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Hyperactivity in Italy[1]

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Prevalence rates of hyperactivity in Italy using commonly accepted cutoff scores in the United States were 20% for boys and 3% for girls; the combined prevalence rate was 12%. Italian children exhibited rates of hyperactive behaviors similar to those of children in New Zealand, Spain, and portions of the United States. Nevertheless, rates of hyperactivity are influenced by ethnic and cultural factors, and differences in prevalence rates may be expected in many situations. Factor structures of the Conners' Teacher Rating Scale for boys and girls were different. The need for separate factor analyses for males and females is stressed; hyperactivity and conduct problems, in fact, were separate factors for girls whereas such behaviors were subsumed under one factor for boys. There were also important similarities and differences with the factor structures for boys and girls in Italy and Spain. Methodological issues such as complete specification of the sample and assuring representativeness of samples are discussed.

Research regarding prevalence rates of hyperactivity within and across countries has begun to appear over the past decade. Prevalence rates refer to the percentage of cases in a population that meet a specified criterion for a disorder or problem.

Cross-cultural prevalence research is of interest beyond its epidemiological value because either extreme disparities or essential commonalities in prevalence rates would have theoretical implications regarding the etiology of hyperactivity. For example, if there were essentially no hyperactivity

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in Europe or China, as many professionals assumed a few years ago (Eisenberg, 1976; Sprague, Cohen, & Eichlseder, 1977), research might focus on child-rearing and medical practices across different cultures to explain why hyperactivity might be so different. On the other hand, if prevalence rates of hyperactivity were similar across cultures, essential environmental and genetic components might be assumed to be highly similar. Prevalence rates of hyperactivity have now been obtained in the United States (Langsdorf, Anderson, Walchter, Madrigal, & Juarez, 1979; Sprague, Cohen, & Werry, 1974; R. Ullmann, personal communication, August 1983[2]), Germany (Sprague et al., 1977), New Zealand (Werry & Hawthorne, 1976), and Canada (Trites, Dugas, Lynch, & Ferguson, 1979). This research was designed to establish prevalence rates of hyperactivity in Italy. We also provide methodological and substantive commentary regarding prevalence research on hyperactivity.

Fortunately, one measure of hyperactivity, the 39-item Conners Teacher Rating Scale (TRS; Conners, 1969; Guy, 1976) has been shown to be reliable and valid in scores of studies during the past decade. The TRS is sensitive to the effects of drug therapy, dosage level changes of psychostimulants, and behavior therapy (O'Leary & Johnson, 1979). On the basis of several studies in the United States, a cutoff score of 1.5 on the abbreviated 10-item teacher rating scale (ATRS) has become accepted as an indicator of hyperactivity (Brown & Sleator, 1979; Langsdorf et al., 1979; O'Leary, Pelham, Rosenbaum, & Price, 1976; Prinz, Connor, & Wilson, 1981). This cutoff score was based on the notion that if a child scored 1.96 standard deviations above the mean, i.e., in the upper 2.5% of the population, he or she would be deemed hyperactive (Sprague et al., 1977).

Information regarding hyperactivity has been obtained in several different countries using the ATRS. Data on 5,357 children were obtained in Germany (Sprague et al., 1977) from 26 schools in Munich; 108 teachers provided the TRS ratings on the children. The children ranged in age from 6 to 17 years, but the majority of the sample (76%) was between 7 and 13 years old. Using a 1.5 cutoff score on the ATRS, 12% of German boys and 5% of German girls would have been labeled hyperactive. Using a similar cutoff score in the United States for a sample of white middle-class children in Texas, 11% of the children were labeled hyperactive (Langsdorf et al., 1979); prevalence rates for males and females were not reported separately. In New Zealand, Werry and Hawthorne (1976) found that the 1.5 cutoff identified 22% of the boys and 9% of the girls as hyperactive. Arias and O'Leary (1983), using a sample of 451 Spanish children, found that 22% of the boys and

[2]Data were compiled for us by Rina Ullmann, Department of Psychology, University of Illinois, Urbana, Illinois, August 1983.

10% of the girls met the ATRS 1.5 hyperactivity cutoff.[3] In summary, it is clear from all studies that boys outnumber girls for hyperactivity, although the actual prevalence rates vary considerably across a few studies where comparable measures were employed.

Our study was conducted to assess the prevalence of hyperactivity in Italy using the TRS and the ATRS. Prevalence rates of hyperactivity were estimated by use of the ATRS, which includes 10 items reflecting conduct problems, inattention, and hyperactivity. While the ATRS is not a measure of motor activity or of attention per se, it was found to correlate .94 with the hyperactivity factor of the full 39-item TRS (Werry, Sprague, & Cohen, 1975). In addition, we were interested in the factor structure of the TRS in Italy since a factor structure in part reflects the conceptual meanings that raters place on a phenomenon. More specifically, Peterson (1965) amply demonstrated that the conceptual meaning systems of raters are reflected in the evaluations of persons and objects across cultures. If factor structures obtained were highly different across cultures, it would be imperative to address the issue of whether the differences were due to differences in child behavior rater, meaning systems, or both.

METHOD

Subjects

Fourteen schools were randomly selected from a directory of elementary schools located in the regions of Veneto and Lombardia in northern Italy. Urban and rural areas were equally represented in this sample. The areas sampled were chosen to represent average socioeconomic levels in Italy.

School principals were contacted and asked to randomly select teachers from second-, third-, and fourth-grade classes to participate in a study assessing children's behavioral characteristics. All principals and teachers asked

[3]Trites, Dugas, Lynch, and Ferguson (1979), using a sample of 14,083 elementary school children in the Ottawa-Carleton region of Canada, found that 21% of the boys and 8% of the girls would be seen as hyperactive using a cutoff score of 1.5 on the Conners (1969) Hyperactivity factor. Unfortunately, the authors did not use the 1.5 cutoff score on the ATRS as most other investigators have done; as a result, the data presented by Trites and his colleagues (1979) are not comparable to most previous research or to our study. We analyzed our data using both the ATRS and the Conners (1969) HA factor scores; a 1.5 (or 15+) cutoff on the ATRS yielded 20% of the boys and 3% of the girls, whereas a 1.5 cutoff on the HA factor yielded 29% of the boys and 4% of the girls. We also correlated scores on the ATRS with the Conners (1969) HA factor scores and obtained correlation coefficients of .90 for the boys and of .84 for the girls.

to participate cooperated. The 23 teachers who participated in the study were each paid $10 for completing the TRS for all the children in their classes.

The total number of children was 344, and they were distributed across the grades as follows: second grade, $n = 123$ (females, 57; males, 66); third grade, $n = 105$ (females, 47; males, 58); fourth grade, $n = 116$ (females, 54; males, 62).

TRS Translation

The 39-item Conners TRS, reported in Guy (1976), was translated into Italian by a panel of three Italian clinical psychologists from the Center for Behavior Modification in Verona, Italy. These psychologists were trained in psychology both in the United States and in Italy.

Factor Analyses

Multivariate analyses were performed in order to obtain factor structures for the 39-item TRS. In factor-analyzing the questionnaire, we used a principal components solution and the varimax criterion for rotation (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). To compare our results with previous analytical studies (e.g., Trites, Blouin, & Laprade, 1982; Conners, 1969; Werry et al., 1975) and minimize the possibility of obtaining factors with few items and factors that accounted for minimal amounts of variance, we restricted the factor extraction to six factors. Correlations were in turn obtained among the various factor-scale scores. Factor-scale scores were obtained by standardizing the raw scores of items assigned to a particular factor and multiplying the z score by the corresponding loading. Weighted item scores were then summed to provide a factor-scale score. Only those loadings $>.40$ were used in deriving the correlations among the factor scores. In those few instances where an item loaded $>.40$ on two factors, only the highest item loading was used.

RESULTS

As can be seen in Table I, cutting scores for boys and girls are highly different. The scores in Table I for the ATRS and the Conners (1969) HA factor represent cutting scores that theoretically would identify the upper 2.5% of a normal distribution of scores. However, as can be seen, actual percentages obtained using the cutting scores on the ATRS are much higher than the 2.5% figure. The actual percentages are higher than the expected

Table I. Means, *SD*, Cutting Scores, and Percentage of Children Scoring At and Above the Cutting Score

	Mean	*SD*	(*M* + 2*SD*)	% subjects > cutoff score
		ATRS		
All subjects	.67	.60	1.87	5.8
Boys	.85	.65	2.15	4.7
Girls	.45	.46	1.37	5.7
		TRS Hyperactivity Factor		
All subjects	.65	.77	2.19	7.6
Boys	.93	.85	2.63	4.8
Girls	.32	.48	1.28	6.3

percentages because the distributions of scores for both boys and girls are not normal but are positively skewed (i.e., a J-curve positively skewed to the right). It is important to emphasize that separate cutoff scores have not been previously recommended for boys and girls, but we would certainly advise that differential cutting scores be used if one's purpose is to select samples of children who are statistically different from the norm.

Analyses of variance indicated that there were no differences in hyperactivity on the ATRS across grades two, three, and four, but there were highly significant sex differences ($F(1, 342) = 41.3$, $p < .001$), with boys' scores significantly higher than girls'. Prevalence rates using standard cutoff scores were as follows: When a cutoff score of 1.5 on the ATRS was used, 19.9% of the boys and 2.6% of the girls would be deemed hyperactive. Using a cutoff score of 2.0 on the ATRS, 7.5% of the boys and 1.3% of the girls would be classified as hyperactive.

Factor analyses[4] of the TRS were conducted for the total sample and for the boys and girls separately. Six factors with eigenvalues greater than 1.0 were retained.[5] Items were assigned to the factor in which they had the highest loading over .40. The factor structure of the TRS for the total sample appears in Table II. The TRS items are grouped according to their factor loadings (.40 or greater). The first factor, Hyperactivity/Conduct Disorder,

[4]Technically, the principal components analysis with unities in the diagonal produces components rather than factors; these terms are often used interchangeably (Joreskog & Sorbom, 1979).

[5]These analyses were also conducted without restriction of factors. For girls, 10 factors emerged that had eigenvalues >1.0, but if only factors were retained that had at least three items, the factors in the analysis were essentially the same. For boys, 9 factors emerged with eigenvalues >1.0; when only factors that had at least three items were retained, these factors were the same in both analyses.

The data were also analyzed using a principal factor solution with estimate of communalities in the diagonal and varimax criterion for rotation. Six factors emerged for both boys and girls, with eigenvalues >1.0; these factors replicated almost exactly the factors obtained through the principal component analysis.

Table II. Conners Teacher Rating Scale: Total Sample (N = 344) Varimax Rotated Factor Analysis

Item	Factor					
	HA/ conduct	Interpersonal problems	Depression	Anxiety/ passivity	Inattention	Delinquency
5. Restless/HA	.82	-.002	.16	-.06	-.20	.02
1. Fidgeting	.81	.05	.23	.004	-.13	.10
2. Hums	.78	.24	.16	.02	-.03	.12
6. Excitable	.72	.19	-.003	.16	-.15	.18
3. Demands	.71	-.03	.12	.23	-.07	-.09
14. Disturbs	.69	.34	.27	-.14	-.17	.23
17. Acts smart	.66	.24	.05	-.05	-.07	.27
29. Teases	.65	.43	.23	-.12	-.10	.28
35. Excessive demands	.55	.09	.13	.33	.06	-.07
25. No fair play	.51	.46	.26	.007	-.17	.32
28. P. same sex	.26	.76	.07	.20	.006	.002
27. P. opposite sex	.18	.68	.11	.09	-.02	.005
23. Unaccepted	.03	.63	.25	.32	.09	.10
20. Lies	.09	.52	.30	.08	-.09	.33
7. Inattentive	.27	.16	.81	.06	-.11	.14
8. Doesn't finish	.28	.13	.80	.10	-.09	.15
24. Easily led	.20	.08	.61	-.003	.44	.07
11. Daydreams	-.09	.12	.54	.36	.05	-.14
4. Coordination	.28	.04	.50	.15	.06	.13
26. Lacks leader	-.02	.23	.49	.04	.48	-.04
38. Uncooperative	.16	.23	.48	.11	.04	.41
12. Sullen/sulky	.08	.12	.13	.75	.03	.05
10. Serious/sad	-.20	.01	.05	.64	.28	.03
13. Cries	.16	.14	.08	.55	.10	-.14
16. Mood changes	.46	.08	.10	.54	-.12	.20
22. Isolated	-.18	.17	.25	.54	.26	.12
21. Temper	.38	.28	.03	.46	-.04	.21
36. Stubborn	.37	.43	-.01	.43	-.15	.25
34. Fearful	-.15	-.000	.06	.27	.75	.02
33. Shy	-.28	.04	.14	.15	.71	.04
30. Submissive	-.15	-.10	.03	.01	.65	-.06
31. Defiant	-.30	-.25	-.23	-.11	.55	-.23
9. Sensitive	.26	-.11	-.10	.41	.47	.08
39. Attendance P.	.14	-.12	.18	.12	.08	.73
19. Steals	.06	.23	.06	-.06	-.05	.69
18. Destructive	.44	.38	.09	.03	-.02	.47
32. Impudent	.24	.26	-.00	.14	-.30	.43
Eigenvalue	6.8	3.5	3.6	3.1	3.0	2.5
% total variance	17.5	9.0	9.1	8.1	7.7	6.4
Items	10	4	7	7	5	4

Cumulative variance accounted for by the six factors: 57.8%.

Table III. Conners Teacher Rating Scale: Males (N = 186) Varimax Rotated Factor Analysis

Item	Factor					
	HA/ conduct	Interpersonal problems	Depression	Anxiety/ passivity	Inattention	Delinquency
5. Restless	.83	.04	-.10	-.18	.08	.01
1. Fidgeting	.82	.12	-.04	-.06	.18	.06
2. Hums	.79	.29	-.000	.02	.09	.03
3. Demands	.74	-.05	.26	-.14	-.005	-.04
6. Excitable	.73	.14	.13	-.17	.02	.18
14. Disturbs	.68	.35	-.08	-.14	.29	.18
29. Teases	.65	.44	-.05	-.06	.22	.25
17. Acts smart	.62	.32	-.04	-.10	.000	.26
35. Excessive demands	.55	.18	.41	.04	.01	-.003
15. Quarrelsome	.55	.43	.22	-.12	.12	.26
25. No fair play	.53	.44	.13	-.13	.30	.27
18. Destructive	.46	.33	.03	-.02	.24	.40
27. P. opposite sex	.19	.75	-.04	.01	.11	-.04
28. P. same sex	.33	.71	.18	.06	.06	-.01
20. Lies	.04	.64	.16	.003	.15	.40
23. Unaccepted	.21	.61	.30	.20	.13	.11
36. Stubborn	.35	.47	.34	-.12	-.02	.29
12. Sullen/sulky	.08	.08	.83	.04	.13	.05
10. Serious/sad	-.19	-.03	.68	.28	.15	-.06
22. Isolated	-.08	.07	.60	.34	.10	.13
13. Cries	.12	.32	.59	-.02	.01	-.20
16. Mood changes	.45	.18	.54	-.07	.02	.27
9. Sensitive	.29	-.18	.47	.33	-.18	-.06
34. Fearful	-.17	.06	.15	.77	-.07	-.005
33. Shy	-.28	.003	.11	.74	.11	-.05
30. Submissive	-.15	-.21	.08	.64	-.11	-.01
26. Lacks leader	.04	.18	.13	.62	.22	-.04
24. Easily led	.18	.09	.03	.53	.45	.11
7. Inattentive	.30	.17	.11	.03	.81	.14
8. Doesn't finish	.35	.18	.14	.05	.74	.14
37. Anxious	.36	.12	.06	.19	-.49	-.03
38. Uncooperative	.17	.25	.06	.16	.465	.461
19. Steals	.07	.15	-.005	-.05	.02	.78
39. Attendance	.13	-.06	.03	.05	.19	.74
32. Impudent	.24	.41	.002	-.30	.007	.46
Eigenvalue	7.0	4.1	3.4	3.2	2.8	2.7
% total variance	17.9	10.5	8.7	8.2	7.2	6.7
Items	12	5	6	5	4	3

Cumulative variance accounted for by the six factors: 59.4.

included 10 items, and it accounted for 17.5% of the total variance. The second factor, labeled Interpersonal Problems (4 items), accounted for 9% of the variance. The third factor, Inattention (7 items), accounted for 9.1% of the variance. The fourth factor, Depression (7 items), accounted for 8.1% of the variance. The fifth factor, Anxiety/Passivity (5 items), accounted for 7.7% of the variance. The sixth factor, Delinquency (4 items), accounted for 6.4% of the variance.

Separate factor analyses were computed for boys and girls, as Achenbach (1982) has found that both the composition of items on factors and the factors themselves may vary by sex. As is indicated in Tables III and IV, for girls there was a separate hyperactivity factor, whereas for boys, hyperactivity and conduct problems loaded on one combined factor. Inattention, Interpersonal Problems, and Anxiety/Passivity emerged as factors for both boys and girls, though the items differed across sexes. The Predelinquency factor for boys was not replicated in the girls' sample. While there was some overlap in the factors obtained for boys and girls, the differences obtained make it seem critical that factor structures for boys and girls be assessed separately. There have been at least a dozen studies with the TRS in which factor analyses were conducted; none of these studies included separate factor analyses for boys and girls.

To statistically assess factor similarity for boys and girls, coefficients of congruence were calculated according to Tucker's formula (Harman, 1976). As seen in Table V, the coefficients of congruence for factors with the same or similar names for boys and girls range from .632 to .887. We know of no test of significance for Tucker's (1951) coefficients of congruence for factor structures obtained through varimax rotation. There is a test of significance for coefficients of congruence, but the two solutions to be compared are each rotated first to maximal similarity and the coefficients themselves are computed on these factor structures. Factor structures obtained through rotation to maximal similarity yield different items than those obtained in the varimax rotation.[6]

Given our factor analyses, our congruence data, and the lack of significance test for our coefficients of congruence, we argue that it is advisable to obtain separate factor structures for boys and girls for the following

[6]Using the empirically derived method of testing coefficients of congruence described by Korth and Tucker (1975), all six factors for the males would be judged similar to the factors for the females. The congruence coefficients obtained by this method for the six factors were .99, .97, .88, .71, .64, and .21. The method described by Korth and Tucker is used to ascertain whether there is underlying factorial similarity across samples. This method rotates solutions obtained in two different samples to achieve maximal similarity, and it is not used to maximize interpretation of the factors. In fact, in the transformed factor pattern, the first factor for boys and girls yielded a general Conduct Problem factor with 27 items loading on it.

Table IV. Conners Teacher Rating Scale: Females ($N = 158$) Varimax Rotated Factor Analysis

Item	Factor					
	Hyper-activity	Conduct	Inattention	Anxiety/ passivity	Interpersonal problems	Depression
1. Fidgeting	.72	.18	.18	-.17	-.16	.18
5. Restless/HA	.70	.20	.22	-.23	-.22	.02
3. Demands	.68	.12	.17	.10	.21	-.20
35. Excessive demands	.62	.03	.10	.21	.17	-.20
16. Mood changes	.59	-.70	.20	-.06	.20	.22
2. Hums	.58	.48	.18	.01	-.08	.26
6. Excitable	.56	.32	-.15	-.05	.13	-.03
21. Temper	.56	.09	.14	.05	.23	.35
17. Acts smart	.42	.38	-.05	.07	-.10	.08
29. Teases	.31	.76	.20	-.11	.001	-.01
25. No fair play	.13	.73	.20	-.16	.21	.02
14. Disturbs	.39	.72	.25	-.18	-.05	-.02
15. Quarrelsome	.22	.69	-.16	-.008	.21	.30
20. Lies	-.11	.61	.39	-.02	.07	.01
19. Steals	-.12	.53	.14	-.04	.36	-.23
8. Doesn't finish	.15	.23	.82	-.05	.05	.03
7. Inattentive	.19	.30	.76	-.06	.14	.03
4. Coordination	.18	.11	.61	.03	.05	.17
24. Easily led	.13	.12	.62	.43	.006	-.09
11. Daydreams	.22	-.03	.59	.06	.01	.16
26. Lacks leader	-.14	.06	.57	.37	.18	-.13
38. Uncooperative	.21	.003	.49	.001	.48	-.001
34. Fearful	-.05	-.16	.14	.78	.003	.18
33. Shy	-.24	-.01	.15	.74	.06	.15
9. Sensitive	.24	-.08	-.07	.62	.21	.04
30. Submissive	-.11	-.11	.12	.54	-.11	-.02
37. Anxious	.28	.06	-.14	.50	.05	-.16
31. Defiant	-.23	-.33	-.21	.44	-.07	-.29
28. P. opposite sex	.06	.14	.02	-.05	.74	.20
27. P. same sex	.14	.18	.03	.10	.70	.05
23. Unaccepted	-.17	.08	.36	.05	.64	.24
36. Stubborn	.37	.19	-.009	-.04	.50	.46
22. Isolated	-.15	-.16	.39	.24	.43	.29
12. Sullen/sulky	.08	-.16	.16	.16	.23	.64
10. Serious/sad	-.15	-.21	.05	.40	.12	.56
18. Destructive	.04	.41	-.18	.09	.27	.51
32. Impudent	.08	.14	.03	-.15	.06	.49
Eigenvalue	4.55	4.06	4.10	3.33	2.63	2.78
% total variance	11.7	10.4	10.5	8.5	6.7	7.1
Items	9	6	7	6	5	4

Cumulative variance accounted for by the six factors: 54.4.

Table V. Coefficients of Congruence Among Factors in Boys and Girls

	Females					
Males	HA	Conduct	Inattention	Anxiety/ passivity	Interpersonal problems	Depression
HA/conduct	.887	.733	.329	-.117	.297	.328
Interpersonal problems	.434	.697	.419	-.058	.700	.475
Depression	.345	.028	.402	.437	.530	.632
Anxiety/passivity	-.223	-.245	.327	.870	.147	.019
Inattention	.242	.464	.837	-.088	.271	.253
Delinquency	.313	.639	.329	-.051	.404	.379

reasons: (1) There is a delinquency factor for boys but not for girls; (2) Hyperactivity and Conduct Problems appear as separate factors for boys and girls but as a combined factor for boys; (3) the coefficients of congruence in Table V indicate that some factors, e.g., Depression, have only moderate similarity across boys and girls, reflecting in part quite different items for the two samples.

Correlations among weighted factor scale scores for boys and girls separately appear in Table VI. Most of the factors scores are significantly correlated with one another. However, the correlations are such that the vari-

Table VI. Intercorrelations of Factor Scale Scores

	Males				
	HA/ conduct	Interpersonal problems	Depres- sion	Anxiety/ passivity	Inattention
Interpersonal problems	.57[a]				
Depression	.28[a]	.43[a]			
Anxiety/ passivity	-.26[a]	-.03	.26[a]		
Inattention	.56[a]	.50[a]	.32[a]	.07	
Delinquency	.39[a]	.39[a]	.14[c]	-.17[c]	.38[a]

	Females				
	HA	Conduct	Inat- tention	Anxiety/ passivity	Interpersonal problems
Conduct	.47[a]				
Inattention	.44[a]	.42[a]			
Anxiety/ passivity	-.07	-.23[b]	.11		
Interpersonal problems	.25[a]	.31[a]	.46[a]	.12	
Depression	.14[c]	.02	.19[b]	.26[b]	.44[a]

[a] $p < .0001$.
[b] $p < .001$.
[c] $p < .05$.

ables have large amounts of nonoverlapping variance. Of special interest is the moderate correlation between hyperactivity and conduct problems scores in females (r = .47). This relationship is of special interest as the hyperactivity items were subsumed under one factor, i.e., Hyperactivity/Conduct problems, for boys.

DISCUSSION

There is no magical cutoff score that should be recommended to identify hyperactive children. Various cutoff scores can be used to select a certain percentage of any sample. Our data indicate that use of the mean plus 2 standard deviations yields approximately 5% of the sample of both boys and girls. Most important, it should be emphasized that our cutoff scores are higher for boys and lower for girls than the commonly used 1.5 score.

There is no published study on prevalence of hyperactivity in the United States based on a representative sample of the U.S. population. The data presented by Sprague, Christensen, and Werry (1974) are often referred to as normative data (e.g., Trites et al., 1979; Sprague, Cohen, & Werry, 1974), but Sprague, Christensen, and Werry (1974) stated that "the normal sample included all children in 13 classes except the hyperactive children . . . and any child whom the teacher was planning to refer to the project (drug treatment) in the next academic semester" (p. 149). Langsorf et al. (1979) were interested in prevalence differences across ethnic groups and therefore did not attempt to be representative of the U.S. population, and no sex breakdown was given. The most representative U.S. data (Ullmann, personal communication, August 1983) indicate that 17% of white children met the 1.5 cutoff on the ATRS. As noted earlier, Langsdorf et al. (1979) found that 11% of white middle-class children met the 1.5 cutoff score. The figures presented by Langsdorf and his colleagues are fairly similar to our overall Italian prevalence rate of 12%, whereas the Illinois sample yielded higher percentages. While Sprague et al. (1977) noted that European professionals held the belief that there was no hyperactivity in Europe, it is clear from our data that this notion is not correct.

We are not arguing that prevalence rates should be theoretically the same across cultures of ethnic groups. In fact, they do vary across black, white, and Chicano children in the United States (Langsdorf et al., 1979) and across black, white, and Indian children in South Africa (Barling, O'Leary, & Taffinder, 1983). Further, prevalence rates appear to vary within racial groups across different cultures. More specifically, the range of white children who met the 1.5 cutoff score (on the ATRS) varies from 8% in Germany to 17% in the United States (see Table VII).

Table VII. Overall Prevalence Rates Using 1.5 + Cutoff Score on the ATRS[a]

United States	11%	(Langsdorf et al., 1979)
United States	17%	(R. Ullmann, 1983)
Germany	8%	(Sprague et al., 1977)
New Zealand	15%	(Werry & Hawthorne, 1976)
Italy	12%	(Present study)
Spain	16%	(Arias & O'Leary, 1983)

[a]Rates were obtained by averaging rates for boys and girls where overall rates were not reported.

There are a number of methodological problems regarding research on prevalence of hyperactivity. Sample delineation is crucial, yet it is generally unclear whether "all" children in a school includes only children in regular classes or children in special classes as well. If the latter are excluded, the numbers of children excluded should be noted and the types and percentages of children in various special classes should be reported (e.g., learning-disabled, emotionally disturbed, neurologically impaired, and gifted). Where special classes for exceptional children are excluded, the exclusion could markedly influence the prevalence rates. In obtaining hyperactivity prevalence data, it seems most desirable to include all children within a school district except classes for the mentally retarded. Moreover, when mentally retarded children are excluded, the numbers of such children should be reported.

Description of socioeconomic and ethnicity factors should also be carefully reported in prevalence research, as both factors appear to influence prevalence rates quite markedly. For example, Langsdorf et al. (1979) found that almost 25% of blacks met a commonly accepted criterion of hyperactivity, whereas only 8% of Chicanos met such a criterion. Similarly, Ullmann (personal communication, August 1983) found that 24% of blacks, while only 16% of whites, met the 1.5 ATRS cutoff score in Illinois. Finally, prevalence also appears to vary with socioeconomic status (Trites, 1979).

Our results confirm the work of Achenbach (1982), who found that the sex of the child influenced the factor structures obtained when one uses various behavior problem checklists to assess child behavior. In the present study, the first factor, labeled Hyperactivity/Conduct for boys, included a much broader group of behaviors than the behaviors labeled Conduct Problem Behaviors for girls. Basically, there was a Hyperactivity factor, a Conduct factor, and an Inattention factor for girls. For boys the Conduct factor subsumed both Hyperactivity items and Conduct Problem items. Many studies attest to the different sex ratios for referral problems to mental health clinics (Cerreto & Tuma, 1977). Further, different socialization patterns for

boys and girls (Yussen & Santrock, 1982) are likely to produce different behavior patterns for the two sexes. Such data should alert us to the need to obtain factor structures for boys and girls to assess whether they are different. We are unaware of any published normative studies with the TRS that present factor structures separately for boys and girls.

The main factors we obtained were similar to those obtained in Spain (Arias & O'Leary, 1983) for girls. More specifically, Conduct, Hyperactivity, and Inattention emerged as factors in both groups. The other three factors did not bear enough similarity to have similar labels. For boys, there were Depression or Affective Problem factors and Anxiety/Passivity factors in both countries. The other four factors did not bear enough similarity to have the same labels. Basically, the major finding evident in these data as well as in the data of other researchers in various countries is that Hyperactivity and Conduct Problems or some combination of the two emerge as the first factors that account for the greatest variance. Of special interest was the similar finding that Hyperactivity was a separate factor for girls in both Spain and Italy. Hyperactivity was a separate factor for boys in Spain, but, in the Italian data, items representing both Conduct and Hyperactivity loaded on the first factor for boys. Four or five of the items of factor one are generally seen as Hyperactivity items whereas seven of the items would generally be labeled Conduct items. The third factor, labeled Depression, has not appeared as a separate factor in most studies of boys, but Depression is increasingly recognized as a factor to be assessed in studies of psychopathology of children. Further, it is similar to the symptom description of O'Leary and Steen (1982) in their factor analyses of boys who were mainly hyperactive. The sixth factor, Delinquency, has not appeared as a separate factor in most studies; the items on this factor have often loaded on the Conduct factor. In brief, with the exception of the Depression and Delinquency factors, there was considerable similarity between the factors obtained in this Italian sample and factors obtained in other countries.

In accordance with Quay's argument (1980), we found no pure Hyperactivity factor in the boys' sample; instead, the items often included in a Hyperactivity factor loaded on the first factor, here labeled Hyperactivity/Conduct Disorder factor. Also in accord with Quay's 1980 position, it appears that there is a factor that is different from Conduct Disorders and Hyperactivity, namely, an Inattention factor. Whether hyperactivity, aggression, and conduct disorders can be separated diagnostically and statistically is a subject of considerable debate. It is certainly clear that a large percentage of children can be aggressive and not hyperactive and vice versa. However, between 25 and 50% of the children referred for behavioral problems and/or hyperactivity in the classroom are both aggressive and hyperactive (Prinz et al., 1981; Steen, 1982). The frequently reported high corre-

lations between hyperactivity and aggression in nonclinic or normal samples (Werry et al., 1975; Lahey, Green, & Forehand, 1980) are due in part to the skewed distributions composed of small numbers of children with serious problems and large numbers of children with few or no reported problems. Such correlations should not lead us to conclude that it is practically unfeasible to build diagnostic instruments that can differentially assess hyperactivity and aggression since both Loney, Langhorne, and Paternite (1979) and O'Leary and Steen (1982) have successfully used factor-analytic procedures to assess these behaviors differentially.

Since in this sample there was no pure Hyperactivity factor for boys, one might question the legitimacy of referring to a prevalence rate of hyperactivity for boys. However, when our subjects were scored for the six-item Hyperactivity factor of Conners (1969), boys' scores correlated .90 with the ATRS and girls' scores correlated .84 with the ATRS. Therefore, even though the Conners HA factor often does not emerge as a separate factor (Kupietz & Botti, 1974), it seems clear that the relationship between children's scores on the six-item HA factor and their ATRS scores is high.

Whether Hyperactivity emerges as a separate factor in a factor analysis is not the critical question. For purposes of prevalence studies, it is important that an index of hyperactivity be reliable and meet certain validity criteria. Although it is susceptible to practice effects, the ATRS is reliable and shows substantial correlations with parental ratings (Goyette, Conners, & Ulrich, 1978). Half of the 10 items included in the ATRS appear almost verbatim in the DSM III (American Psychiatric Association, 1980) Diagnosis of Attention Deficit Disorder with Hyperactivity. The ATRS is sensitive to drug (O'Leary & Pelham, 1978) and behavior therapy interventions (O'Leary et al., 1976). It is not necessary to have a measure of behavior emerge in factor-analytic studies as a pure independent factor in order for the measure to be of substantive interest. In fact, in most factor-analytic studies of the behavior of adults and children, generally only two to three factors appear reliably. However, it is still theoretically and practically useful to develop measures of behavior that may correlate with the general factors that emerge in other factor-analytic studies.

Prevalence rates of hyperactivity based on teacher rating data have clear limitations. Despite the similarity of the number of factors extracted and the factor structures obtained across cultures, rating data may produce different results simply because of the selective perceptual sets that might exist across cultures. The TRS requires that a teacher make a judgment regarding the frequency of certain behaviors. Many of the behaviors are fairly specific and would be agreed upon by teachers across different cultures, e.g., steals, lies, hums, cries often and easily. On the other hand, significant judgmental differences or perceptual sets could affect one's ratings of sullen or sulky,

restless or overactive, daydreams, fearful or shy. Of course, differing prevalence data could in fact reflect true differences in hyperactivity across cultures. A methodological study is in order to assess factors that influence teacher judgments of various behavior problems; behaviors might vary by some objective standing and rating data could be obtained to assess whether selective perceptual sets might exist across cultures. If teachers in different countries did not have different perceptual sets regarding the appropriateness of various classroom behaviors, then differences in prevalence rates across countries would have very special meaning.

REFERENCES

Achenbach, T. M. (1982). Empirical approaches to classification of child psychopathology. In J. R. Lachenmeyer & M. S. Gibbs (Eds.), *Psychopathology in childhood.* New York: Gardner.

American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington, D.C.: Author.

Arias, I., & O'Leary, K. D. (1983). *Hyperactivity in Spain.* Unpublished manuscript, State University of New York at Stony Brook.

Barling, J., O'Leary, K. D., & Taffinder, A. (1983). *Hyperactivity in South Africa.* Unpublished manuscript, University of Witwatersrand.

Brown, R. T., & Sleator, E. K. (1979). Methylphenidate in hyperactive children: Differences in dose effects on impulsive behavior. *Pediatrics, 64,* 408-411.

Cerreto, M. C., & Tuma, J. M. (1977). Distribution of DSM-II diagnoses in a child psychiatric setting. *Journal of Abnormal Child Psychology, 5,* 147-156.

Conners, C. K. (1969). A teacher rating scale for use in drug studies with children. *American Journal of Psychiatry, 126,* 152-156.

Eisenberg, L. (1976). Foreword. In D. Safer & R. Allen, *Hyperactive children: Diagnosis and management.* Baltimore: University Park Press.

Goyette, C. H., Conners, C. K., & Ulrich, R. F. (1978). Normative data on the revised Conners Parent and Teacher Rating Scale. *Journal of Abnormal Child Psychology, 6,* 221-236.

Guy, W. (1976). *ECDEU Assessment Manual for Psychopharmacology.* (Washington, D.C.: DHEW publication no. ADM76-338), U.S. Department of Health, Education and Welfare.

Harman, H. H. (1976). *Modern factor analysis* (3rd ed.). Chicago: University of Chicago Press.

Joreskog, K. G., & Sorbom, D. (1979). *Advances in factor analysis and structural equation models.* Cambridge: ABT Books.

Korth, B., & Tucker, L. R. (1975). Distribution of change congruence coefficients from simulated data. *Psychometrica, 40,* 361-372.

Kupietz, S., & Botti, E. (1974). Behavior measures in pediatric psychopharmacology. *American Journal of Psychiatry, 131,* 106.

Lahey, B., Green, K., & Forehand, R. (1980). On the independence of ratings of hyperactivity, conduct problems, and attention deficits in children: A multiple regression analysis. *Journal of Consulting and Clinical Psychology, 48,* 566-574.

Langsdorf, R., Anderson, R. F., Walchter, D., Madrigal, J. F., & Juarez, L. J. (1979). Ethnicity, social class and perception of hyperactivity. *Psychology in the Schools, 16,* 293-298.

Loney, J., Langhorne, J. E., & Paternite, C. E. (1979). An empirical basis for subgrouping the hyperkinetic/minimal brain dysfunction syndrome. *Journal of Abnormal Psychology, 87,* 431-441.

Nie, N. H., Hull, C. H., Jenkins, J. G., Steinbrenner, K., & Bent, D. H. (1975). *Statistical package for the social sciences* (2nd ed.). New York: McGraw-Hill.

O'Leary, K. D., & Johnson, S. B. (1979). Assessment. In H. C. Quay & J. S. Werry (Eds.), *Psychopathological disorders of childhood* (2nd ed.). New York: Wiley.

O'Leary, S. G., & Pelham, W. E. (1978). Behavioral therapy and withdrawal of stimulant medication with hyperactive children. *Pediatrics, 61,* 211-217.

O'Leary, K. D., Pelham, W. E., Rosenbaum, A., & Price, G. H. (1976). Behavioral treatment of hyperkinetic children. *Clinical Pediatrics, 15,* 510-515.

O'Leary, S. G., & Steen, P. L. (1982). Subcategorizing hyperactivity: The Stony Brook Scale. *Journal of Consulting and Clinical Psychology, 50,* 426-432.

Peterson, D. R. (1965). Scope and generality of verbally defined personality factors. *Psychological Review, 72,* 48-59.

Prinz, R. J., Connor, P. A., & Wilson, C. C. (1981). Hyperactive and aggressive behaviors in childhood: Intertwined dimensions. *Journal of Abnormal Child Psychology, 9,* 191-202.

Quay, H. C. (1980). *Comments on conduct disorder, attention deficit disorder and hyperactivity.* Paper presented at the annual meeting of the American Psychological Association, Montreal.

Sprague, R. L., Christensen, D. E., & Werry, J. S. (1974). Experimental psychology and stimulant drugs. In C. K. Conners (Ed.), *Clinical use of stimulant drugs in children* (pp. 148-152). New York: American Elsevier.

Sprague, R. L., Cohen, M., & Eichlseder, W. (1977, February). Are there hyperactive children in Europe and the South Pacific? In R. Halliday (Chair), *The hyperactive child: Fact, fiction, and fantasy.* Symposium conducted at the meeting of the American Psychological Association, San Francisco.

Sprague, R. L., Cohen, M., & Werry, J. S. (1974, November). *Normative data on the Conners Teacher Rating Scale and Abbreviated Scale* (Tech. Rep. of the Institute of Child Behavior and Development. University of Illinois, Children's Research Center.

Steen, P. (1982). *Validation of the Stony Brook Activity Scale.* Unpublished doctoral dissertation, SUNY, Stony Brook.

Trites, R. (1979). Prevalence of hyperactivity in Ottawa, Canada. In R. Trites (Ed.), *Hyperactivity in children.* Baltimore: University Park Press.

Trites, R., Blouin, A. G., & Laprade, K. (1982). Factor analysis of the Conners Teacher Rating Scale based on a large normative sample. *Journal of Consulting and Clinical Psychology, 50,* 615-623.

Trites, R., Dugas, E., Lynch, G., & Ferguson, H. B. (1979). Prevalence of hyperactivity. *Journal of Pediatric Psychology, 4,* 179-188.

Tucker, L. R. (1951). *A method for syntheses of factor analyses studies.* Rep. No. 984. Washington, D.C.: Department of the Army, Personnel Research Section.

Werry, J. S., & Hawthorne, D. (1976). Conners teacher questionnaire—Norms and validity. *Australian and New Zealand Journal of Psychiatry, 10,* 257-262.

Werry, J. S., Sprague, R., & Cohen, M. (1975). Conners Teacher Rating Scale for use in drug studies with children—An empirical study. *Journal of Abnormal Child Psychology, 3,* 217-229.

Yussen, S. R., & Santrock, J. W. (1982). *Child development: An introduction.* Dubuque, Iowa: Wm. Brown.