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Diagnostic efficiency of symptoms in the diagnosis of DSM-IV: generalized anxiety disorder in youth

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Background: Evaluated five probability indices, including odds ratios, to determine relative contribution of Uncontrollable Excessive Worry (DSM-IV criterion A and criterion B) and Physiological Symptoms associated with uncontrollable excessive worry (DSM-IV criterion C) for diagnosing DSM-IV generalized anxiety disorder in youth. **Method:** One hundred eleven youths (6 to 17 years old) and their parents who presented to a childhood anxiety disorders specialty clinic were administered a semi-structured diagnostic interview schedule. Separate evaluations were conducted for children and adolescents. **Results:** Results showed that symptoms comprising DSM-IV's generalized anxiety disorder diagnosis vary relative to one another in the degree to which they contribute to the diagnosis, with certain symptoms having relatively higher diagnostic value than other symptoms. The relative value of symptoms also appeared to vary with children's and adolescents' reports, and parents' reports about their children and adolescents. **Conclusions:** Despite variations in symptoms' values, with only a few exceptions, almost all symptoms were still quite useful for diagnosis, whether reported by children, adolescents, or their parents. **Keywords:** Anxiety, assessment, diagnosis, DSM, GAD, screening.

With the publication of the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association (APA), 1994), several changes occurred concerning the classification of anxiety disorders in youth. A primary change was the elimination of the category, 'Anxiety Disorders of Childhood and Adolescence,' as only separation anxiety disorder remained specific to childhood, and overanxious and avoidant disorders were eliminated. The elimination of overanxious disorder rested largely on the view that the conceptualization of generalized anxiety disorder (GAD) was applicable to children and adolescents (APA, Task Force on DSM-IV, 1991).

Because research evidence for this view was sparse, Tracey, Chorpita, Douban, and Barlow (1997) conducted a study aimed at filling this gap. Tracey et al. (1997) evaluated four probability indices (i.e., sensitivity, specificity, positive predictive power, and negative predictive power) for each of the six Physiological Symptoms (criterion C) that comprise DSM-IV GAD as reported by 44 clinic referred youths (ages 7 to 17 years old) and their parents. Of the 44 youths, 31 were diagnosed with either a principal or an additional composite diagnosis of DSM-IV GAD; the remaining 13 were diagnosed with other DSM-IV anxiety disorders. Of interest was Tracey et al.'s reporting of those symptoms endorsed by youths and parents that were predictive of youths receiving a GAD diagnosis. The symptom Restlessness/Keyed Up, when endorsed by youths, was predictive of youths receiving a DSM-IV GAD diagnosis. The symptom Irritability, when endorsed by parents, also was predictive of youths receiving a DSM-IV GAD diagnosis. Overall, Tracey et al.'s study represents an important first step in investigating how well the conceptualization of DSM-IV's GAD category applies to children and adolescents.

Given the wide usage of DSM-IV in diagnosing child anxiety disorders, including GAD, it is important to empirically establish that the conceptualization of DSM-IV's GAD category applies to children and adolescents. Within this frame, it is important to determine the *relative* contribution of DSM-IV GAD symptoms as such determination has the potential to lead to continual improvement in the classification scheme (e.g., Lonigan, Anthony, & Shannon, 1998; Silverman, 1992). Thus, *diagnostic efficiency*, defined as the relative usefulness/value of symptoms for diagnosis, was investigated not just for Physiological Symptoms associated with Uncontrollable Excessive Worry (DSM-IV criterion C), but also for *Excessive Uncontrollable Worry* (DSM-IV criterion A and criterion B). Our investigation of diagnostic efficiency was broadened in this way given DSM-IV's requirement that worry in GAD must be endorsed as both *Excessive* (criterion A) and *Uncontrollable* (criterion B). Diagnostic efficiency was based on information reported by both youths and parents using samples of youths who met either a primary or comorbid diagnosis of DSM-IV GAD, and youths who did *not* meet either primary or comorbid diagnosis for DSM-IV GAD. The youths with no GAD diagnoses all met DSM-III-R criteria for overanxious disorder, with the majority having overanxious disorder as a primary diagnosis. This thereby provided a clinically meaningful comparison between children who showed sub-clinical levels of worry and children who met criteria for DSM-IV GAD (Beidel, Silverman, & Hammond-Laurence, 1996).

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Five probability indices: sensitivity, specificity, positive predictive power, negative predictive power, and odds ratios, were therefore evaluated in this study. Of these probability indices, the odds ratio provides particularly useful information about diagnostic efficiency of symptoms. An odds ratio incorporates within a single index the: base rate of a disorder, base rate of a symptom, odds of a diagnosis given a symptom, and odds of a diagnosis given the absence of a symptom (Lonigan et al., 1998). These probability indices were used to evaluate the relative contribution of Uncontrollable Excessive Worry (criteria A and B) and Physiological Symptoms associated with Uncontrollable Excessive Worry (criterion C) for DSM-IV GAD diagnosis.

Diagnostic efficiency was evaluated based on youths' and parents' interview reports. Both youths' and parents' interview reports were used given that both sources usually participate in a child/adolescent diagnostic work-up in anxiety disorders research and practice (e.g., Chorpita, Albano, & Barlow, 1998; Silverman et al., 1999a, b). Separate evaluations for attaining diagnostic value of DSM-IV GAD symptoms were conducted for: children (ages 6 to 11 years old) and adolescents (12 to 17 years old). This was done because the research evidence, albeit sparse, suggests that base rates for the types of symptoms that comprise GAD DSM-IV criteria are likely to vary with age, and probability indices are influenced by base rates (Lonigan et al., 1998; Widiger, Hunt, Frances, Clarkin, & Gilmore, 1984).

In terms of Physiological Symptoms' base rates, Tracey et al. (1997) found different frequencies for GAD Physiological Symptoms between children (under 13.3 years old) and adolescents (over 13.3 years old).[1] Specifically, children's self-reports indicated that Restlessness/Keyed Up was the most frequent symptom; adolescents' self-reports indicated that Restlessness/Keyed Up and Irritability were most frequent. In terms of base rates for GAD excessive uncontrollable worry areas, we are not aware of studies that have specifically reported this information. Research has shown, however, that the frequency of children's self-reports of areas of worry varies between children and adolescents in both non-clinic (Muris, Merkelbach, Gadet, & Moulaert, 2000) and clinic referred (Weems, Silverman, & La Greca, 2000) samples of children. For example, Murris et al. (2000) found different frequencies for various areas of worry between younger (ages 4 to 6 years old) and older (ages 10 to 12 years old) children (e.g., worry about separation from parents was most frequently reported by younger children). Weems et al. (2000) also found different frequencies for various areas of worry between children (ages 6 to 8 years old) and adolescents (12 to 16 years old) (e.g., worry about performance, future events, appearances, and little things were most frequently reported by adolescents). Given these findings of different frequencies of various areas of worry between younger and older children, probability indices were computed separately for children (ages 6 to 11 years) and adolescents (ages 12 to 17 years) based on youths' and parents' reports (about their children and adolescents).

Method

Participants

Participants were 111 children and adolescents and their parents who presented to the Child and Family Psychosocial Research Center, Child Anxiety and Phobia Program at Florida International University, Miami. Participants were referred to the Program by school counselors, mental health professionals, pediatricians, or self-referral. The total sample was comprised of 49 girls and 62 boys, with ages ranging from 6 to 17 years old (mean age = 10.62 years, $SD = 2.85$). In terms of ethnicity/race, 51.4% were Hispanic American, 41.4% were European American, 3.6% were African American, and for the remaining 3.6%, ethnic/racial information was not provided. Among the 111 children and adolescents, 73% ($n = 81$) received either a primary ($n = 22$) or comorbid ($n = 59$) diagnosis of DSM-IV GAD. Of the 81 youth who received either a primary or comorbid diagnosis of DSM-IV GAD, 50 were children and 31 were adolescents. The remaining 30 (27%) youths with no GAD diagnoses all met DSM-III-R criteria for overanxious disorder.[2] Primary diagnoses were: overanxious disorder ($n = 21$), social phobia ($n = 4$), separation anxiety disorder ($n = 2$), depression ($n = 1$), specific phobia ($n = 1$), and sleep terror disorder ($n = 1$). All diagnoses were based on combined youth and parent interview reports via the Anxiety Disorders Interview Schedule for DSM-IV: Child and parent versions (Silverman & Albano, 1996).

Measure

The Anxiety Disorders Interview Schedule for DSM-IV: Child and parent versions (ADIS-IV: C/P; Silverman & Albano, 1996). The ADIS-IV: C/P is a semi-structured diagnostic interview that emphasizes anxiety disorders and other major childhood disorders, including the affective and externalizing disorders based on DSM-IV criteria (APA, 1994). Test-retest reliability using the ADIS-IV: C/P (Silverman, Saavedra, & Pina, 2001) was examined in approximately 40% of the present sample of youths and parents using a retest interval of 7 to 14 days. Reliability of anxiety disorder diagnoses revealed that the diagnoses derived using the ADIS-IV: C/P were highly reliable (Silverman et al.,

[1] Although base rates were not reported in Tracey et al. (1996), the authors' reporting of each physiological symptom's frequency allows for the calculation of base rates.

[2] As part of CAPP's clinical research activities, all children and their parents are assessed with the overanxious disorder module from the DSM-III-R version of the ADIS-C/P (APA, 1987).

2001). For example, kappa coefficients for separation anxiety disorder, social phobia, specific phobia, and GAD were all in the excellent range ($\kappa = .80$ to .92). Kappas for the uncontrollable worry areas listed in the DSM-IV GAD module ranged from .31 to .63 based on children's interview reports, and .43 to .78 based on parents' interview reports. Kappas for the physiological symptoms associated with the uncontrollable worry areas listed in the DSM-IV GAD module ranged from .54 to .81 based on children's interview reports, and .23 to .67 based on parents' interview reports.

Procedures

Graduate students in psychology conducted the majority of the interviews; Dr Wendy K. Silverman conducted a small number of interviews. Diagnosticians were trained by observing live and videotaped interviews. Initial discrepancies were discussed to reach agreement on five child–parent interviews before diagnosticians conducted an interview. In cases of multiple diagnoses, relative impairment or interference of each diagnosis was used for ascertaining the primary diagnosis, the secondary, etc., as delineated in the ADIS-IV: C/P guide (Albano & Silverman, 1996).

Because the present study focused on GAD's diagnostic criteria, additional comments regarding the assessment of GAD are warranted. Briefly, the GAD module of the ADIS-IV: C/P (Silverman & Albano, 1996) is consistent with the criteria appearing in the DSM-IV. It begins with a short description of worry: 'Worry is when you keep thinking about things over and over and it is hard to stop thinking about it. And the things you are thinking about are usually things that make you feel nervous or afraid.' After the youth's and parents' understanding of worry is assured, the module proceeds with questions that inquire about the presence/absence of excessive (via a 9-point severity rating scale) and uncontrollable (Yes/No) worry in at least one area [i.e., School, Performance, Interpersonal Relationships, Health of Self, Health of Others, Family, Little Things and Things Going On in the World]. The module then proceeds with questions that inquire about the presence/absence of at least one Physiological Symptom (i.e., Can't Sit Still and Relax, Tires Easily, Can't Concentrate, Irritability, Muscle Aches, and Trouble Sleeping) associated with Uncontrollable Excessive Worry. The module also contains a question about whether the endorsed symptoms have been present for the past six months.

Results

Data analyses

Base rates (BR) for each GAD uncontrollable excessive worry area and for each physiological symptom were computed by dividing the number of participants who endorsed the symptom of interest as present by the total number of participants (Milich, Widiger, & Landau, 1987; Pelham, Evans, Gnagy, & Greenslade, 1992). Values for diagnostic efficiency indices (i.e., conditional probabilities) were calculated according to the formulas shown in Table 1. As in past research (e.g., Landau, Milich, & Widiger, 1991; Laurent, Landau, & Stark, 1993; Milich et al., 1987; Pelham et al., 1992), conditional probability (i.e., sensitivity, specificity, positive predictive power, negative predictive power) values ranging from .00 to .29 were viewed as *low*; values ranging from .30 to .69 were viewed as *moderate*; and values ranging from .70 to 1.00 were viewed as *high*. Odds ratios were evaluated to determine the *relative* contribution or value of each symptom for diagnosis. More specifically, for each Uncontrollable Excessive Worry Area (criteria A and B), and each Physiological Symptom associated with Uncontrollable Excessive Worry Areas (criterion C) an odds ratio was computed. Similar to Lonigan et al. (1998), each odd ratio was compared to the mean/average value of *all* items comprising each of these two respective areas (see list of items in Tables 2 and 3).

Diagnostic efficiency of GAD Excessive Uncontrollable Worry areas

Youths' interview reports. For children, interview reports of excessive uncontrollable worry in the areas of Health of Self, Family, and School emerged as efficient inclusion indicators with positive predictive power (PPP) in the high range (*PPP* = .96, .93, and

Table 1 Definitions and computations for diagnostic efficiency indices

	Symptom	
Diagnosis	Present	Absent
Present	a	b
Absent	c	d
Index	Definition	Computation
SEN	Probability of symptom if diagnosis	a/(a + b)
SPE	Probability of no symptom if no diagnosis	d/(c + d)
PPP	Probability of diagnosis if symptom	a/(a + c)
NPP	Probability of no diagnosis if no symptom	d/(b + d)
OR	Ratio of odds of diagnosis if symptom to odds of no diagnosis if no symptom	(a/c)/(b/d)

Note: SEN = Sensitivity, SPE = Specificity, PPP = Positive Predictive Power, NPP = Negative Predictive Power, OR = Odds Ratio. a, b, c and d refer to the number of cases within each cell of the 2 × 2 table of presence or absence of a symptom and diagnosis. Adapted from Lonigan et al. (1998).

Table 2 Base rates, conditional probabilities, and odds ratios for GAD Excessive Uncontrollable Worry reported by youths and parents for children and adolescents ($N = 111$)

	Children ($n = 57$; 6 to 11 years old)							Adolescents ($n = 54$; 12 to 17 years old)					
	BR	*SEN*	*SPE*	*PPP*	*NPP*	*OR*		*BR*	*SEN*	*SPE*	*PPP*	*NPP*	*OR*
Youths' reports													
	Children's reports							*Adolescents' reports*					
Health (self)	.39	.51	.94	.96	.40	15.4	Health (self)	.54	.73	.92	.96	.58	28.0
Family	.41	.51	.89	.93	.39	12.7	Health (others)	.60	.80	.92	.96	.65	25.2
School[a]	.39	.47	.83	.89	.36	10.5	Perfectionism	.33	.40	.83	.86	.36	13.3
Things Going On in the World	.28	.35	.94	.95	.34	8.6	Family	.45	.60	.92	.95	.48	10.4
Health (others)	.49	.65	.94	.97	.49	2.6	Interpersonal	.43	.57	.92	.94	.46	6.8
Perfectionism	.25	.33	1.00	1.00	.35	1.5	School[a]	.67	.80	.67	.86	.57	5.0
Little Things	.28	.33	.89	.89	.32	–	Things Going On in the World	.24	.33	1.0	1.0	.38	1.44
Performance	.25	.29	.89	.88	.31	–	Little Things	.41	.57	1.0	1.0	.48	–
Interpersonal	.25	.29	.89	.88	.31	–	Performance	.26	.37	1.0	1.0	.39	–
M	.33	.41	.91	.93	.36	8.55	*M*	.44	.57	.91	.95	.48	12.88
SD	.09	.13	.05	.04	.06	5.53	*SD*	.15	.18	.11	.05	.10	10.14
Parents' reports													
	Parents' reports of children							*Parents' reports of adolescents*					
Performance	.51	.65	.89	.94	.47	35.0[b]	Health (self)	.43	.57	.92	.94	.46	18.1
Health (others)	.43	.57	.94	.97	.44	18.7	Family	.38	.50	.92	.94	.42	14.7
Interpersonal	.41	.53	.94	.96	.41	15.4	Health (others)	.52	.67	.83	.91	.50	11.6
School	.62	.75	.72	.88	.50	14.7	Interpersonal	.60	.73	.75	.88	.53	9.0
Little Things	.32	.39	.89	.91	.34	9.5	School	.67	.83	.75	.89	.64	6.7
Perfectionism	.31	.37	.89	.90	.33	8.6	Performance	.45	.57	.83	.89	.43	4.2
Family	.43	.53	.83	.90	.38	1.1	Things Going On in the World	.19	.27	1.0	1.0	.35	1.3
Health (self)	.29	.37	.94	.95	.35	–	Little Things	.38	.37	.92	.92	.37	–
Things Going On in the World	.25	.31	.94	.94	.33	–	Perfectionism	.38	.47	.83	.88	.38	–
M	.40	.50	.89	.93	.39	11.33[c]/14.72[d]	*M*	.44	.55	.86	.92	.45	9.37
SD	.12	.15	.07	.03	.06	6.29[c]/10.64[d]	*SD*	.14	.18	.08	.04	.09	5.90

Note: BR = base rate; SEN = sensitivity; SPE = specificity; PPP = positive predictive power; NPP = negative predictive power; OR = odd ratio. Symptoms are listed in descending order based on their OR value. – The 95% confidence intervals do not include the value of 1 and thus the null hypothesis that the two incidence rates are the same is rejected (Noušis, 1990). [a] Significantly more prevalent in adolescents than in children [χ^2 (1) = 8.78, $p = .003$] following modified Bonferroni alpha corrections. [b] Extreme OR value. [c] Mean (SD) OR based on the obtained ORs not including the extreme OR value. [d] Mean (SD) OR based on the obtained ORs including the extreme OR value.

Table 3 Base rates, conditional probabilities, and odds ratios for GAD Physiological Symptoms reported by youths and parents for children and adolescents ($N = 111$)

	Children ($n = 57$; 6 to 11 years old)							Adolescents ($n = 54$; 12 to 17 years old)					
	BR	*SEN*	*SPE*	*PPP*	*NPP*	*OR*		*BR*	*SEN*	*SPE*	*PPP*	*NPP*	*OR*
Youths' reports													
	Children's reports							*Adolescents' reports*					
Irritability	.42	.55	.94	.97	.43	15.4	Can't sit still/relax	.67	.87	.83	.93	.71	35.8
Trouble sleeping	.42	.65	1.0	1.0	.50	14.0	Can't concentrate[a]	.67	.87	.83	.93	.71	35.8
Can't sit still/relax	.48	.65	1.0	1.0	.50	2.6	Tires easily	.50	.67	.92	.95	.52	25.0
Can't concentrate[a]	.38	.51	1.0	1.0	.42	1.8	Trouble sleeping	.57	.87	.83	.93	.71	18.9
Tires easily	.33	.41	.89	.91	.35	–	Irritability	.57	.73	.83	.92	.56	16.6
Muscle aches	.32	.40	.89	.91	.35	–	Muscle aches	.38	.50	.92	.94	.42	12.0
M	.39	.53	.95	.97	.43	8.45	*M*	.56	.75	.86	.93	.61	24.02
SD	.06	.11	.05	.04	.07	7.25	*SD*	.11	.15	.05	.01	.12	10.04
Parents' reports													
	Parents' reports of children							*Parents' reports of adolescents*					
Can't sit still/relax	.75	.94	.78	.92	.82	112.8[b]	Can't sit still/relax	.74	.93	.75	.90	.82	35.0
Can't concentrate	.54	.69	.89	.95	.50	14.5	Trouble sleeping	.52	.70	.92	.95	.55	25.0
Irritability	.57	.71	.83	.92	.50	12.8	Tires easily	.43	.57	.92	.94	.46	16.3
Trouble sleeping	.48	.61	.89	.94	.44	11.7	Can't concentrate	.55	.70	.83	.91	.53	14.6
Tires easily	.42	.51	.83	.90	.38	4.4[c]	Irritability	.55	.67	.75	.87	.47	6.4
Muscle aches	.38	.43	.78	.85	.33	–	Muscle aches	.36	.50	1.00	1.00	.45	1.9
M	.52	.65	.83	.91	.50	13.00[d]/31.24[e]	*M*	.53	.68	.86	.93	.55	16.53
SD	.13	.18	.05	.04	.17	1.41[d]/45.76[e]	*SD*	.13	.15	.10	.05	.14	12.11

Note: BR = base rate; SEN = sensitivity; SPE = specificity; PPP = positive predictive power; NPP = negative predictive power; OR = odd ratio. Symptoms are listed in descending order based on their OR value. – The 95% confidence intervals do not include the value of 1 and thus the null hypothesis that the two incidence rates are the same is rejected (Noušis, 1990). [a] Significantly more prevalent in adolescents than in children [χ^2 (1) = 7.92, $p = .005$] following modified Bonferroni alpha corrections. [b] Extreme OR value. [c] Outlier OR value. [d] Mean (SD) OR based on the obtained ORs not including the outlier and the extreme OR values. [e] Mean (SD) OR based on the obtained ORs including the outlier and the extreme OR values.

.89 respectively), identifying a moderate proportion of the children [Sensitivity (SEN) = 51%, 51%, and 47%, respectively]. Excessive uncontrollable worry in the areas of Health of Self, Family, and School had relatively higher ORs than the average OR ($M = 8.55$, $SD = 5.53$) (see Table 2). Children who reported excessive uncontrollable worry in one of these areas were at least 10 times ($OR = 10.5$) more likely to have a diagnosis of DSM-IV GAD than children who did not report excessive uncontrollable worry in at least one of these areas. Excessive uncontrollable worry in the area of Things Going On in the World had about average value ($OR = 8.6$) relative to the average OR ($M = 8.55$, $SD = 5.53$). In contrast, excessive uncontrollable worry in the areas of Health of Others and Perfectionism had relatively lower ORs than the average OR ($M = 8.55$, $SD = 5.53$).

For adolescents, interview reports of excessive uncontrollable worry in the areas of Health of Self and Health of Others emerged as efficient inclusion indicators with PPPs in the high range ($PPP = .96$ and .96), identifying a high ($SEN = 73\%$ and 80%) proportion of the adolescents. Excessive uncontrollable worry in the areas of Health of Self and Health of Others had relatively higher ORs than the average OR ($M = 12.88$, $SD = 10.14$) (see Table 2). Adolescents who reported excessive uncontrollable worry in one of these areas were at least 25 times ($OR = 25.2$) more likely to have a diagnosis of DSM-IV GAD than adolescents who did not report excessive uncontrollable worry in at least one of these areas. Excessive uncontrollable worry in the areas of Perfectionism and Family had about average value relative to the average OR ($M = 12.88$, $SD = 10.14$). In contrast, excessive uncontrollable worry in the areas of Interpersonal Relationships, School, and Things Going On in the World had relatively lower ORs than the average OR ($M = 12.88$, $SD = 10.14$).

Parents' interview reports. Parents' interview reports about their children revealed that excessive uncontrollable worry in the areas of Health of Others, Interpersonal Relationships, and School emerged as efficient inclusion indicators with PPPs in the high range ($PPP = .97$, .96, and .88 respectively), identifying a moderate ($SEN = 57\%$, 53%) to high ($SEN = 75\%$) proportion of the children. Excessive uncontrollable worry in the areas of Health of Others, Interpersonal Relationships, and School had relatively higher ORs than the average OR ($M = 11.33$, $SD = 6.29$) (see Table 2). Parents' reports about their children's excessive uncontrollable worry in one of these areas were at least 14 times ($OR = 14.7$) more likely to have a diagnosis of DSM-IV GAD than children who did not have excessive uncontrollable worry in at least one of these areas. Excessive uncontrollable worry in the areas of Little Things and Perfectionism had about average value relative to the average OR ($M = 11.33$, $SD = 6.29$). In contrast, parents' reports of their children's excessive uncontrollable worry in the area of Family had relatively lower OR than the average OR ($M = 11.33$, $SD = 6.29$) (see Table 2). The item uncontrollable worry area of Performance had an extreme OR value (35.0). Means (standard deviation) were 11.33 (6.29) not including this extreme value and 14.72 (10.64) including this extreme value.

Parents' interview reports about their adolescents revealed that excessive uncontrollable worry in the areas of Health of Self, Family, and Health of Others emerged as efficient inclusion indicators with PPPs in the high range ($PPP = .94$, .94, and .91, respectively), identifying a moderate proportion of the adolescents ($SEN = 57\%$, 50%, and 67%). Excessive uncontrollable worry in the areas of Health of Self, Family, and Health of Others had relatively higher ORs than the average OR ($M = 9.37$, $SD = 5.90$) (see Table 2). Parents' interview reports about the adolescents' excessive uncontrollable worry in one of these areas were at least 11 times ($OR = 11.6$) more likely to have a diagnosis of DSM-IV GAD than adolescents who did not report excessive uncontrollable worry in at least one of these areas. Excessive uncontrollable worry in the area of Interpersonal Relationships had about average value ($OR = 9.0$) relative to the average OR ($M = 9.37$, $SD = 5.90$). In contrast, parents' reports of their adolescents' excessive uncontrollable worry in the areas of School, Performance, and Things Going On in the World had relatively lower ORs than the average OR ($M = 9.37$, $SD = 5.90$).

Diagnostic efficiency of GAD Physiological Symptoms

Youths' interview reports. For children, interview reports of physiological symptoms revealed that Irritability and Trouble Sleeping emerged as efficient inclusion indicators with PPPs in the high range ($PPP = .97$ and 1.0, respectively), identifying a moderate proportion of the children ($SEN = 55\%$ and 65%). Irritability and Trouble Sleeping had relatively higher ORs than the average OR ($M = 8.45$, $SD = 7.25$) (see Table 3). Children who reported one of these physiological symptoms were at least 14 times ($OR = 14.0$) more likely to have a diagnosis of DSM-IV GAD than children who did not report physiological symptoms in at least one of these areas. In contrast, the physiological symptoms Can't Concentrate and Can't Sit Still and Relax had relatively lower ORs than the average OR ($M = 8.45$, $SD = 7.25$).

For adolescents, interview reports of physiological symptoms revealed that Can't Sit Still/Relax and Can't Concentrate emerged as efficient inclusion indicators with PPPs in the high range ($PPP = .93$ and .93, respectively), identifying a high ($SEN = 87\%$ and 87%) proportion of the adolescents. Can't Sit Still and Relax and Can't Concentrate had relative higher ORs than the average OR ($M = 24.02$, $SD = 10.04$) (see Table 3). Adolescents who repor-

ted one of these physiological symptoms were at least 35 times ($OR = 35.8$) more likely to have a diagnosis of DSM-IV GAD than adolescents who did not report physiological symptoms in at least one of these areas. The physiological symptom Tires Easily had about average value ($OR = 25.0$) relative to the average OR ($M = 24.02$, $SD = 10.04$). In contrast, the physiological symptoms Muscle Aches, Irritability, and Trouble Sleeping had relative lower ORs than the average OR ($M = 24.02$, $SD = 10.04$).

Parents' interview reports. Parents' interview reports about their children revealed that the symptom Can't Concentrate emerged as an efficient inclusion indicator with a PPP in the high range ($PPP = .95$) identifying a moderate proportion of the children ($SEN = .69$). Can't Concentrate had a relatively higher OR than the average OR ($M = 13.0$, $SD = 1.41$) (see Table 3). Parents' interview reports about their children suggested that children with this physiological symptom were at least 14 times ($OR = 14.5$) more likely to have a diagnosis of DSM-IV GAD than children who did not report this physiological symptom. Parents' interview reports indicated that the physiological symptoms Trouble Sleeping and Irritability had about average values relative to the average OR ($M = 13.0$, $SD = 1.41$). The physiological symptom Can't Sit Still and Relax was found to be an extreme OR value (112.8). The OR for the physiological symptom Tires Easily was found to be an outlier (4.4). Means (standard deviation) were 13.00 (1.41) not including extreme/outlier values and 31.24 (45.76) including extreme/outlier values.

Parents' interview reports about their adolescents revealed that the symptoms Can't Sit Still and Relax, and Trouble Sleeping emerged as efficient inclusion indicators with PPPs in the high range ($PPP = .90$ and .95, respectively), identifying a high proportion of the adolescents ($SEN = 93\%$ and 70%). Can't Sit Still and Relax, and Trouble Sleeping had relatively higher ORs than the average OR ($M = 16.53$, $SD = 12.11$) (see Table 3). Parents' interview reports about their adolescents suggested that adolescents with one of these physiological symptoms were at least 25 times ($OR = 25.0$) more likely to have a diagnosis of DSM-IV GAD than adolescents without these physiological symptoms. Tires Easily and Can't Concentrate had about average value relative to the average OR ($M = 16.53$, $SD = 12.11$). In contrast, parents' interview reports about their adolescents indicated that the physiological symptoms Irritability and Muscle Aches had relatively lower ORs than the average OR ($M = 16.53$, $SD = 12.11$).

Discussion

Results of this study highlight the importance of considering diagnostic indicators that express more than the prevalence rate (base rate) of a symptom in clinic referred children and adolescents. Results also demonstrate that symptoms frequently present in children and adolescents with the disorder (sensitivity) do not necessarily have value as diagnostic indicators. For instance, the obtained base rate and sensitivity of the DSM-IV GAD symptom uncontrollable worry in the area of Health of Others (as reported by children) were the highest of the uncontrollable excessive worry areas. However, this symptom's contribution (OR) to the diagnosis (as reported by children) was second to lowest relative to the average (mean OR).

The findings also indicated that certain Uncontrollable Excessive Worry areas (criteria A and B) and Physiological Symptoms associated with Uncontrollable Excessive Worry (criterion C) were found to have relatively higher diagnostic value than the average value of items in each these areas. Uncontrollable excessive worry in the area of Health of Self (as reported by children/adolescents and parents of adolescents) was found to have the highest diagnostic value relative to the average value of uncontrollable excessive worries reported by children/adolescents and parents of adolescents. Uncontrollable excessive worry in the area of Health of Others (as reported by parents of children) was found to have the highest diagnostic value relative to the average value of uncontrollable excessive worries reported by parents of children. The Physiological Symptoms associated with Uncontrollable Excessive Worries with the highest diagnostic value (relative to the mean/average value) were: Irritability, Trouble Sleeping (as reported by children), Can't Sit Still and Relax, Can't Concentrate (as reported by adolescents), Can't Concentrate (as reported by parents of children), and Can't Sit Still and Relax, and Trouble Sleeping (as reported by parents of adolescents).

The findings also indicated that symptoms that comprise the DSM-IV diagnostic criteria vary relative to one another in the degree to which they contribute to a DSM-IV GAD diagnosis. However, the relative value of symptoms also appeared to vary with children's and adolescents' reports, and parents' reports about their children and adolescents. Despite variations in symptoms' values, with only a few exceptions,[3] almost all symptoms were still quite useful for diagnosis, whether reported by children, adolescents, or their parents. These findings would therefore seem to suggest that the conceptualization of DSM-IV's GAD category applies to children and adolescents.

[3] The symptoms found to have relative low diagnostic value were: Uncontrollable excessive worries in the area of Perfectionism (as reported by children), Things Going On in the World (as reported by adolescents, and parents of adolescents), and Family (as reported by parents of children). Physiological symptoms Can't Concentrate (as reported by children), and Muscle Aches (as reported by parents of adolescents) also had relative low diagnostic value.

If these findings are replicated and found to be robust, they would suggest a possible sequence in which clinicians might inquire about GAD symptoms (i.e., start with those symptoms that have highest diagnostic value, followed by those with average, and then those with lower than average value). The findings also suggest that those symptoms with about average or relatively lower than average value might be the ones to be skipped relative to those with higher value during the diagnostic work-up of a child or adolescent.

Although this study represents an important step in the evaluation of the diagnostic value of DSM-IV's GAD symptoms in youth, three main limitations of the study should be noted. First, given that conditional probabilities and ORs vary across samples (to the extent that the prevalence of the disorder varies), it would seem important to continue conducting diagnostic efficiency studies in diverse samples (Lonigan et al., 1998). Second, although the use of a sample of youth who met DSM-IV diagnostic criteria for GAD and youth who met diagnostic criteria for DSM-III-R overanxious disorder provides a clinically meaningful distinction between children who show sub-clinical levels of worry and those who are experiencing DSM-IV GAD, it provides little information regarding the relative contribution of symptoms in samples in which other diagnoses might be more prevalent (e.g., separation anxiety disorder, social phobia), or in a sample in which the base rate of DSM-IV GAD is substantially different.[4] Third, other studies (e.g., Landau et al., 1991; Lonigan et al., 1998) have suggested the importance of examining not only diagnostic efficiency of individual symptoms that pertain to criteria, but also diagnostic efficiency for combinations of symptoms. Unfortunately, we were unable to examine combinations of uncontrollable excessive worry areas and physiological symptoms in this study because of the way in which we conducted the GAD inquiry using the ADIS for DSM-IV: C/P. In the present study, children and parents were asked about the presence/absence of physiological symptoms, overall, rather than tying physiological symptoms to specific areas of worry. Future studies should ask the children and parents during the interview about the presence/absence of physiological symptoms (criterion C) relative to each endorsed uncontrollable worry area. Despite these limitations, the present study extends previous research (Tracey et al., 1997) evaluating the diagnostic value of GAD symptoms, and suggests interesting and important avenues for future research.

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