1·0	(1·0–1·0)	1·0	(1·0–1·0)
χ^2_3 (*p*)	17·6	(0·001)	9·4	(0·024)	9·1	(0·028)	3·6	(0·307)
Employment								
Student	0·3*	(0·1–0·8)	0·3*	(0·1–0·8)	0·5	(0·2–1·7)	0·5	(0·1–2·5)
Homemaker	1·2	(0·8–1·7)	1·2	(0·8–1·8)	1·2	(0·6–2·4)	1·0	(0·5–2·0)
Retired	0·6*	(0·4–1·0)	0·5*	(0·3–0·9)	1·0	(0·7–1·5)	0·5*	(0·3–0·9)
Other	1·6*	(1·1–2·3)	1·6*	(1·0–2·5)	1·5	(0·8–2·8)	1·1	(0·5–2·1)
Working	1·0	(1·0–1·0)	1·0	(1·0–1·0)	1·0	(1·0–1·0)	1·0	(1·0–1·0)
χ^2_4 (*p*)	23·5	(0·000)	24·0	(0·000)	3·8	(0·430)	7·5	(0·111)
Marital status								
Never married	0·8*	(0·6–1·0)	0·9	(0·6–1·1)	0·6*	(0·3–1·0)	1·5	(0·8–2·8)
Previously married	1·6*	(1·3–2·0)	1·6*	(1·2–2·0)	1·7*	(1·3–2·4)	0·9	(0·6–1·3)
Married/cohabitating	1·0	(1·0–1·0)	1·0	(1·0–1·0)	1·0	(1·0–1·0)	1·0	(1·0–1·0)
χ^2_2 (*p*)	34·7	(0·000)	15·5	(0·000)	25·6	(0·000)	2·2	(0·336)

[a] The odds ratios (ORs) were estimated in logistic regression models with each sociodemographic variable predicting each excessiveness group. Respondents with broadly defined GAD ($n=583$), excessive GAD ($n=411$), and non-excessive GAD ($n=172$) were compared in turn with respondents having no lifetime GAD ($n=4510$). Lastly, respondents with excessive GAD ($n=411$) were compared with respondents with non-excessive GAD ($n=172$).

* Significant at 0·05 level, two-sided test.

excessiveness by respondents. Further research will be needed, ideally with a prospective design and more detailed clinician- and self-judgments of worry excessiveness, to better clarify the relation of excessiveness to the characteristics and correlates of GAD.

In addition, we obtained accounts of parental GAD indirectly from respondents rather than directly from their parents. Limited information is available about the validity of these diagnoses, although past research has found that FH-RDC GAD diagnoses are far more common in the parents of GAD-diagnosed than non-diagnosed respondents and that this familial aggregation is relatively specific to GAD and independent of other disorders (Kendler *et al.* 1997). Because family history assessments of this sort routinely result in lower rates of

diagnosis than direct assessment of family members (e.g. Andreasen *et al*. 1977; Duggan *et al*. 1998), and because indirect reports and direct interviews appear to provide relatively independent and complementary information about disorders in family members (Kendler & Roy, 1995), it will be important to replicate our parental GAD results using direct as well as indirect assessment methods.

With these limitations in mind, we found several differences between excessive and non-excessive worriers who met all other DSM-IV criteria for GAD. Results revealed that excessive worry begins earlier in life, has a more persistent course and greater co-morbidity, and is associated with greater symptom severity. At the same time, non-excessive cases have a severity distribution not markedly different from that of excessive cases, significant co-morbidity with the vast majority of the other DSM-IV disorders assessed in the survey, and similar odds of treatment-seeking as excessive cases. In addition, the sociodemographic profile and odds of parental GAD of non-excessive cases is quite similar to that of excessive cases. Finally, non-excessive cases with episodes in the past 12 months reported disability comparable to that of excessive cases. Taken together, these results suggest that non-excessive worry is associated with a somewhat milder symptom presentation than excessive worry but is characterized by many of the same features and outcomes as the full GAD syndrome.

The obvious implication of our findings is that individuals need not view their worry as excessive to experience clinically significant impairment, at least when worry co-occurs with the other symptoms of GAD. This is consistent with the suggestion in the DSM-IV text that worry can be inferred to be excessive, even if excessiveness is denied by the worrier, so long as other features of pathological worry (uncontrollability, distress, functional impairment) are evident (APA, 1994: 433). It has been observed that no other DSM disorder, including other disorders involving severe levels of normal emotional processes (e.g. depressed mood in major depressive disorder), requires an explicit judgment of excessiveness as part of its primary diagnostic criteria (Rickels & Rynn, 2001). The discovery of a group of significantly impaired worriers who are excluded from diagnosis by the excessiveness criterion challenges its appropriateness for GAD as well.

One might ask, given its limited conceptual and evidentiary base, why the excessiveness criterion was originally adopted in DSM-III-R. One reason may have been the desire to avoid pathologizing normative reactions to stressful life events. Because worry is experienced to some degree by most psychologically healthy individuals (Borkovec, 1994; Muris *et al*. 1998), especially in times of stress, the GAD diagnostic criteria must be able to distinguish normal, transient stress reactions from clinically significant anxiety. What is more contentious, however, is whether a GAD diagnosis should be assigned when the characteristic symptom constellation of the disorder is experienced in response to severe or chronic stressors. Although such symptoms may not be considered excessive, and so would not merit a GAD diagnosis by current DSM criteria, they could still cause considerable suffering and impairment that might be effectively addressed by standard GAD treatments. For example, Ballenger *et al*. (2001) noted that the GAD syndrome is common among patients with chronic physical conditions, but that physicians are often reluctant to diagnose GAD because they consider the presence of anxiety to be normal and justified by the physical illness. Yet this co-occurring GAD often worsens prognosis for the physical illness, which means that failure to detect, diagnose, and treat the GAD could lead to substantially poorer health outcomes for such patients. Still another possibility is that the anxiety symptoms might be detected but assigned a residual diagnosis (e.g. Adjustment Disorder with Anxiety; Anxiety Disorder Not Otherwise Specified) rather than a diagnosis of GAD. However, if non-excessive GAD represents a less severe or closely related form of GAD, diverting non-excessive cases into a separate, heterogeneous residual category may reduce the validity of the GAD diagnosis, undermine clinical decision-making, and slow the accumulation of knowledge about GAD. There is consequently a need to determine whether and where non-excessive cases should be classified within the diagnostic system.

Despite their many similarities, excessive and non-excessive GAD cases were distinguished by several robust differences that remained

significant even after worry uncontrollability, distress, and impairment were controlled. These findings raise at least two intriguing questions for future investigation. First, might excessive GAD, with its earlier onset and more chronic, co-morbid course, represent a different form of the disorder than non-excessive GAD? It has been suggested that earlier-onset GAD represents a more severe disorder stemming from temperament factors or from extreme early stressors that predispose the individual to a range of emotional disorders, whereas late-onset GAD represents a more circumscribed, less characterological condition precipitated by moderate life stress (Brown *et al*. 1994; Campbell *et al*. 2003). It is possible that the concepts of excessive GAD and early-onset GAD converge on an overlapping set of individuals who are especially vulnerable to developing severe, chronic emotional disturbance (see Hudson & Rapee, 2004). At the same time, our preliminary finding that excessive GAD is no more familial than non-excessive GAD suggests that the relations among the relevant vulnerability factors may be quite complex. Additional research is needed to determine whether there are distinct variants of GAD for which excessive worry may be a marker.

Second, what leads individuals to describe their worries as excessive? Our finding that excessive GAD is associated with greater symptom severity could indicate that excessive cases actually experience more frequent or intense worry than non-excessive cases. An alternative explanation is that the worry experiences of the two groups are objectively the same, but that the former appraise the experiences in a more negative light than the latter. A growing body of research suggests that severe worriers with and without GAD are distinguished more by their subjective interpretations of worry and anxiety than by the actual frequency, severity, or disruptiveness of their anxiety experiences (Ruscio *et al*. 2003; Ruscio & Borkovec, 2004). There is a need to examine the correspondence of excessiveness appraisals to actual anxiety symptoms, to identify factors other than anxiety symptoms that may lead worry to be appraised as excessive, and to consider the relative weight that should be given to anxiety symptoms versus appraisals of these symptoms when GAD is diagnosed.

CONCLUSION

The discovery of important similarities between excessive and non-excessive GAD calls into question the validity of the excessiveness criterion and underscores the need for further research into the definition of GAD. Ultimately, decisions about excessiveness will need to be considered alongside other modifications to the GAD criteria proposed for DSM-V and ICD-11, especially others that would result in a more liberal diagnostic threshold (e.g. Kessler *et al*. 2005*b*), to ensure that the revised diagnostic criteria do not substantially increase the number of false-positive diagnoses. If the decision is made to remove the vaguely defined excessiveness requirement from the GAD criterion set, an added benefit could be improvement in the reliability of the GAD diagnosis, which – despite significant advances in DSM-IV – continues to be the lowest of any principal anxiety disorder (Brown *et al*. 2001). If instead the decision is made to retain the excessiveness criterion, research might evaluate whether diagnostic reliability and validity could be improved by replacing the ambiguous wording of 'excessive worry' with a more explicit descriptor (e.g. intense, frequent) or with the more narrow specifier of worry about minor matters from which the criterion was originally derived (e.g. Craske *et al*. 1989). Whether excessiveness is discarded or retained, there will be a need for additional research into the features that distinguish pathological worry and anxiety from normal variants of these processes (Borkovec *et al*. 1991; Weems *et al*. 2000), leading to further refinement of the diagnostic criteria and a more valid and useful GAD diagnosis.

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DECLARATION OF INTEREST

None.

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