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Running Head: PARENT RATING SCALES COMPARISON

**Is One Parent Rating Scale Enough:  
A Comparison of Three ADHD Parent Rating Scales**

**Nicole M. Lesiak**

**Rochester Institute of Technology**

School Psychology Program  
College of Liberal Arts  
George Eastman Building  
18 Lomb Memorial Drive  
Rochester, New York 14623-5604  
716-475-6701 716-475-2765

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School Psychology.

Student \_\_\_\_\_

First Reader V. Costiuliadek

Date May 1996

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*Abstract:* This study examined the accuracy of three parent rating scales in identifying Attention Deficit Hyperactivity Disorder (ADHD) in children who had been diagnosed previously with this disorder. If the assumption is made that all previous diagnoses were accurate, then all diagnoses on all scales should be positive. The rating scales selected were *The Attention Deficit Disorders Evaluation Scales Second Edition - Home Version (ADDES)* (1995), *Conners' Abbreviated Symptom Questionnaire, Parent Version (ASQ-P)* (1990), and the *Revised Home Situations Questionnaire (HSQ-R)* (1990). Subjects consisted of parents of fifty elementary age children. Results indicated that none of the three scales correctly indicated 100% of the previously identified ADHD students. Accuracy rates ranged from 39% to 74%. Implications for ADHD identification within the schools were considered.

Attention Deficit Hyperactivity Disorder (ADHD) is a behavioral condition estimated to affect 4-10 % of all children in the United States (Pennington, 1991). Prevalence estimates vary depending on the cutoff scores used in studies. These estimates have varied from a low of 3% in a study by Shapiro & Garfinkel (as cited in Reid & Maag, 1994) to moderate levels ranging from 5-8% found by Pellhem, Gnagy, Greenslade, & Milich (as cited in Reid & Maag, 1994) to a high of 23% in a study by Shaywitz and Shaywitz (1988). In fact, every general education classroom may enroll one ADHD child. ADHD (characterized by inattention, impulsivity, and hyperactivity) underlies approximately 40% of referrals made in schools (Barkley, 1990). ADHD occurs more frequently in males with ratios ranging from four to one (general population) to nine to one (clinical settings), depending on the setting (American Psychiatric Association, 1994).

ADHD is often visible beginning in infancy through symptoms such as restlessness and frequent crying. Therefore, parents experience the behavior associated with ADHD for years before school enrollment. Parents report that their affected children are less attentive, more impulsive, and more hyperactive than their "non-ADHD" children.

The diagnosis of ADHD involves collecting behavioral data from a variety of situations and individuals familiar with the child. Rating scales are frequently used to accomplish this. A disorder is present or absent depending on the degree to which an individual deviates from the mean of the norm group. The DSM-IV gives five criterion for a diagnosis of ADHD. The first criterion (A) is "a persistent pattern of inattention and/or hyperactivity that is more frequent than is typically observed in individuals at a comparable level of development" (American Psychiatric Association, 1994). The DSM-IV states that some symptoms must have been present before age seven (Criterion B). The third criterion (C) is that the symptoms must be present in at least two

settings such as at home and at school. There must also be clear evidence "of interference with developmentally appropriate social, academic or occupational functioning" (Criterion D) (American Psychiatric Association, 1994, p. 78). The final criterion (E) is that the disturbance does not occur only during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and cannot be accounted for more appropriately by another mental disorder. The new criteria recognize the need for two separate lists, inattention and hyperactive-impulsive, which describe symptoms and behavior associated with ADHD. Three subtypes are now recognized: Attention Deficit Hyperactivity Disorder, Combined; Attention Deficit Hyperactivity Disorder, Predominantly Inattentive; and Attention Deficit Hyperactivity Disorder, Predominantly Hyperactive-Impulsive. Therefore, rating scales should be capable of categorizing behavior into the areas of Inattention and Hyperactive-Impulsive.

Parent rating scales often are used to help determine the extent to which Criterion C is fulfilled. Many questions asked on a rating scale require a respondent who is frequently with the child. Parents are with the child in various settings outside the classroom throughout the day and are in the best position to have consistent observational opportunities in a setting outside school. Knowing this, several parent rating scales for assessing ADHD have been developed.

Diagnosis of ADHD is difficult due to confounding variables such as learning disabilities, mental retardation, conduct disorders or other mental disorders. Therefore, before using a rating scale for diagnostic purposes, thorough reliability and validity studies must be conducted. Assessment instruments should possess a minimum reliability of .80 for screening purposes and .90 for diagnostic purposes (Salvia & Ysseldyke, 1991). Studies of the scales' ability to discriminate among known groups are particularly necessary. Rating scales must be effective in

discriminating between children with and without Attention Deficit Hyperactivity Disorder to reduce the likelihood of false positives and false negatives.

With the recent increase of ADHD diagnoses, school psychologists' use of parent rating scales has increased. ADHD is becoming a more prominent educational concern because of the association of ADHD with both academic difficulties and school behavior problems. Although The Individuals with Disabilities Education Act (IDEA) (1990) does not recognize ADHD as an official disability, students with ADHD may be eligible for support services under the Other Health Impaired or Physically Impaired categories (Reid & Maag, 1994). Also, individuals diagnosed as ADHD are recognized as handicapped under Section 504 of the Rehabilitation Act as published in the Individuals with Disabilities Educational Law Report (1991). Children are increasingly eligible for special education services when it is found that ADHD is negatively impacting their ability to be successful in the classroom. School Psychologists may feel increasing pressure to identify students as ADHD in order for them to receive services they would not be entitled to under the current special education criteria. Since diagnosis requires that the behavior occur in more than one environment, both parents and teachers need to provide information regarding the behavior of the child. Unfortunately, research assessing reliability and validity of these newly developed parent rating scales is scant.

One such scale is *The Attention Deficit Disorders Evaluation Scale Second Edition, Home Version* (ADDES) by Stephen B. McCarney, EdD (1995). The ADDES was designed to provide a measure of the characteristics found in the DSM-IV definition of Attention-Deficit/Hyperactivity Disorder. The ADDES produces two factors associated with ADHD diagnosis: Inattention and Hyperactive-Impulsive. The 46 items were developed by using the



DSM-IV criteria and the input from diagnosticians and parents of ADHD children (McCarney, 1995). Descriptors were gathered from the volunteers concerning what behavior was most indicative of ADHD in children and youth. The original item sample of 53 questions was tested and reduced to the 46 items through item analysis. The items are rated on a five-part scale: "Does not engage in the behavior", "One to several times per month", "One to several times per week", "One to several times per day", and "One to several times per hour." The ADDES may prove to be an excellent scale in the diagnosis of ADHD; however, due to its recent publication date there is no published scientific research on its merits.

A second scale, the *Conners' Abbreviated Symptom Questionnaire, Parent Version* (ASQ-P) (1990), is composed of the ten items most frequently endorsed by parents of hyperactive children. The ASQ-P was originally developed in 1973 as a device for measuring the effectiveness of various drugs used to treat hyperactivity in children and adolescents (Conners, 1990). These items were extracted from the full version of the *Conners' Parent and Teacher Rating Scales*, and are called the Hyperactivity Index. Since the ASQ-P was based on the original full scales, technical data has not been investigated thoroughly on the Hyperactivity Index itself. The *Conners' Rating Scale Manual* (1990) provides reliability and validity data specifically for the ASQ-P. The Product-moment correlation between mothers' and fathers' ratings on the Hyperactivity Index is .55. In a study by Sandberg, Wieselberg, and Shaffer (as cited in Conners, 1990) an alpha internal consistency reliability coefficient of .92 is reported, corrected for length. The validity studies cited in the *Conners' Rating Scale Manual* were conducted by outside researchers. The Hyperactivity Index has been shown to be an effective screener for Attention Deficit Hyperactivity Disorder in studies by Boyle & Jones and Satin et al. (as cited in Conners,

1990), and to discriminate behavior disordered children from normal by Margalit (as cited in Conners, 1990) and Learning Disabled peers by Wynne and Brown (as cited in Conners, 1990). Goyette, Conners, and Ulrich (1978) found that the original 93 item scale factored into five scales labeled conduct disorder, discrete attention, psychosomatic, hyperactivity, and anxiety. Cohen (1988) attempted to replicate these findings using a varimax rotation and produced four factors: conduct disorders, attention deficit disorder with hyperactivity, anxiety, and psychosomatic complaints. Cohen found that children diagnosed with ADHD obtained significantly higher scores on the second subscale. This subscale is characterized by inattention, impulsivity, hyperactivity, preservation, and mild conduct problems.

The ASQ-P is now in its 1990 publication by Multi-Health Services. The ten item questionnaire uses a four point response scale of "not at all", "just a little", "pretty much", and "very much." Elevated scores on the scale suggest an increased chance of pathology. Few research studies are available on the abbreviated form of this rating scale. Goyette, Conners, and Ulrich (1978) reported that the ASQ-P is reliable in identifying hyperactive children and assessing drug-induced behavioral effects. An inter-rater parent agreement of .55 ( $p < .001$ ) was computed for the ten items on the ASQ-P. The authors reported that the age and sex of the child are significant determinants in the child's score: younger children typically have a higher score on the ASQ-P.

The ASQ-P has been criticized for being unstable over time due to the limited item content (Goyette, Conners, & Ulrich, 1978). In addition, Ullmann, Sleanor and Sprague (1985) reported that the scale assesses both conduct problems and hyperactivity symptoms. Therefore, Barkley (1990) suggested that it was not a good choice for assessing ADHD in children or adolescents.

A third scale that purports to be sensitive to ADHD symptoms is the *Revised Home Situations Questionnaire* (HSQ-R) developed by DuPaul (1990). The HSQ-R was developed to rate the pervasiveness of behavior problems across situations in ADHD children. The items purport to measure whether problem behavior occurs in specific situations and, if so, items rate the severity of the behavior. This scale was designed to evaluate children suspected to have ADHD and to measure the severity and pervasiveness of attention difficulties within the home environment (DuPaul & Barkley, 1992). The HSQ-R is comprised of fourteen items that identify specific situations that are common in the home environment. The parent indicates whether his or her child has attention problems in each situation. If the item is answered "yes", the severity is rated on a ten-point Likert scale ranging from absent (0) to severe (9). Three scores are derived, the total score, the number of problems, and the mean severity score (total score divided by the number of problems) (DuPaul & Barkley, 1992). The scale yields two factors; problems in compliance situations and problems in leisure situations. DuPaul and Barkley (1992) reported a statistically significant main effect for gender. Boys received higher scores than girls, indicating a higher severity and frequency of attention problems. The researchers felt that such a result was consistent with a number of studies finding a greater prevalence of ADHD symptoms in boys than girls (DuPaul, 1991).

The current study investigated the accuracy of these three parent rating scales in identifying ADHD in children who had been diagnosed previously with this disorder. If the assumption is made that all previous diagnoses were accurate, then all diagnoses on all scales should be positive.

Factors thought to moderate accuracy were also investigated. It was anticipated that

higher accuracy rates would be exhibited for boys than for girls (DuPaul & Barkley, 1992).

Parent gender effects on accuracy were also investigated. Finally, accuracy trends across the childrens' ages were considered.

## METHOD

### Subjects

Parents of 85 children who had a diagnosis of ADHD on the school medical data card were contacted to participate in the study. The method and purpose of the study was provided in an initial contact letter. Parents were asked to return a signed form of written consent if they chose to participate in the data collection. Parents of 50 children diagnosed with ADHD by a professional served as respondents for this study. Thirty-four parents were from central Delaware and sixteen parents were from central lower Michigan. A diagnosis by a physician was necessary for identification in the state of Delaware; in Michigan identification by a licensed psychologist was sufficient. Thirty-five respondents were mothers or stepmothers (70%) and fifteen were fathers or stepfathers (30%). Participation was voluntary.

There were 44 male (88%) and six female (12%) children rated. Children were divided into age groups as follows: 3-8 (17), 9-12 (27), 13-16 (6). Approximately fifty-two percent (26) of the children were on medication for symptoms associated with ADHD.

### Instruments

Three parent rating scales were completed by each parent participant.

**ADDES**--The psychometric properties of the ADDES are exemplary (McCarney, 1995).

The ADDES was normed with 3,932 parents and 2,750 children from twenty-three states, the largest norm sample for a device designed to measure ADHD symptoms (McCarney, 1995). Test-retest reliability is .88 or above for all ages, inter-rater reliability ranges from .80 to .84, (average  $r = .82$ ), internal consistency reliability for both subscales is above .95 and standard error of measurement confidence levels based around the raw score are provided in the manual. The ADDES manual provides data for content, construct, diagnostic, and criterion-related validity. To assure content validity, an item pool was created based on literature review, the DSM-IV, and ideas from diagnosticians and parents of children with ADHD. The item/total score correlations for each of the two subscales exceeded .63, which is above the acceptable level of .30 (McCarney, 1995). Construct validity was investigated through factor analysis, diagnostic validity, subscale interrelationships, and item validity. Diagnostic validity was measured by rating a random sample of male and female youths and comparing them to a group identified with ADHD. The groups previously identified with ADHD rated lower on the subscale scores than the non-ADHD group. Higher scores represent an absence of significant behavior concerns. McCarney established criterion-related validity in studies comparing the ADDES with the *Conners' Parent Rating Scale-48*, *Conners' Parent Rating Scale-93*, *Children's Attention and Adjustment Survey-Home Form*, and the *Child Behavior Checklist*. The subscales on the ADDES correlated above .69 with the Impulsive/Hyperactive, Conduct Problem, and Learning Problem subscales and above .80 with the Hyperactivity Index on the *Conners'-48*. The ADDES correlated above .62 with the Conduct Disorder, Restless-Disorganized, Learning Problem, Obsessive-Compulsive, and Hyperactive-Immature components on the *Conners'-93*. The ADDES correlated above .79 with the

Inattention, Impulsivity, ADD, Hyperactivity, and ADHD subscales on the *Children's Attention and Adjustment Survey-Home Form*. The ADDES and the *Child Behavior Checklist* correlated above .60 on the subscales measuring the similar constructs of Social Problems, Thought Problems, Attention Problems, Delinquent Problems, and Aggressive Behavior (McCarney, 1995).

ASQ-P--Despite the extensive use of the Conners' scales in research, little information is presented in the manual regarding scale development and standardization. However, studies have produced reliability and validity evidence in support of the scales (Martens, 1992). Test-retest reliability is moderate to high (ranges from .33 to .91), inter-rater reliability is moderate to high (range from .23 to .94), and the internal consistency is adequate (.61 to .95). Although the ten items on the scale were not selected to discriminate between conduct disordered, hyperactive, or inattentive children, the ASQ-P is widely used for identifying ADHD children. A major drawback of the 1989 ten item scale is the lack of norms based on parents. The ASQ-P is based on the longer version (93 items) and there are no parent norms for the *Conners' Parent Rating Scale-93*. Therefore, Oehler-Stinnet (1992) does not recommend use of the ASQ-P for diagnostic purposes.

HSQ-R-- The norm sample for the HSQ-R was from an urban setting in one geographic location and therefore, may not be generalizable. Internal consistency (.93) and test-retest reliability were high (.77) for the HSQ-R (DuPaul & Barkley, 1992). The HSQ-R significantly correlates with criterion measures such as parent ratings on the ADHD rating scale and direct

observations of children's attention to classwork. Scores were stable across a two or four-week interval (DuPaul & Barkley, 1992). The scale provided important situation specific information concerning the severity of ADHD symptoms in children (DuPaul & Barkley, 1992).

### Procedures

Parents who agreed in writing to participate in the study were provided with the three rating scales to complete and return. The purposes and possible benefits of the study were explained in a cover letter to parents. All identifying information was removed from the forms and number-codes were inserted.

The parents completed the three rating scales during one period. If medications were being used by the child, parents were asked to rate their children in a non-medicated state.

Six scores were derived for each child; ADDES inattentive, ADDES hyperactive-impulsive, ADDES total, ASQ-P, HSQ-R Factor 1, and HSQ-R Factor 2. A Pearson Product Moment Correlation was computed on each of the fifteen possible pairs of scores. The correlations were investigated to detect which scales were associated the most strongly.

"Hit rates", rates of identification, were calculated for each scale using cutoff scores suggested within the respective manuals. For the ASQ-P this was a T score above 70. The ADDES requires a scaled score below six on each subscale. The HSQ-R considers any score greater than 1.5 standard deviations above the mean for a child's age and sex to be important.

## RESULTS

None of the three scales correctly indicated 100% of the previously identified ADHD students. Accuracy rates ranged from 38% (HSQ-R, leisure situations) to 78% (ADDES-combined). Figure 1 gives the number and percent of children identified by each scale.

Male and female accuracy rates and effect-size  $r$ 's (reported as  $\phi$ ) for each scale are presented in Table 1. Because the sample contained only six females, the results should be viewed as suggestive rather than conclusive. The ADDES-Combined had the highest accuracy percentage for males. The ASQ-P had the highest accuracy percentage for females. Though effect size would generally considered to be weak, a consistent pattern in the expected direction is obtained. On all scales, comparing males to females, a lower accuracy percentage was obtained for males.

No single parent rating scale was found to be 100% accurate. The use of two scales may be the best practice when working with parents. The ADDES provides information concerning inattentive versus hyperactive-impulsive behavior that may be missed with a briefer scale. In this study, when the ADDES and ASQ-P rating scales were used in combination 43/50 (86%) children were identified, raising the initial "hit rate." The ASQ-P identified four children that the ADDES did not.

The HSQ-R identified one student that the ASQ-P also did. However, it "hit" one child that no other scale did. The combination of the three rating scales identified 44/50 children, raising the "hit rate" to 88%.



The results suggest that professionals need to consider using more than one parent rating scale for a possible ADHD diagnosis. The rating scales vary in success rates based on gender and age. Although the use of one rating scale may be the quickest and easiest way, this method may also miss close to one-quarter of ADHD children. Male and female parent accuracy rates and effect size  $r$ 's for each scale are presented in Table 2. Again the highest percentage occurred on the ADDES-Combined for both genders. Though effect size  $r$ 's may be considered weak, a consistent pattern emerges. On almost all scales, in proceeding from mothers to fathers, a lower accuracy rate was obtained.

Accuracy rate by age trends are presented in Figure 2. Inspection shows a curvilinear trend (inverted U) in accuracy rates for the ADDES Inattentive subscale and Combined score only. The largest percentages identified occurred in the age group 9-12.

## DISCUSSION

Based on the "hit rates" calculated in this study, none of the three rating scales selected was sufficiently accurate in identifying students with ADHD. Results close to 100% accuracy would be optimal because children and parents depend on proper identification in order to receive appropriate services. The highest overall percentage was 78%, on the ADDES Combined score. The DSM-IV specifies that only one of the scales be elevated for the child to be considered to be displaying ADHD characteristics. However, even on this scale 22% of the actual ADHD population was not identified on either subscale. Within the ADDES, the Inattentive subscale was more successful than the Hyperactive-Impulsive subscale in identifying students. The HSQ-R was the least accurate in identification for both males and females. The ASQ-P, although brief,

was surprisingly successful (70%) overall.

A weak but consistent pattern of child gender differences was observed, suggesting that parent rating scales may not be equally sensitive to ADHD in males and females and scores may be affected by gender.

Several factors may account for the weak but consistent pattern of results showing the mothers' rating to be more accurate in identifying their children than fathers'. Fathers may be more tolerant of certain behavior, and therefore rate the children less harshly; or, fathers may be home less often and therefore, may not witness as many behavior problems.

Some students who were rated as having significant problems on the ADDES Inattentive subscale were not identified by the other scales. This suggests that for the children who have ADHD predominantly Inattentive Type, one parent rating scale is not sufficient. The ADDES unlike the other two scales, allows separate ratings for Inattentive and for Hyperactive-Impulsive subscales. This feature appears to improve accuracy.

This study has several limitations. First, although parents were asked to recall what the behavior was like prior to medications, several parents may have underrated children because the behavior is no longer observable due to medications.

Second, subjects were predominantly males. However, current research shows that the majority of individuals with ADHD are male, with ratios ranging from 4:1 to 9:1. The current study has a male: female ratio of approximately 7:1. Therefore, it is within the expected limits but further research on girls would be helpful.

Third, the accuracy of the original diagnoses is unknown. Considering that different methods and instruments may have been selected in the original identification of these students, it

is not clear whether the original identification was accurate. The various professionals involved in the evaluation may have used different criteria for identification. Also, the differences noted between the guidelines for eligibility in Michigan and Delaware may have affected these results. It is also to be noted that professionals may approach the disorder in different ways. The DSM-IV would not have been utilized for children identified several years ago. The changes made in the criteria for ADHD may contribute to a discrepancy in diagnoses.

Fourth, the patients identified by a medical doctor may also be receiving Ritalin to control the symptoms associated with the disorder. The success of this treatment or other behavioral interventions may reduce the accuracy of parent rating scales. Parents needed to remember how the behavior presented prior to treatment.

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Figure 1

# Total Students Identified as ADHD

By Three Parent Rating Scales

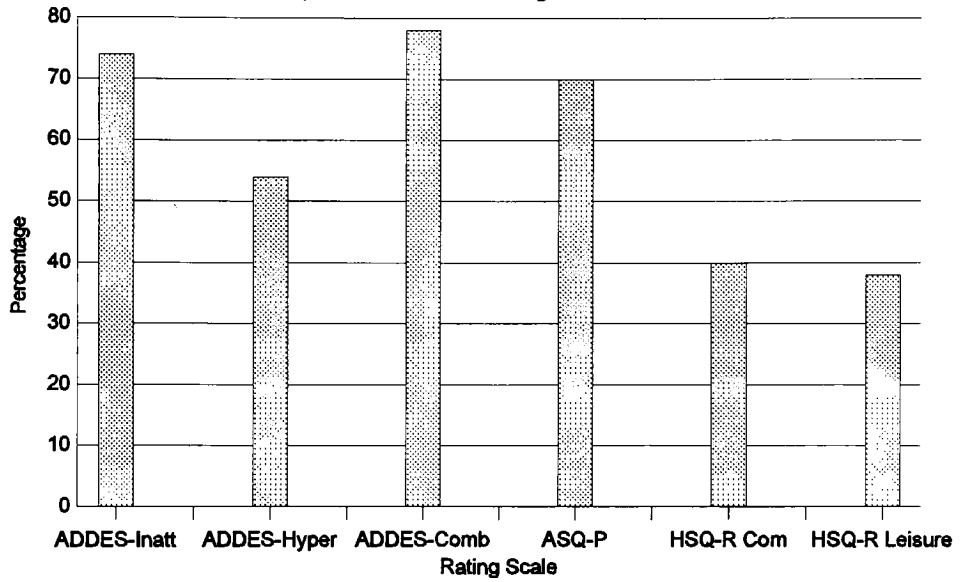


Table 1

Males versus Females Identified as ADHD by Three Parent Rating Scales

	hit	miss	accuracy	$\chi^2 (1), \phi, 95\% CI$
ADDES-Inattentive				.35, .08, (-.32, .16)
male	32	12	73%	
female	5	1	83%	
ADDES-Hyperactive-Impulsive				.50, .09, (-.36, .17)
male	23	21	52%	
female	4	2	67%	
ADDES-Combined				.01, .05, (-.18, .08)
male	34	10	77%	
female	5	1	83%	
ASQ-P				2.92, .24, (-.35, -.13)
male	29	15	66%	
female	6	0	100%	
HSQ-R Factor 1				2.02, .20, (-.51, .11)
male	16	28	37%	
female	4	2	67%	
HSQ-R Factor 2				.39, .09, (-.38, .19)
male	16	28	37%	
female	3	3	50%	

Note:  $\phi$  calculate as in Rosenthal, R. & Rosnow, R. (1991). Essentials of behavioral research: Methods and Data Analysis, (2nd edition), pp. 513-545.

All 1-tailed p's > .05

Mother N= 44, Father N= 6

Table 2

$\chi^2$  test of independence and phi coefficients for mother versus father ratings on three parent rating scales

	hit	miss	accuracy	$\chi^2 (1), \phi, 95\% CI$
ADDES-Inattentive				.60, .11, (-.04,.26)
mothers	27	8	77%	
fathers	10	5	67%	
ADDES-Hyperactive-Impulsive				1.69, .18, (.04,.32)
mothers	21	14	60%	
fathers	6	9	40%	
ADDES-Combined				1.60, .18, (.03,.33)
mothers	29	6	83%	
fathers	10	5	67%	
ASQ-P				.11, .05, (-.09,.19)
mothers	25	10	71%	
fathers	10	5	67%	
HSQ-R Factor 1				0, 0, (-.14,.14)
mothers	14	21	40%	
fathers	6	9	40%	
HSQ-R Factor 2				.04, .03, (-.11,.17)
mothers	13	22	37%	
fathers	6	9	40%	

Note:  $\phi$  calculated as in Rosenthal, R. & Rosnow, R. (1991). Essentials of behavioral research: Methods and Data Analysis, (2nd edition), pp. 513-545.

All 2-tailed p's > .05

Mother N=35, Father N=15



Figure 2

### Age trends by parent rating scales

