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By

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AN ABSTRACT OF A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Counseling, Educational Psychology
and Special Education

1993

ABSTRACT

EFFECTS OF DISCREPANCY MODELS AND
ELIGIBILITY DECISIONS ON STUDENT SELECTION IN
THE DIAGNOSIS OF LEARNING DISABILITIES

By

Karen Ann Payette

Concern over the growing numbers of students identified as learning disabled has led school districts to examine the criteria for diagnosis and the means by which they are operationalized. Two highly recommended methods for determining a severe discrepancy between ability and achievement, a key criterion in LD diagnosis, were applied to a sample of 344 students to determine how a change in method might influence the rates and characteristics of students meeting this criterion. Agreement between method and eligibility decisions were also examined, as well as student characteristics that might influence decision-makers to find a student LD.

The results indicate an increase in numbers when a regression method is used over a simple difference score method. When the change, however, included moving to more severe cutoff score, as proposed in the intermediate school district studied, the pattern reversed and a 20 percent decrease was observed. While IQ correlated with the discrepancies when the simple difference score method was used, no correlation was observed when regression was

employed, adding to a growing body of literature that suggests regression may be a more equitable method for calculating severe discrepancies. Contrary to other published work, neither method resulted in disproportionate racial representation among those meeting the severe discrepancy criterion.

A second major objective of the study involved comparing the IEPCs' eligibility decisions against the severe discrepancy criterion. An agreement rate of 75 percent suggests a greater reliance on the severe discrepancy criterion than previously reported. Agreement was the same regardless of the method used. When examining those students "misclassified", results indicate that IEPCs may be swayed by a student's IQ or achievement levels, alone, in the decision-making process. Overrepresentation of white students and students in the later elementary or secondary grades was observed among those who demonstrated a severe discrepancy but were found ineligible. Among the students found eligible without a severe discrepancy, a disproportional number were female.

ACKNOWLEDGMENTS

The author wishes to extend a very sincere thank you to Dr. Harvey Clarizio for serving as committee chairman. His guidance, support and encouragement throughout the completion of this dissertation have been far beyond expectations and will always be remembered. Appreciation is also extended to Dr. Deborah Bennett for being a source of inspiration and sound advice along the way, to Dr. Susan Phillips and Dr. Frank Floyd for their valuable comments, and to Christine Schram for always being there when I needed her.

To my husband, Peter, I would like to express heartfelt gratitude for the love, patience and pride he has shown throughout my doctoral studies. Without his support, this research would not have been possible. Finally, a special word of thanks goes to my children, Jennifer and Pete, for making me feel truly blessed.

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I. INTRODUCTION

Within our schools, learning disabilities (LD) continues to be the most frequently diagnosed and rapidly growing handicapping condition of all the special education categories. Since the inclusion of learning disabilities as a new disability in 1976-77, the number of students served under this category has grown by 170 percent. The relative proportion of these students, as a function of the total number of children served in special education, increased from 24.9 percent in 1976-77 to 50.5 percent in 1990-91, exceeding any other disability (U.S. Department of Education, 1992). Given these facts, the criteria for diagnosis and the means by which they are operationalized are continually under scrutiny by local districts who seek to provide services to those students who are "truly" learning disabled while avoiding overidentification and inappropriate LD placements, which drain limited resources from other programs and students.

When establishing criteria for a LD diagnosis, most states (86%) have included the existence of a severe discrepancy between achievement and intellectual ability in one or more specified academic areas as a necessary, but not exclusive condition for determining a student to be learning

disabled (Mercer, Sears, Mercer, 1990). Methods for quantifying a severe discrepancy between ability and achievement have been the subject of much debate. More recently, attention has focused on the influence of various methods on the number and characteristics of students who receive a LD label.

The purpose of this research is to apply two of the more highly recommended models for determining a severe discrepancy to data already collected on children referred for possible learning disability services. Will one method identify more students as having a severe discrepancy than a second method? Will the two methods systematically favor different ability groups? Will racial groups be affected differentially? How will the results of each method compare with the Individual Educational Planning Committee's (IEPC's) decisions regarding eligibility?

A review of the literature will identify a number of studies that have compared various models for determining a severe discrepancy. Several studies have considered the effects of one formula over another on racial representation. Of those studies considering race as a factor, only one study (Evans, 1992) has consistently used individually administered intelligence and achievement tests and age-based standard scores, which are two standards for input or test quality commonly advocated by such measurement experts as Reynolds (1990) in the assessment of a potential severe discrepancy. In addition, when race was considered

as a variable, data were collected from only three geographic areas; Florida, Indiana, and Arkansas, which limits the generalizability of the research findings. In addition to using quality input data, this study will provide information on a sample of students referred in a state other than those previously studied and will broaden the data base from which generalizations might be formulated in the future. It will extend the research by comparing the IEPC's decision for eligibility with the finding of a severe discrepancy using each method, thereby attempting to draw conclusions regarding the influence of a severe discrepancy, as well as other student characteristics, on the final decision for special education services.

II. REVIEW OF THE LITERATURE

The review of the literature will focus on providing background information in three areas of research pertaining to the questions being addressed in this reseach project. First, a discussion of the severe discrepancy component for determining a learning disability will include a brief historical perspective and specific formulas presented in the literature for determining if a child is achieving commensurate with his age and ability. Second, the effect on minorities of the various formulas used for determining discrepancies will be examined based on the findings from previous studies. Third, comparisons between the IEPC's decision to find a student eligible and the presence of a severe discrepancy, by either a simple difference score method or a regression method, will also be reviewed in an attempt to better understand the decision making process and characteristics and conditions that affect it.

A. Severe Discrepancy

Recently, the use of a severe discrepancy between ability and achievement to determine the need for special education has been criticized. It has been referred to as a popular tool to reduce incidence rates of learning disabilities, while creating a false sense of objectivity and precision among diagnosticians and neglecting other

criteria for identification (Hammill, 1990; Chalfant, 1989, Algozzine and Ysseldyke, 1987; Council for Learning Disabilities, 1986). Nonetheless, as Reynolds (1990) noted, when the rules and regulations for the Education of the Handicapped Act (EHA), now known as the Individuals with Disabilities Education Act (IDEA), were being developed,

> the only consensus regarding definition or characteristics of this thing called LD was that it resulted in a major discrepancy between what one would expect academically of LD children and the level which they were actually achieving (p. 573).

Mercer and his colleagues (1990) continue to find this consensus in their survey of State Departments of Education, stating, "It is accurate to say the states are currently in agreement on the importance of the discrepancy component for identifying LD students" (p. 151).

Since the passage of EHA, now IDEA, the U.S. Department of Education has attempted to provide guidance in determining a severe discrepancy by proposing various formulas. Some of the earlier formulas included age and grade equivalents that were ultimately rejected, primarily because of their mathematical inadequacies (Reynolds, 1985; Wilson & Cone, 1984). Currently, standard-score comparison methods are generally considered more accurate in defining discrepancies than age or grade scores, and more states are

mandating their use. Mercer and his colleagues (1990) found in their survey of State Education Departments that a total of 18 states specifically specify in their guidelines that standard scores are to be used in lieu of deviation from grade level methods and expectancy formula methods, using grade and/or age score differences, to determine a severe discrepancy. This represents an increase of seven states when compared to results of an earlier survey conducted by Frankenberger and Harper (1987).

Two of the more highly recommended methods will be presented in detail.

1. The Simple Difference Score Model

The simple-difference score approach defines as the appropriate discrepancy score the simple difference between an obtained aptitude or intelligence score and the obtained achievement score when both measures are expressed on a common scale (Reynolds, 1990). Both the IQ and achievement scores frequently are expressed on a standard score scale with a mean of 100 and a standard deviation of 15, allowing for a simple and direct comparison. With this procedure, a severe discrepancy is based on a criterion level described in standard score units, such as 15 points. The ease with which it can be employed and its intuitive appeal make this method probably the most popular (Evans, 1992; Michigan Association of Learning Disabilities Educators, 1992).

Although the simple-difference score method is considered more accurate and statistically sound than age or grade scores, it is criticized for not taking into account measurement error and the effects of regression toward the mean. In order to reduce the chance of measurement error, Hanna, Dyck, and Holden (1979) introduced a standard score comparison method using T-scores and a graph, into which the reliability of the two tests are entered to determine the standard errors of measurement of the difference in T-score units. Reynolds (1981) attempted to establish that the discrepancy was not due to chance or errors of measurement by expressing the scores as z-scores and dividing the z-score difference by the standard error of the difference score. Although these procedures addressed the issue of measurement error, they also introduced more esoteric, derived scores which add confusion for teachers and test administrators who are accustomed to a standard score with a mean of 100 and a standard deviation of 15 (Cone & Wilson, 1981). Bennett and Clarizio (1988) recommend that if, in practice, district administrators find themselves determining a fixed cutoff level, such as 15 standard score points, it should be at least large enough to ensure a statistically significant difference.

Reynolds (1990) also points out that educators often make the mistake of assuming that the standard deviation of the measures used, usually 15, is also the standard deviation of the difference scores. Difference scores have

their own distribution and their own standard deviation. If two scores are positively correlated, as with intelligence and achievement, the standard deviation of the newly created distribution will be significantly smaller than that of the two original distributions. School districts attempting to predict the number of students who will be identified, based on the standard deviation of the univariate distributions, will miss the desired frequency significantly.

A more central issue with the simple-difference score model concerns regression effects. By not considering regression of IQ on achievement, theory suggests that the simple-difference score model will systematically overestimate the frequency of LD among those with above-average ability and systematically underestimate the frequency of LD among those with below-average abilities (Reynolds, 1990; Wilson & Cone, 1984; Thorndike, 1963). The procedure, therefore, could be viewed as discriminatory in that all persons do not have an equal chance of having a severe discrepancy. Studies bearing on the empirical validation of these theoretical assumptions will be discussed on pages 12 to 22 and will be a focus of the current research.

2. Regression Discrepancy Model

The regression discrepancy model has been identified as one of the most statistically adequate models for determining a severe discrepancy (Chalfant, 1989; Reynolds,

1984; Wilson & Cone, 1984; Thorndike, 1963). In comparison to a simple difference score model, the regression discrepancy model utilizes the mathematical principle of regression toward the mean to more accurately define the discrepancy. Regression toward the mean refers to the tendency of extreme scores on one measure to be less extreme on a second related measure and is the result of imperfect correlation between the two measures. Students are not expected to have achievement scores exactly matching their IQ score. Such an expectation would exist only if the correlation between the two measures was perfect, or 1.00. Rather, expected achievement is defined as the mean achievement score of students with the same IQ. The mean achievement score can be determined mathematically by knowing the correlation between the IQ test and the particular achievement test used. In general, the correlation between intelligence and achievement tests commonly used in LD diagnosis range from .5 to .7.

The effect of the regression phenomenon can be illustrated further by comparing it to the simple-difference score approach at several IQ levels. Using the simple-difference score model, students earning a mean IQ of 120 would be expected to earn mean achievement scores of 120. Using the regression approach and an IQ-achievement test correlation of .6, children with an IQ of 120 would be expected to earn a mean achievement score of 112. The simple-difference score would identify eight additional

points toward a severe discrepancy over the regression approach with these high IQ students. Students with an IQ of 80 would be expected to earn mean achievement scores of 80 using the simple difference score model, but 88 using regression. In contrast to the high IQ students, the low IQ students would be awarded eight less points toward a severe discrepancy when regression is not employed.

Regression is a very general and real phenomenon (Thorndike, 1963). For those who find simple-difference scores intuitively appealing, however, regression might seem more like an irrelevant statistical abstraction. In the minds of some, it becomes a manipulation for qualifying larger numbers of low-IQ students as LD. Considering earlier definitions of learning disabilities that required "adequate" intelligence (Johnson & Myklebust, 1967), placement of students with below-average and borderline intelligence in LD programs might seem inappropriate. A survey by Kavale and Reese (1991) of the perceptions of 547 LD teachers in Iowa revealed, in fact, that 80% of the respondents believe that LD is "somewhat" or "almost always" associated with average or above average intelligence. This line of thought may explain the hesitancy of some practitioners to move to a regression approach.

In conclusion, Reynolds (1990) offers a regression model for determining a severe discrepancy. The initial step involves calculating the expected achievement score

($\hat{Y}$), based on the student's IQ, using a standard regression equation.

$$\hat{Y} = \left[r_{xy} \left(\frac{X - \bar{X}}{SD_x} \right) \right] SD_x + \bar{X}$$

where r_{xy} = the correlation between X and Y

X = the intelligence score

$\bar{X}$ = the mean of X

SD_x = the standard deviation of X

The final step specifies that a severe discrepancy between aptitude (X) and achievement (Y) exists when

$$\hat{Y} - Y_i \geq SD_y \, Z_a \sqrt{1 - r_{xy}^2} - 1.65 SE_{\hat{Y} - Y_i}$$

$$\text{where } SE_{\hat{Y} - Y_i} = \sqrt{1 - r_{xy}^2} \sqrt{1 - r_{\hat{Y} - Y_i}}$$

$$\text{and } r_{\hat{Y} - Y_i} = \frac{r_{yy} + r_{xx} r_{xy}^2 - 2r_{xy}^2}{1 - r_{xy}^2}$$

and Y_i = the child's achievement score

X_i = the child's intelligence score

$\hat{Y}$ = the mean achievement score for all children with IQ = X_i

SD_y = is the standard deviation of Y

Z_a = is the point on the normal curve corresponding to the relative frequency needed to denote "severity" (Reynolds recommends a value of 2.0)

r_{xy}^2 = is the square of the correlation between the intelligence and achievement.

r_{yy} = internal consistency reliability of the achievement measure.

r_{xx} = internal consistency reliability of the aptitude measure.

This formula compares a child's current level of achievement with the mean level of achievement of all other children with the same IQ and takes into account the unreliability of the difference score.

3. Simple Difference Scores versus Regressed Scores

Empirically, Valus (1986) was not able to substantiate the over- and underestimating phenomena, as a function of IQ, in her study where standard score differences and regressed score differences were compared. A large overlap (86.8%), supported by a chi-square significant at the .001 level, was found between the two procedures when applied to a small sample (n = 68) of students with a mean WISC-R FSIQ of 92.7 who had been placed in LD programs from two midwestern states. She suggests that the differences between the two procedures may be more theoretical than practical.

While not addressed by Valus (1986), it is possible that some school districts in her sample may have their own policies and screening techniques that exclude both the high and low IQ students from placement in learning disabilities programs, based on the assumption that these students were not intended to be served under the LD label. Students with IQ's in the mid-ranges would be less affected by regression to the mean and might qualify as LD, regardless of the procedure used. It should also be noted that Valus used the Hanna, Dyck and Holen (1979) method for standard score comparisons, which recommends use of the Verbal IQ rather than Full Scale IQ for comparison. When computing regressed scores, she used the Iowa Regression Tables, based on the Full Scale IQ as a measure of aptitude. Although the two methods yielded concurrent classifications a high percentage of the time, they used different measures of aptitude. The effect of this inconsistency in the use of IQ scores on her results is unclear.

Additional data do not support Valus's (1986) conclusion that the difference between the regression analysis and standard-score procedures is primarily theoretical rather than practical. Bennett and Clarizio (1988), using scores of 86 LD referrals with a mean WISC-R FSIQ of 94.9 from primarily white suburban and urban communities, compared four methods for calculating a severe discrepancy; two standard score difference methods (z-score difference and an estimated true score difference) and two

regression methods (unadjusted regressed difference and adjusted regressed difference). When compared to the standard score difference methods (z-score difference and estimated true score difference), the unadjusted regressed difference was in agreement only 28.8% and 10% of the cases, respectively. Greater agreement was observed between the adjusted regressed difference method and the z-score difference and estimated true score difference, but only if the tests involved were of high reliabilities. The results also showed that the unadjusted regression procedure selects the smallest percentage of students. These researchers concluded that regression procedures cannot be used interchangeably with standard score comparison methods in the determination of a severe discrepancy.

Clarizio and Phillips (1988) compared two methods, a z-score discrepancy and a regression procedure, using two different cutoff procedures. Scores were collected from 236 predominantly white LD referrals with a mean WISC-R IQ of 96.4 from suburban and rural school districts. When the cutoff score was held constant, the standard score difference method identified 50% of the referred group as LD, but the regression method identified only 28%. Therefore, the regression formula markedly decreased the number of referred students identified as LD when the significance level remained the same. The two methods did not identify children who were significantly different from one another with regard to measured intelligence. In a

second comparison, the percentage identified as LD was held constant at varying percentages (10%, 25%, and 54%). When the bottom 10% and 25% of those referred were identified as LD, the standard score and regression methods did not differ much with respect to agreement with the interdisciplinary evaluation team decisions and with each other. At a 54% percent cutoff, the standard score difference and the regression methods continued to agree highly with each other (87%) but not with the team decisions (65% and 68% respectively). Based on their sample, these researchers concluded that school districts interested in decreasing the number of students identified as LD could do so either by changing to a regression method or, simply, by adjusting (increasing) the cutoff score for the standard score difference.

MacMann, Barnett, Lombard, Belton-Kocher and Sharpe (1989), in their sample of 373 rural students referred for LD evaluation (mean WISC-R IQ = 96.8), found that the degree of inconsistency in classification across methods (standard score comparison and regression prediction) was not as pronounced as they had anticipated. Indeed, the proportions of severe underachievers identified by the two methods were equivalent for five of seven across-method comparisons, making Valus' (1986) suggestion that the "differences between the two procedures are more theoretical than practical" (p. 204) seem reasonable. Only when judged against a stringent kappa statistic (a coefficient of

agreement for nominal scales) of >.90, were a sufficient proportion of students inconsistently classified by the two different methods of discrepancy score calculation. More importantly, these researchers found that "the degree of variation attributed to the two different methods of discrepancy score calculation was trivial in comparison to the extreme levels of classification inconsistency introduced by test selection" (p. 139).

In sum, there appears to be no clear answer regarding the "best" method of discrepancy score calculation, based on these studies. A clearer picture begins to emerge as researchers have studied more diverse populations with regard to IQ and race, when comparing standard score differences and regressed score differences in the determination of a severe discrepancy. A review of these studies follows.

B. Race and a Severe Discrepancy

Braden (1987) used a hypothetical sample (based on the standardization sample of the WISC-R) to illustrate that a simple difference score model will have a differential impact on black and white students, owing to the correlation between simple standard score difference discrepancies and IQ and the lower mean IQs of blacks on measures of intelligence. Jensen and Reynolds (1982) identified the white students' IQ distribution on the WISC-R as having a mean of 102.25 and a standard deviation of 14.08, and

distinct from the black students' IQ distribution with a mean of 86.42 and a standard deviation of 12.75. Results of the application of a simple difference score method and a regression method on Braden's hypothetical sample of nearly 20,000 students showed that the odds of being identified LD change drastically across intelligence intervals for the simple difference method, but are constant for the regression method. For example, the probability of students with an IQ of 125 demonstrating a severe discrepancy using a simple standard score difference of 15 points was .3372 in contrast to a probability of .0188 for students with an IQ of 75. Using regression, the probability remained at .1056 across intelligence intervals. When the probability of meeting the severe discrepancy criterion varies across IQ levels, as with the simple difference method, the effect will be disproportionate racial representation in groups meeting the severe discrepancy criterion. While the results of this study provide insight into the problems associated with racially diverse populations and discrepancy formulas, empirical studies are needed to support conclusions drawn from this hypothetical sample.

Braden and Weiss (1988) supported these earlier conclusions empirically using 2,263 students from a countywide school district in north-central Florida. Group IQ and achievement scores were collected from second and fifth graders, of which 1343 were white, 817 were black, and 53 were of other races. The mean IQ of the black students,

as measured by the Otis-Lennon School Ability Test, was more than one standard deviation below that of whites, with a black mean IQ calculated at 90.89 and a white mean IQ at 106.97. Similar achievement differences (approximately one SD) were observed for blacks and whites in reading and math at both grade levels. Severe discrepancies between aptitude and achievement were calculated using the simple difference method and a regression formula in both subject areas and at both grade levels, allowing for four comparisons. When the simple difference model was applied, minorities were proportionate to overall sample parameters in only one of four cases. When the regression model was applied, minority representation was proportionate in three of the four cases. The empirical outcomes suggest use of simple discrepancy criteria may raise ethical and legal questions, while the use of regression provides more equitable treatment in the determination of learning disabilities.

Braden and Weiss (1988) defend their use of group tests over individually administered tests, which are commonly use to qualify students for special education, by stating that results will be similar. They do not, however, give much support for their statement. Reynolds (1990) states that for diagnostic purposes, individually administered tests should be used, particularly with young children. He argues that "for all children, but especially for handicapped children, too many uncontrolled and unnoticed factors can affect test performance in an adverse manner" (p. 586). A

test administrator is more likely to detect these factors during individual assessment.

McLeskey, Waldron and Wornhoff (1990) improved on the previous research by using individual test scores to examine the application of a simple difference and a regression method for determining a severe discrepancy and the impact of the use of an IQ cutoff with black and white students referred for possible learning disability services. Using a sample of 218 white students (WISC-R FSIQ = 96.3) and 132 black students (WISC-R FSIQ = 88.5) in the state of Indiana, McLeskey and his colleagues compared the two methods, based on scores from the Wechsler Intelligence Scale for Children - Revised (WISC-R), the Wide Range Achievement Test (WRAT) and the Peabody Individual Achievement Test (PIAT). In their sample, 42% of the black students who met the severe discrepancy criterion in reading using a regression method failed to meet the criterion using a standard score procedure. A similar 42% of the black students who met the discrepancy criterion in mathematics using a regression method failed to meet the criterion when the standard score procedure was applied. Finally, the use of a regression procedure resulted in a proportionally balanced representation of black and white students, in contrast to a standard score procedure which resulted in identification of a significantly greater proportion of white students than black students with learning disabilities. Thus, these research findings were consistent with those of Braden and

Weiss (1988) in demonstrating that use of a regression method to determine a severe discrepancy provides all students more equitable access to special education services. In addition, McLesky et al. (1990) noted that use of an IQ cutoff score at 85, when 41% of his black students had FSIQs below this level in contrast to only 16% of the white students, adds a another source of racial bias when used in combination with a simple difference score method for determining LD.

McLesky et al. (1990) used a combination of age and grade-based norms in the measures of achievement, which is not recommended when making ability-achievement comparisons (Reynolds, 1990). Only age-based achievement standard scores should be used, as they are being compared to IQ scores which are age-based. In addition, P.L. 94-142 specifically notes that a child's achievement should not be commensurate with his or her age and ability to meet the severe discrepancy criterion. These researchers also justified mixing scores from the WRAT and PIAT in their analyses because the correlations between these tests are moderate to high, despite previous research that found extreme levels of classification inconsistency introduced by test selection (MacMann et al., 1989; Clarizio and Bennett, 1987; Macmann and Barnett, 1985).

A recent study by Evans (1992) provides one more link in a chain of evidence that finds simple-difference scores to be discriminatory to black children because of its

inequitable treatment across IQ levels. Using achievement tests from the Woodcock-Johnson Psycho-Educational Battery - Revised (WJ-R) and the Wechsler Intelligence Scale for Children - Revised (WISC-R), Evans compared the simple difference and regression methods on scores from 194 referred students, 60% white and 40% black, from one school district in central Arkansas. The two models identified similar proportions of white students. However, the simple difference model identified significantly fewer black students. The difference between mean FSIQs of 91.5 and 84.5 for whites and blacks, respectively, in conjunction with the relationship between small simple difference discrepancies and low IQ, would account for the smaller proportion of blacks identified by the simple difference model. In addition, Evans found that grade and time of evaluation (initial/re-evaluation) produce subgroups that differ with respect to mean FSIQ (older students and re-evaluations have lower FSIQs) and, consequently, were subject to the same bias experienced by black students when the simple-difference method of determining a severe discrepancy is used. With regard to identification rate, the regression model identified a slightly higher percentage of referred students than the simple difference model in Evan's sample.

All the studies examining race, in addition to several other factors such as IQ cutoffs, grade level, and time of evaluation, suggest that severe discrepancy models are not

interchangeable, as evidenced by the proportions of subgroups identified. Districts moving from a simple-difference method to a regression method for determining a severe discrepancy could see different identification patterns, and possibly rates, depending on student characteristics within the districts. The current research will attempt to add empirical data from another geographical location, using quality input data.

C. IEPC Decisions and a Severe Discrepancy

The reader is reminded that a severe discrepancy does not constitute the diagnosis of LD. It only establishes that the primary symptom exists. In the final analysis, professional judgement plays an important role as the Individualized Educational Planning Committee (IEPC) integrates all the diagnostic information. For this reason, predictions regarding identification rates and characteristics, based on studies of different formulas for calculating a severe discrepancy, might fail to accurately identify those students who ultimately are labeled as LD. The final area for review, therefore, will deal with studies that have looked at the match between team decisions regarding classification and the existence of a severe discrepancy using the different methods for determination.

Ysseldyke, Thurlow, Graden, Wesson, Algozzine and Deno (1983), in their generalizations from five years of research on the assessment and decision making process with students

considered learning disabled, state that "placement decisions made by teams of individuals have very little to do with the data collected on students" (p. 78). Rather, they found that sex, socioeconomic status, physical appearance and reason for referral were factors that influenced the decisions made by school personnel, as well as the availability of services and the power that a student's parents hold in the school system. The team decision making process is set in motion by a teacher's initial decision to refer a student, and teams serve primarily to confirm the existence of problems first observed by the teachers.

In contrast to the conclusions drawn by Ysseldyke, et al. (1983), Huebner (1991) argues that there is an accumulated body of evidence that referral and assessment data typically influence special education decisions. His own series of analogue studies have documented the importance of test data in the decision making process using a variety of samples (teachers and school psychologists) and test data bases. He notes, however, that the influence of test data appears less in studies where the test results are unusually ambiguous or borderline. The presentation of ambiguous test data may be one explanation for the discrepancy in research findings from Huebner's studies and those conducted earlier by Ysseldyke and his colleagues. The form in which test scores are reported (percentiles, grade-equivalents, deviation IQs) also appears to have an

impact on the decision-making process with both teachers and school psychologists.

The research of Ysseldyke, et al. (1983) was completed prior to publication of Critical Measurement Issues in Learning Disabilities (Reynolds, 1985), prepared by a special working group funded by the Special Education Programs branch of the federal government. This publication clearly delineated the most appropriate norm-referenced scores (i.e., standard scores) and the best methods for quantifying a severe discrepancy. Given additional guidance, have decision making teams relied more on test data, and more specifically severe discrepancies, when determining a student to be LD than has previously been suggested?

Valus (1986) questioned how many students placed in LD programs actually showed a severe discrepancy. She found that, even though staffing teams acknowledged the importance of identifying a severe discrepancy in her survey, no such discrepancy was evident in one third of her sample of LD placements, regardless of the method used. She concluded that slow learners may have been overrepresented among the students who did not demonstrate a severe discrepancy, and that staffing teams need guidance in determining whether or not slow-learning students are also learning disabled.

Furlong (1988), examining the implementation of the simple difference score model in California, also found that although students with lower ability test scores were less

likely to meet the legal discrepancy criterion than were students with higher ability test scores, they were actually more likely to receive a positive placement decision. This situation was also true for minority students (primarily Mexican-American) as well as students who were being re-evaluated (in contrast to initial referrals), and is probably accounted for by IQ differences. In his sample of 393 students referred for evaluation, 43 percent of those students placed in special education resource rooms or special day classes as learning disabled did not meet the state's severe discrepancy requirement, based on simple difference scores.

Subsequently, Furlong and Feldman (1992) studied a subgroup of the 393 students reported on by Furlong (1988) to evaluate whether regression to the mean could "explain" inconsistent placement decisions. Their sample consisted of the 153 students who received inconsistent placements, including (1) those meeting the California severe discrepancy criterion, but found ineligible and (2) those failing to meet the California severe discrepancy criterion, but placed in resource rooms or special day classes as learning disabled. One third of these students changed discrepancy status in the correct direction when a regression formula was applied.

Thus, regression can explain some of the inconsistent placement decisions. The greatest number of corrections by regression were noted on the group of students placed in the

more restrictive special day classes. Nearly one-half of the those students changed discrepancy status. This outcome is not surprising, given the group's low WISC-R Verbal IQ of 76.1 and Performance IQ of 82.5. Regression corrected one-third of placement decisions in resource rooms and only one-fourth of the ineligibility decisions. A bias observed in this study toward not placing higher IQ students, even those who obtain scores between 100 to 110, is not as easily explained. In addition, an effect for age indicates that younger children are not placed as frequently as older students with similar profiles, despite meeting the severe discrepancy criterion. More research is needed to determine why younger children might be treated differently. These researchers point out that no significant differences in the proportion of white and minority students changing status after regression was applied indicates that the study's results are not an artifact of race. How the larger sample would have changed, not just the subgroup of inconsistent placements, after regression was applied is unknown, but would be of interest.

Using the team decision for eligibility as the LD criterion, Clarizio and Phillips (1989) found that a misclassification rate of approximately 35% across both simple difference and regression methods. The number of false positives (those found eligible without a severe discrepancy) was only 4% with the regression method, compared to 16% for the standard score difference method.

Interestingly, the same classification results were achieved when low achievement in reading was used in place of the severe discrepancy requirement for LD eligibility, suggesting that achievement level may have as much influence as ability-achievement discrepancies in team decision-making.

McLeskey (1992) provided descriptive information about 790 students found to be LD, grades K-12, in Indiana. Like Valus (1986), he found a severe discrepancy existed for approximately two-thirds (67%) of his total LD sample when a regression formula, as directed by state guidelines, was used. The percentage of students with severe discrepancies decreased significantly from the primary grades through the secondary level. McLeskey noted that 58% of the students with learning disabilities were retained prior to being identified, a rate more than twice as high as retention rates for nondisabled students in Indiana. This result, further supported by interview data, suggests that retention is being used in Indiana as a remedial measure before labeling a student with a learning disability.

In another publication by McLesky and Grizzle (1992), using the same Indiana sample of learning disabled students, they compared LD students who had been retained (LDR) with those who had not been retained (LDNR) and found no significant difference with regard to the presence of a severe discrepancy; 67% of the LDNR group and 71% of the LDR group had severe discrepancies. In this study, a

history of retention does not appear to be a significant factor in justifying an LD label without the presence of a severe discrepancy, as an equal number of students who had not been retained also failed to show a severe discrepancy.

Finally, Clarizio and Phillips (1986) investigated sex bias in the diagnosis of learning disabled students by examining the discrepancies between ability and achievement in males and females from two groups, one consisting of referred but not eligible (NE) students and the other consisting of students who had been diagnosed learning disabled (LD) in Michigan. Full Scale IQs from the WISC-R and the standard scores in reading from the Wide Range Achievement Test (WRAT) were used to calculated discrepancies, based on the assumption that reading is the most common type of LD problem referred in the public schools. Although boys outnumbered girls by more than a 3.5 to 1 ratio in receiving a diagnosis of LD, analyses of the discrepancies for male and female subjects failed to indicate any evidence of sexual bias in diagnostic and placement procedures. In addition, these researchers found that approximately one-half of the students labeled as LD did not show a reliable discrepancy between expected and actual achievement, as defined by .66 standard deviations between the two scores. Approximately 40 percent of the students found not eligible did have reliable discrepancy scores.

Although the rate of agreement between the presence of a discrepancy and diagnosis of LD is poorer in the study by Clarizio and Phillips (1986) than in more recent studies, several procedural differences may help to explain the differences. LD consideration was restricted to the area of reading, as these researchers did not look at discrepancies in other areas where a student might have qualified, such as math or written language. In addition, selection of .66 standard deviations between the two scores to indicate a reliable, or statistically significant, discrepancy is quite different from the selection of 1.5 to 2.0 SDs to indicate a severe, or educationally significant, discrepancy in the more recent studies. Also, a simple difference score method, rather than a regression method, was used to identify a discrepancy. Possibly, more recent studies are showing better agreement between the presence of a severe discrepancy and a diagnosis of LD because some progress has been made in the operationalization of this criterion. Another look at the match between a severe discrepancy and an LD diagnosis by the IEPC with sex as a factor might be warranted, as operational definitions have become more standardized.

No study has considered race, specifically black students, when comparing eligibility decisions and the presence of a severe discrepancy using a regression formula. There are, however, circumstances that raise questions regarding the race factor in LD eligibility decisions.

Tucker (1980) asserts that, as schools have been pressured to stop classifying minority children as mentally retarded, black students have been increasing placed in LD classrooms so by 1974, they were overrepresented among the learning disabled. In his words:

> when it was no longer socially desirable to place black students in EMR classes, it became convenient to place them in the newly provided LD category. It took a year to make the changeover, but the resultant proportional differences are maintained (p. 104).

If LD classrooms have become an answer for low performing black students, as Tucker suggests, is this happening without requiring they meet LD criteria, specifically, a severe discrepancy between ability and achievement?

Contrary to Tucker, Chin and Hughes (1987) concluded that the increase of black students in LD classrooms has not resulted in disproportionate representation after analyzing placement data from the Office of Civil Rights from 1978 to 1984. However, a more recent demographic profile of secondary school-age students (ages 13-21) with disabilities, based on a nationally representative sample and the work of the National Longitudinal Transition Study of Special Education Students (NLTS) in 1987, is presented in the Fourteenth Annual Report to Congress on the Implementation of the Individuals with Disabilities

Education Act (U.S. Department of Education, 1992) and disagrees with Chin and Hughes (1987). Findings from the NLTS study indicated that youth with disabilities are twice as likely to be black and only slightly less likely to be white than the total population of youth. Black youth are more highly represented in every disability category. With regard to specific disabilities, the racial characteristics of secondary school youth with learning disabilities included 67.2% white students and 21.6% black students; for mental retardation, the proportions were more pronounced with 61.0% white students and 31.0% black students. In contrast, secondary age youth in general were 70% white and 12% black, according to 1987 figures. Thus, it appears from these reported findings that race may continue to be a biasing factor in special education placement.

Several reasons for the disproportionate numbers are offered in this Fourteenth Annual Report to Congress (1992). The use of standardized assessment instruments which are racially biased may, at least in part, be responsible. The likelihood of minority children also being poor and more likely to have experienced poor health care and nutrition seems logical, too, and suggests the disabilities truly exist. For our discussion, however, the contention that school professionals are more likely to refer and place minority and poor children in special education because of lower expectations regarding the educability of these children is most germane. Are IEPCs influenced by decreased

expectations for black children so that meeting the severe discrepancy criteria may not play as prominent a role when eligibility decisions for learning disabilities are made?

In sum, several recent studies comparing a severe discrepancy to the IEPC's decision for eligibility indicate that approximately one-third of the students found eligible using a regression formula do not demonstrate a severe discrepancy between ability and achievement. With standard difference score methods, the level reached even higher, with reports of 40 to 50 percent. This condition appears to exist despite the concept of severe discrepancy being fundamental to the guidelines set forth by the federal government for identifying LD students. In addition, low achievement, by itself, appears to be an influential factor in finding a student learning disabled, which would make students classified as learning disabled not clearly different from other students who are failing in school. The sex of the student has not been shown to influence placement without the presence of a severe discrepancy, although the data is limited to a single study. Of those students found eligible as learning disabled, elementary students are more likely than secondary students to demonstrate a severe discrepancy, according to one study.

D. Summary and Implications for Current Research

While the concept of a severe discrepancy between ability and achievement as a fundamental characteristic of

learning disabilities has not received universal support, states currently appear to be in agreement on the importance of the discrepancy component for identifying LD students. The U.S. Department of Education attempted to provide guidance to state and local districts by proposing various formulas, using standard scores, to calculate a discrepancy. Two of the more frequently used methods include the simple difference score model and the regression discrepancy model. The regression model takes into account the regression between ability and achievement that results from less than perfectly correlated measures and is recommended over the simple difference score method for this reason.

Previous studies comparing the two models have found significant differences, particularly when the populations studied have included minority students. In general, these studies have shown that the simple-difference score method, by favoring the higher IQ students, identifies a disproportionate number of white students over black students. When regression analysis is used, proportionate numbers of black and white students are found to meet the severe discrepancy criterion. Identification rates vary from sample to sample, with some researchers noting an increase in students showing a severe discrepancy when regression is used, while others show a decrease.

Although these findings would appear to suggest significant changes in the characteristics and identification rates of students found to be LD if districts

were to change from a simple difference to a regression method for determining a severe discrepancy, the impact may not be as predictable as assumed. Because a severe discrepancy is a required, but not exclusive, criterion for eligibility as learning disabled, as well as the fact that studies have shown some disregard for the discrepancy requirement, outcomes as to who is found LD may not be easily predicted. Current studies, in fact, show that almost one-third of those students found to be LD do not show a severe discrepancy, using a regression formula, and that this is more likely to happen at the secondary level than in the elementary grades.

The proposed study will attempt to replicate findings from Evan's study (1992), using students from another area of the country to show that use of a regression method over a simple difference score method to determine a severe discrepancy provides all students, black or white, with a more equitable opportunity to be considered for special education services. By consistently using individually administered intelligence and achievement scores and age-based normative data, this research will improve methodologically on previous research. In addition, it will look at the impact such a change in methods, as well as a change in cut-off values, will have on identification rates in one intermediate school district in Michigan.

Finally, it will extend previous research by looking more closely at those students exhibiting a severe

discrepancy with those found to be learning disabled by the IEPCs. Are there students who show a severe discrepancy but are not found eligible for special education as learning disabled, as well as students who are found eligible, even though a severe discrepancy can not be documented. What characteristics do these students display with regard to race, gender, grade, ability and achievement? An attempt to understand the characteristics and conditions that influence decision makers in ultimately finding a student LD will be the goal of these final analyses.

III. METHODOLOGY

A. Subjects

The subjects came from six urban, suburban, and rural school districts served by an intermediate school district in Michigan. Data were collected on all students referred for a psychoeducational evaluation during the 1990-91 school year due to learning problems. Those students who were referred primarily for emotional difficulties were not included in the study unless referral information also addressed a concern for learning problems. Students who were found to be educable mentally impaired (EMI), hearing impaired (HI), visually impaired (VI), or physically and otherwise health impaired (POHI) were also excluded from study. If students fell below a Full Scale IQ of 70, but failed to qualify as mentally impaired based on other criteria, they were included in the sample.

All students studied had been administered the Wechsler Intelligence Scale for Children-Revised (WISC-R) as a measure of intellectual functioning and achievement tests from the Woodcock-Johnson Psycho-Educational Battery-Revised (WJ-R) as measures of achievement in the academic areas. A total of 344 students, kindergarten through twelfth grade, were included in the study. Heaviest referral rates were at the first and second grade level, with 21.5% and 24.1% of the sample coming from these two grades, respectively. Of the 344 students, 227 (66.0%) were white, 101 (29.4%) were

black, and 16 (4.6%) made up an "other" category, which combined Native American and Hispanic students. Approximately one-half of the students were enrolled in urban schools (49.4%) with the remainder (50.6%) attending suburban or rural schools. Males (70.3%) outnumbered females (29.7%) more than two to one. Overall cognitive functioning was in the average range, as indicated by a mean IQ of 94.1 on the individually administered intelligence test. Two-thirds (66.8) of the sample had been retained at least one year prior to referral. Based on decisions of the Individualized Educational Planning Committees (IEPCs), 201 (58.4%) of the students studied were found eligible for special education services as learning disabled. Table one gives more detailed descriptive statistics for the sample.

A total of 89 students were dropped from the pool of referred students due to incomplete data sets. The most common reason for incomplete data appeared to result from a procedure used in one district whereby students were screened out of the process if preliminary testing by the school psychologist suggested no evidence of a learning disability. This factor accounted for 58 of the students dropped from the pool.

TABLE 1

Sample Description
(N = 344)

Percent	Frequency	
Educational Setting	n	%
Urban	170	49.4
Nonurban	174	50.6
Race		
White	227	66.0
Black	101	29.4
Other	16	4.6
Sex		
Male	242	70.3
Female	102	29.7
Grade Placement		
K	8	2.3
1	74	21.5
2	83	24.1
3	57	16.6
4	34	9.9
5	30	8.7
6	21	6.1
7	13	3.8
8	4	1.2
9	8	2.3
10	6	1.7
11	5	1.6
12	1	.3
IQ (mean= 94.14 S.D.= 11.55)		
60-69	3	.9
70-79	24	7.0
80-89	112	32.6
90-99	93	27.0
100-109	79	23.0
110-119	27	7.8
120-129	5	1.5
130-139	1	.3

Retentions		
none	114	33.2
one	166	48.4
two	60	17.5
three	3	.9
IEPC Decision		
eligible	201	58.4
ineligible	143	41.6

B. Measures

1. Wechsler Intelligence Test for Children-Revised

The Wechsler Intelligence Test for Children - Revised (WISC-R) was published in 1972 and is an individually administered intelligence test for children between the ages of 6 and 16. The WISC-R provides IQs for the Verbal, Performance, and Full Scales with a mean of 100 and a standard deviation of 15. The internal consistency reliabilities of the Verbal, Performance, and Full Scales are excellent (average of .94, .90, and .96 respectively).

2. Woodcock-Johnson Psycho-Educational Battery-Revised

The Woodcock-Johnson Psycho-Educational Battery-Revised (WJ-R) was published in 1989 and is a set of individually administer tests for measuring cognitive abilities, scholastic aptitudes and achievement. Only the WJ-R Achievement Tests (WJ-R ACH) were used in this study. Norms include individuals from ages 2 to 90+. Nine tests are provided in a Standard Battery and nine additional tests

make up the Supplemental Battery of the WJ-R ACH. The internal consistency reliabilities are generally in the high .80s and low .90s for the individual tests and in the mid .90s for test clusters. A .92 internal consistency reliability coefficient was calculated, based on the individual achievement tests from the standard battery, and represents both the median and the mean for the WJ-R ACH.

3. Correlation Between Measures

Intercorrelations between the WISC-R and the WJ-R ACH for the regression model were restricted to the average Full Scale IQ - achievement correlation of .6. This decision was based on information from a number of sources. First, the WJ-R Technical Manual (McGrew, Werder, & Woodcock, 1991) provides correlational information between the WISC-R and the WJ-R reading and mathematics tests from a study of third graders in which a .6 correlation is reported. Second, correlational information from the original WJ (Woodcock, 1978), while also restricted by selected grade levels as well as standard battery tests, is consistent with a .6 correlation. Third, median correlations of .6 in reading and math across achievement tests are reported by Sattler (1988), based on his review of a large number of studies. Finally, Reynolds (1985) identifies .6 as the commonly accepted correlation between ability and achievement in his published work, Critical Measurement Issues in Learning Disabilities.

C. Formulas

1. Simple Difference Model

The simple difference model represents the model currently recommended by the intermediate district under study in their LD guidelines and utilized within the local districts. It can be expressed by the following equation:

$$X_i - Y_i \geq 15$$

where Y_i = the child's WJ-R achievement score

X_i = the child's Full Scale IQ Score

A second cutoff score, denoting a more severe discrepancy, was substituted in the above equation for additional comparisons.

$$X_i - Y_i \geq 22$$

2. Regression Model

The regression model represents the model being considered by the intermediate school district for future LD eligibility as new guidelines are being developed. Reynold's (1990) offers the following regression equation to determine a student's expected achievement score ($\hat{Y}$), based on his/her IQ:

$$\hat{Y} = \left[r_{xy} \left(\frac{X - \bar{X}}{SD_X} \right) \right] SD_X + \bar{X}$$

where r_{xy} = the correlation between X and Y

X = the child's FSIQ

$\bar{X}$ = the mean of X

SDx = the standard deviation of X

The second step in the regression model determines if the difference between a student's predicted achievement score ($\hat{Y}$) and his real achievement score (Y) is severe, as defined by the intermediate school district under study. Currently, the district is interested in changing from a simple difference model to a regression model and increasing the level of severity from a minimum of 15 to a minimum of 22 points. Given this information, the following formulas were used in this study as a second step in the regression method:

$$\hat{Y}_i - Y_i \geqslant 15$$

$$\hat{Y}_i - Y_i \geqslant 22$$

where: $\hat{Y}_i$ = the child's expected achievement score

Y_i = the child's achievement score

This procedure deviates from Reynold's (1990) recommended formula for determining a severe discrepancy (as described in the Review of the Literature), which uses a number of standard deviations from the mean of the difference score distribution rather than a fixed number of standard score points to define "severe". Reynold's use of standard deviations allows for consistency across all tests, as the size of the standard deviation will differ depending on the correlation between ability and achievement. In practice, however, school districts are inclined to use a formula based on a fixed number of standard score points because it is more manageable than the complex formula proposed by Reynolds.

D. Procedures

All evaluations were completed by a multidisciplinary evaluation team that included a state approved school psychologist and a certified learning disabilities teacher employed by the local districts during the 1990-91 school year.

Standard score and regressed standard score differences were calculated in five areas of eligibility (basic reading, reading comprehension, mathematics calculation, mathematics reasoning, and written expression), using a Full Scale IQ from the WISC-R and age-based achievement scores in reading, mathematics and written language from the WJ-R ACH.

Although Michigan Special Education Rules also identify oral expression and listening comprehension as two additional areas of eligibility, school districts do not appear to use these categories without a discrepancy in a basic academic skill area. Within this study's sample, only one student was considered LD without a deficit identified in reading, math, or written language. The WISC-R Full Scale IQ was used because it is the ability measure recommended by this intermediate school district in their LD guidelines.

Although the standard battery of tests from the WJ-R ACH is used uniformly throughout the intermediate school district as the measure of achievement in the determination of learning disabilities, additional tests from the supplementary battery are sometimes given, depending on the concerns of the learning disabilities specialist administering the test. The supplementary tests can then be combined with the standard battery tests to give cluster scores in the areas of eligibility. Although uniform test comparisons for all students would be preferable when applying different formulas to the data, this procedure could distort the data upon which the IEPCs made their decisions and, thereby, limit conclusions that might be drawn regarding their intent. To resolve this problem, severe discrepancies were calculated in two different ways.

First, discrepancies were calculated using only tests from the standard battery of the WJ-R ACH for all subjects.

Achievement tests and corresponding areas of eligibility were as follows:

Achievement Test	Area of Eligibility
Letter-Word Identification	Basic Reading Skills
Passage Comprehension	Reading Comprehension
Calculation	Math Calculation
Applied Problems	Math Reasoning
Broad Written Language	Written Expression

Second, cluster scores that combined achievement tests from the standard and supplementary batteries were used in place of standard battery scores for students who were given the additional tests. From the total sample, 57% of the students received additional testing in basic reading skills, 49% received additional testing in reading comprehension, and 42% received additional testing in basic math skills. In the second analysis, therefore, students discrepancies were not based consistently on the same achievement tests. Achievement clusters and corresponding areas of eligibility were as follows:

Achievement Cluster	Area of Eligibility
Basic Reading Skills Cluster (combines Letter-Word Identification and Word Attack)	Basic Reading Skill

Achievement Cluster	Area of Eligibility
Reading Comprehension Cluster (combines Passage Comprehension and Reading Vocabulary)	Reading Comprehension
Basic Math Skills Cluster (combines Calculation and Quantitative Concepts)	Math Calculation

For these students, written expression and math reasoning continued to be judged from the standard battery tests.

E. Research Questions

This study was designed to provide guidance to an intermediate school district considering changes in their operational definition of LD. Specifically, two changes were contemplated in how one defines a severe discrepancy between ability and achievement. One change entailed raising the magnitude of the discrepancy from 15 to 22 standard score points. The second change involved the switch from the use of standard scores to regressed standard scores. The proposed changes were applied to data already collected on students who had been referred for evaluation within school districts served by the ISD. In an effort to predict rates and patterns of LD identification that might result from the policy change under consideration, the following research questions were developed:

1. What effect will changing from the simple difference method to the regression method have on the percentage of students determined to have a severe discrepancy when the cutoff value is held constant at 15 points and at 22 points?

2. What effect will establishing a standard score cutoff at two different levels (15 points, 22 points) have on the percentage of students determined to have a severe discrepancy using each of the methods.

3. What effect will changing the method of identification from simple difference to regression and increasing the cutoff score from 15 to 22 points have on the percentage of students determined to have a severe discrepancy?

4. Will the regression method treat ability groups more equitably than the simple difference score method, as predicted by previous research?

5. Will the regression method treat black students more equitably than the simple difference score method, as predicted by previous research?

One needs to keep in mind that a severe discrepancy is only one component of the LD determination process.

Therefore, predictions for rates and patterns can not be based solely on this criterion. In the final analysis, professional judgment plays an important role as the IEPC integrates all the diagnostic information. Given this fact, additional research questions were developed, intended to examine the relationship between team decisions regarding classification and the existence of a severe discrepancy using the different methods for determination:

6. Are there students who are identified as demonstrating a severe discrepancy between ability and achievement, but are not found eligible by the IEPCs as learning disabled under current guidelines? Under proposed guidelines?

7. Are there students who are found eligible as learning disabled by the IEPCs, even though a severe discrepancy was not demonstrated under current guidelines? Under proposed guidelines?

8. What characteristics do these students who are "misclassified" by the IEPCs under current guidelines display with regard to ability, race, gender, grade and achievement?

F. Data Analysis

Each student's Full Scale IQ and achievement standard scores, using the achievement tests identified in the Procedures section, were compared in five areas of eligibility. A student was identified as demonstrating a severe discrepancy if one or more of the five comparisons were equal to or greater than the cutoff level under each method.

The following statistical techniques were used to analyze the data.

1. Pearson Product Moment Correlation Coefficient: The Pearson coefficient was used to determine the relationship between student scores on the standard battery and the supplemental battery in order to make decisions regarding test selection for comparisons.

2. McNemar's Test for Correlated Proportions: McNemar's test for correlated proportions was used to test the significance of increases or decreases in the proportion of students found eligible under the severe discrepancy criteria using the different methods and cut-off values.

3. Kappa: The Kappa statistic, as described by Cohen (1960) for measuring nominal agreement among raters, was used to measure the agreement between pairs of methods and cutoff values for classifying students by severe discrepancy

between ability and achievement. It was also used to measure the agreement between methods and the IEPC in determining which students were labeled as learning disabled. The overlap statistic provided descriptive evidence regarding the same comparisons and was calculated by adding the number of students upon which the pair agreed, both positive and negative, and dividing that number by the total number of students evaluated.

4. Point-Biserial Correlation Coefficient: To correlate the dichotomous variable of severe discrepancy with the continuous measure of a student's WISC-R Full Scale IQ, the point-biserial correlation coefficient (r_{bp}) was used. The r_{pb} indicates if a relationship exists between those found to have a severe discrepancy and their IQ for each of the two methods.

5. Chi-Squared: The chi-squared statistic was used to answer research questions regarding race, grade and gender bias when comparing methods and the IEPC decision.

6. Analysis of Variance: Analysis of variance was used to test for differences in achievement means when students were grouped by eligibility status and the severe discrepancy criterion.

7. Two Sample T-Test: The two sample t-test was used to test for significance of differences in mean IQs between black and white students, eligible and ineligible students, and students with or without a severe discrepancy.

8. Descriptive statistics were also used to determine if there appeared to be any relationships between ability, race, grade, gender and achievement and the determination of eligibility as learning disabled.

G. Limitations

A primary limitation of this study resulted from the use of accessible rather than randomly selected subjects. Of the 21 local districts served by the intermediate school district, six districts that represented a cross-section of geographic, socioeconomic, and ethnic areas within the intermediate school district volunteered to provide data. All complete files from within the six districts made up the final sample. Although the generalization of the results of this study beyond the intermediate school district are questionable, they do add, by replication, another piece of information in an accumulating knowledge base about the rates and patterns of LD identification.

A second limitation of this study involves the number of comparisons that are required by Michigan Special Education Rules in finding a student eligible for special education. Statistically, each additional comparison

between a student's ability and achievement scores increases the probability that a positive effect will be found. Nonetheless, given the legal requirements placed on schools to consider multiple areas of eligibility, a sacrifice in statistical precision appears to be unavoidable, and is necessary in this study to predict the impact of policy change for the local districts. In practice, all qualitative and quantitative data regarding a student's performance are to be considered in the decision making process and may lessen the chance of an unnecessary label.

Still another limitation involves sources of bias. Students who were referred for evaluation are the subjects under study. Any conclusions regarding bias in the LD identification process or placement decisions made by the IEPCs will not have addressed the fact that bias may have existed in the initial referral process. Whether race, gender, ability, or grade level were factors influencing teachers or administrators in decisions to refer students is unknown.

The socioeconomic status of the referred students was a desired but unavailable factor for study. Without controlling for SES, it is difficult to sort out other related factors, such as IQ and race. In the end, SES might be an influential factor in determining not only which students are referred, but also which ones are selected to receive special education services.

Conclusions reached in this study need to be viewed in light of the emphasis placed by local, intermediate, and state level organizations toward operationalizing the concept of a severe discrepancy, while at the same time cautioning against the rigid applications of mathematical formulas involving only standardized test data. In the final analysis, professional judgment plays an important role in integrating all the diagnostic information in a complex decision making process that may also include psychological, political, educational or practical considerations outside the child. The complexity of this decision making process, consequently, limits the confidence with which predictions can be made based solely on the statistical criteria and factors within the child, as used in this study.

IV. RESULTS

Before addressing the research questions put forth in the preceding section, several statistical procedures were completed in order to determine the relationship between students' scores on tests from the standard battery of the WJ-R ACH and their scores on a combination or cluster of tests from the standard battery and supplementary battery. Correlations between the single test scores and corresponding cluster scores for all the students who received additional testing are presented in Table 2. The very high correlations ($r = .94, .93$ and $.87$, $p < .001$) between the two achievement scores (single score and cluster score) in each area would suggest that the additional testing made very little difference in the measurement of student achievement and, consequently, would not change the results in subsequent analyses involving the calculation of a severe discrepancy or decisions based upon it.

In addition, the high internal consistency reliability coefficients reported for the standard battery, ranging from .90 to .94, may help to explain the consistency in achievement across batteries. While additional testing might typically increase reliability, in this case, excellent levels of reliability were already reached through the standard battery. The supplementary battery increased reliability to only a small degree, with internal

Table 2

Pearson Product Moment Correlation (r)
between Achievement Tests and Achievement Clusters
from the Woodcock-Johnson Psycho-Education Battery-Revised

n	Achievement Test (one test from Standard Battery)	Achievement Cluster (adds a second test from Supplementary Battery)	r
196	Letter-Word Identification	Basic Reading Skills	.94*
169	Passage Comprehension	Reading Comprehension	.93*
144	Calculation	Basic Math Skills	.87*

* $p < .001$

consistency reliability figures reported to range from .94 to .96 for the additional test clusters.

We can predict little difference in the selection of students showing a severe discrepancy, regardless of the level of testing completed, based on these very high correlations between the two achievement scores in each area and the high test reliability coefficients of the standard battery. It is also interesting, however, to observe the results after actually applying the two methods at different cutoff values to the data. A comparison of Table 3 and Table 4 suggests there is little difference between the actual numbers and characteristics of the students demonstrating a severe discrepancy, regardless of the level of achievement testing utilized. Overall, the total number of students showing a severe discrepancy by either method or cutoff level does not change by more than five students when the two levels of achievement testing are compared.

While the numbers change only slightly, is this small change also true with regard to individual students? Further analyses, using the overlap statistic (number of decisions in agreement divided by the total number of cases considered) also show very little difference in the determination of a severe discrepancy, regardless of the achievement scores used. Table 5, which reports the extent of agreement when the current guidelines (simple difference method - 15 point cutoff) are used, indicates large overlap statistics, ranging from 91.18 to 96.69 percent, across

TABLE 3

Number of Students Meeting the Severe Discrepancy Criterion Using Only the **Standard Battery** of the WJ-R by Gender, Race and Total Sample

Factor	n	Simple Difference		Regression	
		15 pts	22 pts	15 pts	22 pts
Male	242	166	118	190	129
Female	102	59	44	72	49
White	227	154	112	167	115
Black	101	60	42	81	53
Other	16	11	8	14	10
Total	344	225	162	262	178

TABLE 4

Number of Students Meeting the Severe Discrepancy Criterion Using the **Standard and Supplementary Batteries** of the WJ-R by Gender, Race and Total Sample

Factor	n	Simple Difference		Regression	
		15 pts	22 pts	15 pts	22 pts
Male	242	168	123	193	132
Female	102	59	42	74	48
White	227	154	113	170	116
Black	101	62	43	83	54
Other	16	11	9	14	10
Total	344	228	165	267	180

TABLE 5

Agreement Between Levels of Achievement Testing (Standard Battery vs. Standard and Supplementary Batteries) in the Selection of Students by Total Sample, Race, and Gender using the **Simple Difference Method - 15 Pt. Cutoff**

Factor	Agree SD	Agree No SD	Disagree	%Overlap	Kappa	Sig
Male	163	71	8	96.69	.91	p<.001
Female	55	38	9	91.18	.81	p<.001
White	149	69	11	95.19	.90	p<.001
Black	59	38	4	96.03	.92	p<.001
Total	218	109	17	95.06	.88	p<.001

TABLE 6

Agreement Between Levels of Achievement Testing (Standard Battery vs. Standard and Supplementary Batteries) in the Selection of Students by Total Sample, Race, and Gender using the **Regression Method - 22 Pt. Cutoff**

Factor	Agree SD	Agree No SD	Disagree	%Overlap	Kappa	Sig
Male	127	108	7	97.11	.94	p<.001
Female	46	51	5	95.10	.90	p<.001
White	111	107	9	96.04	.92	p<.001
Black	52	46	3	97.03	.87	p<.001
Total	173	159	12	96.51	.92	p<.001

factors. Under current guidelines, a total of 17 students, or 4.94 percent of the sample, would be influenced by a decision to use one level of testing over another. Very high kappa statistics, representing the proportions of agreements after chance agreement has been removed from consideration, ranged from .81 to .91 and also suggest that the differences are trivial. Table 6 presents similar data using proposed guidelines (regression - 22 point cutoff) for comparison. Under proposed guidelines, only 12 students, or 3.48 percent of the sample, would be influenced by a change in testing levels. Kappa statistics range from .87 to .94.

Given these empirical findings, along with the high correlation coefficients identified and the excellent test reliability coefficients of the standard battery, it would seem reasonable to conclude that the additional tests administered to some students did not result in significant changes in the number of students demonstrating a severe discrepancy. Subsequent analyses will, therefore, employ only scores from the standard battery of the WJ-R ACH, which was administered to all students. The significance of these differences to diagnostic personnel, aside from the research concerns being addressed here, are another matter and will be revisited in the discussion section.

Having dealt with these preliminary concerns, we can now look at the results of this study that provide answers to the first three research questions regarding identification rates.

A. Identification Rates

The first three research questions addressed the change in identification rates that this intermediate school district might experience if they were to change their operational definition of LD. One change involves the switch from the use of standard scores to regressed standard scores. Table 7 indicates the change in number and percent of students that would meet the severe discrepancy criterion as method and cutoff score change and the significance of the change using a chi-square test for correlated proportions (McNemar's Test for Large Samples). Looking first at a change in method, regression significantly increased identification rates at each cutoff value. At the 15-point discrepancy level, 37 more students, representing a significant increase of 16.4 percent ($p < .001$), demonstrated a severe discrepancy using a regression method over a simple difference score method. At the 22-point discrepancy level, 16 more students, representing a significant increase of 9.9 percent ($p < .025$), demonstrated a discrepancy using a regression method over simple difference method.

The second change entails raising the magnitude of the discrepancy from 15 to 22 standard score points. By examining Table 7, we see that a significant decrease in the number of students meeting the severe discrepancy criterion occurs when the cutoff level is raised from 15 to 22 points using either method. While a decrease would logically be

TABLE 7

Change in Identification Rates
as Method and Cutoff Value Change

Change	Increase (+) Decrease (-)			
	n	%	X^2	sig
Sim Dif-15 to Regres-15	+37	+16.4	25.81	p=.0000
Sim Dif-22 to Regres-22	+16	+ 9.9	6.40	p=.0114
Sim Dif-15 to Sim Dif-22	-63	-28.0	62.88	p=.0000
Regres-15 to Regres-22	-84	-32.0	83.91	p=.0000
Sim Dif-15 to Regres-22	-47	-20.7	46.92	p=.0000

df = 1

expected, the amount of change may be of greater interest. Using the simple difference method, a significant decrease of 63 students, or 28 percent ($p < .001$) is observed. Using regression, a significant decrease of 84 students, or 32 percent ($p < .001$) is observed. In this intermediate school district, simply adjusting the cutoff level would decrease the number of students demonstrating a severe discrepancy by over a fourth of the current rate.

What effect, then, will changing the method of identification from simple difference to regression **and** increasing the magnitude of the discrepancy from 15 to 22 points have on the percentage of students determined to have a severe discrepancy? As indicated in Table 7, the change resulted in a decrease of 47 students, or 20.7 percent ($p < .001$) who met the severe discrepancy criterion. Therefore, this intermediate school district could deal with the increased identification rates that would result from using the regression method by adjusting the cutoff value to identify only the most severely learning disabled.

In addition to predicting the change in identification rates resulting from a change in policy, it is of interest to know how well the methods for determining a severe discrepancy agree on which students to identify and exclude. One approach is to measure the extent of overlap between the methods. Overlap statistics were calculated for six comparisons by method and cutoff value. Secondly, kappa statistics were calculated. The percent of overlap and the

kappa coefficient for each comparison are reported in Table 8. Although one would expect high percentages of agreement and significant kappa values when only the cutoff value was changed, this result was also true when the method for calculating a severe discrepancy was changed. Of particular interest in this study is the comparison between the simple difference method at a 15 point cutoff (current guidelines) and the regression method at a 22 point cut-off value (proposed guidelines). Regardless of the significant decrease in identification rates previously noted with this same comparison, the current guidelines and proposed guidelines tended to include and exclude a high percentage (84.59%) of the same students.

B. Effect of Method on Ability Groups

The fourth research question asked whether ability groups, as determined by IQ scores, would be treated more equitably using a regression method over a simple difference score method. Table 9 presents information regarding the distribution of WISC-R Full Scale IQ scores in the sample. A mean FSIQ score of 94.14 and a standard deviation of 11.55 describe the overall ability of the referral group. Approximately two thirds (67.44%) of the students studied had FSIQs under 100. Scores ranged from 64 to 136.

The calculation of a point-biserial correlation coefficient (r_{pb}) was used to determine if a relationship exists between the dichotomous variable of severe

TABLE 8

Agreement Between Methods at Different Cutoff Values in the Selection of Students

Comparison	% Overlap	Kappa	Sig
Simple Dif-15 and Simple Dif-22	81.69	.64	p<.001
Simple Dif-15 and Regres-15	84.59	.64	p<.001
Simple Dif-15 and Regres-22	84.59	.69	p<.001
Simple Dif-22 and Regres-15	70.93	.44	p<.001
Simple Dif-22 and Regres-22	88.37	.76	p<.001
Regres-15 and Regres-22	75.58	.50	p<.001

TABLE 9

WISC-R FSIQ Intervals for the Referral Sample by Frequency and Percent

Interval	n	%
60 - 69	3	.87
70 - 79	24	6.98
80 - 89	112	32.56
90 - 99	93	27.03
100 - 109	79	22.97
110 - 119	27	7.85
120 - 129	5	1.45
130 - 139	1	.29

discrepancy (meeting or not meeting the criterion) and the continuous measure of FSIQ. If the odds of meeting the severe discrepancy criterion change across IQ levels for the simple difference method, as theory suggests, then a correlation should be observed between student FSIQs and their severe discrepancy status. Likewise, if the odds of meeting the severe discrepancy criterion remain constant across IQ levels for the regression method, no correlation should be observed when this method is employed.

As presented in Table 10, significant ($p<.0001$) point-biserial correlation coefficients of .33 and .36 were found at the 15-point and 22-point cutoff values, respectively, using the simple difference score method. In contrast, nonsignificant point-biserial correlations of .08 and .10 were found at the 15-point and 22-point cutoff values, respectively, using the regression method.

Further evidence that IQ plays a role in determining a severe discrepancy under the simple difference method comes from comparing mean FSIQs of those students who met the criterion with those students who did not, as reported in Table 11. At both levels, the simple difference method identified a group of students with a significantly higher mean IQ as meeting the severe discrepancy criterion, $t(342)= 6.37$, $p<.001$ and $t(342) = 7.00$, $p<.001$, using a one-tailed test because we expected one group to be lower. The group of students not qualifying under the simple difference method at either cutoff level had FSIQs approximately eight points

TABLE 10

Point-Biserial Correlation Between IQ and Severe Discrepancy Criterion by Method and Cutoff Value

Method	Cutoff Value	r_{pb}	t	sig
Simple Dif	15	.33	6.378	p=.0000
Simple Dif	22	.36	7.006	p=.0000
Regression	15	.08	1.481	p=.1395
Regression	22	.10	1.910	p=.0570

TABLE 11

Mean FSIQs for Students With and Without a Severe Discrepancy by Method and Cutoff Value

Method - Cutoff	Mean FSIQ		t	sig
	with severe dis	without severe dis		
Simple Dif - 15	96.87	88.97	6.37	p=.0000
Simple Dif - 22	98.47	90.28	6.92	p=.0000
Regres - 15	94.65	92.47	1.49	p=.1371
Regres - 22	95.28	92.91	1.91	p=.0570

df = 342

lower. On the other hand, when regression was used, there was an insignificant difference of approximately two points between the mean FSIQ of those meeting the severe discrepancy criterion and those not meeting it, $t(343) = 1.49$, n.s. and $t(342) = 1.91$, n.s., using a two-tailed test. In sum, the current evidence appears to support previous research that identifies an influence of IQ on simple difference scores in favor of higher ability students.

C. Effect of Method on Race

Knowing that an influence of IQ on simple difference scores in favor of higher ability students is present and that the mean WISC-R Full Scale IQ for white students in the sample is 96.41 (s.d.= 11.7), which is significantly higher than the mean Full Scale IQ of 89.45 (s.d.= 9.8) for black students, $t(226) = 5.217$, $p<.001$, we would expect to see an overrepresentation of white students who meet the severe discrepancy criterion when the simple difference method is used. In contrast, when regression is employed, we would expect representation to be proportional for blacks and whites because there was no evidence of an influence by IQ using the regression method.

Surprisingly, no comparison between black and white students by method and cutoff value identified a significant proportion of one race over the other as meeting the severe discrepancy criterion (see Table 12). Chi-squares of 2.193 and 1.688 for the simple difference method and 1.666 and

TABLE 12

Number and Percent of Black (n = 101) and White (n = 227) Students Meeting the Severe Discrepancy Criterion by Method and Cutoff Value

Method and Cutoff Value	Black n (%)	White n (%)	X^2	sig
Simple Dif-15	60 (59.4)	154 (67.8)	2.193	p=.1386
Simple Dif-22	42 (41.6)	112 (49.3)	1.688	p=.1939
Regres-15	81 (80.2)	167 (73.6)	1.666	p=.1968
Regres-22	53 (52.5)	115 (50.6)	.092	p=.7616

df = 1

.092 for the regression method did not reach significance, indicating that any differences in representation between black and white groups were the result of chance.

In summary, the data analyses show that moving from a simple difference score method to a regression method for determining a severe discrepancy and increasing the cutoff value from 15 to 22 points would result in approximately a 20 percent decrease in the number of students who meet the severe discrepancy criterion within this intermediate school district during a one-year period. The change to a regression model could also result in a more equitable approach to the provision of LD services by providing students at all IQ levels the same chance of meeting the severe discrepancy criterion and eliminating the influence that was observed by a significant correlation between IQ and simple difference scores. Likewise, black and white students would be represented proportionally within groups demonstrating a severe discrepancy and thereby have equal access to special education services under this criterion. It should be noted, however, that race did not show up as a significant factor in this referred sample of students, even when a simple difference method was used and the mean IQ's of the racial groups were known to be significantly different.

Is a severe discrepancy between ability and achievement the key defining feature leading to a student being found eligible as LD or do other factors appear to contribute to

the eligibility decision? The second group of research questions consider the relationship between IEPC decisions regarding eligibility and the existence of a severe discrepancy using the different methods for determination.

D. Eligibility and a Severe Discrepancy

It is important to keep in mind that the IEPCs in this study were making decisions based on current LD guidelines which include the use of simple difference scores and a 15-point discrepancy between ability and achievement in determining a severe discrepancy. Consequently, if a severe discrepancy plays a key role in determining who is LD, we would not expect to see similar agreement when comparing eligibility decisions and a severe discrepancy when we apply proposed guidelines, which use a regression formula and a more severe 22-point difference. We know from earlier results that application of the current and proposed guidelines would result in disagreement on the severe discrepancy status in 53 cases, or 15% of the students. Interestingly, however, the rate of agreement between the eligibility decision and the presence or absence of a severe discrepancy, as measured by the overlap statistic, was similar regardless of the method or cutoff value, as indicated in Table 13. Using the current guidelines, the IEPC decision was consistent with a decision based solely on the severe discrepancy criterion in 73.83% of the cases. Applying the proposed guidelines, consistency was observed

TABLE 13

Agreement between IEPC Eligibility Decision and Eligibility Based Only on the Severe Discrepancy Criterion

	% Overlap	Kappa	Sig
IEPC Decision compared to Simple Difference - 15	73.83	.45	p<.001
IEPC Decision compared to Regression - 22	74.71	.49	p<.001

in 74.71 percent of the cases. In other words, in approximately three-fourths of the cases, regardless of method or cutoff value, the eligibility decision was consistent with the severe discrepancy status. In approximately one-fourth of the cases, a decision was made to find a student eligible without a severe discrepancy or ineligible with a severe discrepancy. Presentation of further analyses will attempt to explain why this similar level of agreement could occur despite a change in guidelines.

The sixth research question asks if there are students who are identified as demonstrating a severe discrepancy between ability and achievement, but are not found eligible by the IEPCs as learning disabled under current guidelines. A total of 57 students, or 16.57 percent of the referred sample fell within this category (see Table 14). When compared to those students who demonstrated a severe discrepancy and were found eligible by the IEPC, the ineligible group had a significantly higher Full Scale IQ of 102.30. The eligible group had a Full Scale IQ of 95.03, $t(223) = 4.239$, $p<.001$ (see Table 15). Consequently, it appears that the students with high IQs are less likely to receive an eligibility decision and placement in special education than the students with low IQs, despite evidence of a severe discrepancy. Even if a regression model could correct for a method that gives high IQ students additional

TABLE 14

Comparison of Eligibility Status to
Severe Discrepancy Criterion under
Current and Proposed Methods and Cutoff Values
by Frequency and Percent

Discrepancy Criterion	Eligible		Ineligible	
	n	%	n	%
(Current Guidelines) Simple Diff - 15				
Severe Discrepancy	168	48.84	57	16.57
No Severe Discrepancy	33	9.59	86	25.00
(Proposed Guidelines) Regression - 22				
Severe Discrepancy	146	42.44	32	9.30
No Severe Discrepancy	55	15.99	111	32.27

TABLE 15

Comparison of Eligibility Status to
Severe Discrepancy Criterion under
Current and Proposed Methods and Cutoff Value
by mean WISC-R Full Scale IQ

Discrepancy Criterion	Full Scale IQ		t
	Elig	Inelig	
(**Current** Guidelines) Simple Diff - 15			
Severe Discrepancy	95.03	102.30	4.239***
No Severe Discrepancy	85.55	90.28	2.475*
(**Proposed** Guidelines) Regression - 22			
Severe Discrepancy	94.08	100.75	2.900**
No Severe Discrepancy	91.85	93.43	.873

* p < .01 ** p < .005 *** p < .001

points toward a severe discrepancy, the IEPCs seem to have already made informal adjustments in the same direction.

What change is seen when we compare the IEPC decision with those students meeting the severe discrepancy criterion when the proposed guidelines are applied, including the regression method and a higher cutoff value? The group demonstrating a severe discrepancy, but found ineligible by the IEPCs shrinks from 57 (16.57%) to 32 (9.30%), as indicated in Table 14. In other words, the proposed guidelines "correct" almost half of the current "misclassifications", if one considers the severe discrepancy criterion to be key to a diagnosis of LD. The students removed from the "misclassified" group would be those with smaller severe discrepancies (15 vs. 22 points). Any change in status caused by a change in method for calculating a severe discrepancy across would be small, overshadowed by the requirement for a larger discrepancy. However, the almost 10 percent that remain "misclassified", have large discrepancies (at least 22 points when only 15 are currently required) and still were not found eligible by the IEPC, giving additional support to the conclusion that something more than the discrepancy is heavily weighed by the decision makers. Although the mean FSIQ for those demonstrating a severe discrepancy under the proposed guidelines, but found ineligible, has come down to 100.75, it is still significantly higher, $t(176) = 2.90$, $p<.005$, than the mean FSIQ of 94.08 of those with a severe

discrepancy who were found eligible by the IEPCs, as noted in Table 15.

Federal and state laws dictate that a severe discrepancy between ability and achievement is a required, but not exclusive factor in the diagnosis of learning disabilities. Consequently, IEPCs might decide that despite the presence of a severe discrepancy, some students would not require placement in special education programs in order to address their educational needs, or they might decide that an exclusionary factor, such as environmental or emotional issues, are responsible for depressing achievement. However, diagnosing a student LD without evidence of a severe discrepancy, would appear to be a departure from legislative intent. The seventh research question examines the occurrence of this situation in the sample of referred students.

E. Eligibility without a Severe Discrepancy

Are there students who are found eligible as learning disabled by the IEPCs, even though a severe discrepancy was not demonstrate under current guidelines? Referring back to Table 12, in 33 cases, representing 9.59 percent of the students, a decision was made to classify the student LD without evidence of a severe discrepancy in any academic area. Again, a comparison of FSIQ's between those students found eligible versus those found not eligible indicates a significant difference in mean FSIQs, $t(117) = 2.475$, $p<.01$.

As a group, the students found ineligible without a severe discrepancy of at least 15 points, using the simple difference method, had a mean FSIQ of 90.28. Those students found eligible without a severe discrepancy under the same guidelines had a mean FSIQ of 85.55, suggesting that a greater need to "bend the rules" and provide educational services through special education placement might be perceived by IEPC members for lower IQ students. Although the simple difference method of calculating a severe discrepancy may make it more difficult for lower IQ students to demonstrate a severe discrepancy, IEPCs appear to make decisions in some cases that counteract these outcomes and are more in line with a regression approach.

How do the numbers change with regard to those students found eligible without a severe discrepancy when we apply the proposed guidelines, as shown in Table 14? We would expect this group to grow simply because we have applied a more severe cutoff value than the IEPCs were using for decision making. This expectation was confirmed. The group of students found eligible without a severe discrepancy increases from 33 (9.59%) to 55 (15.99%).

Do these results suggest that IEPCs are inclined toward identifying lower IQ students as LD when making eligibility decisions, finding them eligible more easily than higher IQ students? To answer this question, a point-biserial correlation coefficient was calculated between the IEPC's eligibility decision (eligible and ineligible) and the FSIQ.

A negative, insignificant r_{pb} (-.07, n.s.) indicates that those students found eligible by the IEPCs had a lower IQ than those found not eligible, but not to a significant degree. It appears that, although the IEPCs made decisions with regard to IQ that counteracted the influence indicated by the simple-difference score method, they did not do so to the extent that a relationship between eligibility and low IQ could be detected.

F. Eligibility and Race

The eighth research question asks what characteristics the students who are "misclassified" by the IEPCs, using the severe discrepancy as the key feature of the eligibility decision and current guidelines, display with regard to ability, race, gender, grade and achievement. Ability has already been addressed in the preceding discussion. What differences are observed with regard to race? Table 16 identifies the number of black and white students in each category of eligibility.

Table 17 looks only at those students who were found to have a severe discrepancy under the current guidelines. If race is not a factor, then we would expect students found ineligible to be represented in the same proportions by race as those found eligible when a severe discrepancy has been observed. The chi-square test shows, however, that a disproportionate number of white students over black students fall in the ineligible category, X^2 (1, N=214) =

TABLE 16

Comparison of Eligibility Status and Severe Discrepancy Criterion under Current Guidelines by Race

		With Severe Discrepancy		Without Severe Discrepancy	
Factor	n	Elig	Not Elig	Elig	Not Elig
Black	101	51	9	14	27
White	227	107	47	18	55

TABLE 17

Frequencies of Students Showing a Severe Discrepancy Under Current Guidelines by Race and Eligibility Decision

ELIGIBILITY	Black	White
Eligible	51	107
Ineligible	9	47

N = 214, df = 1, X^2 = 5.322, p = .0211

TABLE 18

Frequencies of Students Not Showing a Severe Discrepancy Under Current Guidelines by Race and Eligibility Decision

ELIGIBILITY	Black	White
Eligible	14	18
Ineligible	27	55

N = 114, df = 1, X^2 = 1.171, p = .2792

5.382, $p<.025$. Of the 57 students with a severe discrepancy, but found ineligible under current guidelines, 47 (82.46%) were white and 9 (15.46%) were black.

Table 18 provides data to answer the same question regarding race of those students who did not demonstrate a severe discrepancy. Does the eligible group differ proportionately by race from the ineligible group? Unlike the previous comparison, proportionate numbers of black and white students made up the category of students who did not show a severe discrepancy but were found eligible under current guidelines, X^2 (1, N=114) = 1.171, n.s.

In sum, when looking at the "misclassified" students, we see that more white students than black students made up the group that demonstrated a severe discrepancy but was not found to be LD. Equal representation was observed in the group that was found to be LD without a severe discrepancy.

G. Eligibility and Gender

Table 19 identifies the number of boys and girls within each classification by severe discrepancy status and eligibility decision. As previously noted, overall, boys outnumbered girls more than two to one in referrals and eligibility decisions.

Again, using the notion of "misclassification", based on the severe discrepancy criterion and current guidelines, we can compare those students showing a severe discrepancy who were found eligible to those who were found ineligible,

TABLE 19

Comparison of Eligibility Status and Severe Discrepancy Criterion under Current Guidelines by Gender

		With Severe Discrepancy		Without Severe Discrepancy	
Factor	n	Elig	Not Elig	Elig	Not Elig
Males	242	119	47	16	60
Females	102	49	10	17	26

expecting proportional representation of boys and girls across groups. The assumption is that decision makers are not influenced by students' gender when deciding whether or not to find them eligible in the presence of a severe discrepancy. This assumption, in fact, was supported in the data analysis by an insignificant X^2. As reported in Table 20, X^2 (1, N=225) = 2.972, n.s.

In contrast, an unexpected effect for gender was found when comparing the proportions of boys and girls who did not show a severe discrepancy. Within the group of students who were found eligible for special education services without a severe discrepancy, a disproportionate number were girls, X^2 (1, N=119) = 4.681, $p<.05$ (See Table 21). Although girls made up approximately one-third of the students without a severe discrepancy, an almost equal number of each sex from this group were labeled LD. Consequently, there is some indication that being a female may have made a difference when students were labeled LD without evidence of a severe discrepancy.

H. Eligibility and Grade Level

Before comparing the eligibility decision with the severe discrepancy criterion by grade, it may be interesting to observe at which grade levels students are most frequently referred and identified as LD. A look at the breakdown by grade in Table 22 indicates both the highest referral rate and positive eligibility decisions occurred in

TABLE 20

Frequencies of Students Showing a Severe Discrepancy Under Current Guidelines by Gender and Eligibility Decision

ELIGIBILITY	Male	Female
Eligible	119	49
Ineligible	47	10

N = 225, df = 1, X^2 = 2.972, p = .0847

TABLE 21

Frequencies of Students Not Showing a Severe Discrepancy Under Current Guidelines by Gender and Eligibility Decision

ELIGIBILITY	Male	Female
Eligible	16	17
Ineligible	60	26

N = 119, df = 1, X^2 = 4.681, p = .0305

TABLE 22

Students Found Eligible and Ineligible by IEPCS by Grade in Frequencies and Percents

Grade	n	Eligible		Not Eligible	
		n	%	n	%
K	8	2	1.00	6	4.20
1	74	52	25.87	22	15.38
2	83	54	26.87	29	20.28
3	57	36	17.91	21	14.69
4	34	17	8.46	17	11.89
5	30	16	7.96	14	9.79
6	21	14	6.97	7	4.90
7	13	4	1.99	9	6.29
8	4	1	.50	3	2.10
9	8	2	1.00	6	4.20
10	6	1	.50	5	3.50
11	5	2	1.00	3	2.10
12	1	0	0.00	1	.70

the second grade, followed by almost equally high rates in the first grade. Referral of 83 second graders resulted in 54 LD decisions, or 27 percent of all students found eligible in the sample. For first graders, referrals totaled 74 students, with 52 LD decisions, representing 26 percent of all those found eligible. Thus, it appears that over 50 percent, or a majority of the students found to eligible as LD by the IEPCs were in the first or second grades, with referral rates declining steadily after that time.

Table 23 consolidates the grade levels into three categories; early elementary (K-2), later elementary (3-6), and secondary (7-12) and identifies the number of students in each category as to eligibility and discrepancy status. Consolidation was necessary to accommodate small cell sizes when eligibility was compared to the severe discrepancy criterion by grade using the chi-squared statistic. Is there evidence that a student's grade level may play a part in the IEPC decision for eligibility? As indicated in Table 24, a significantly greater proportion of students who demonstrated a severe discrepancy, but were found ineligible, were older students from the late elementary and secondary levels, X^2 (2, N=225) = 10.243, $p < .01$. This result is particularly interesting, as one might hypothesize just the opposite; that younger students would have access to more remedial programs in the primary grades, which could

TABLE 23

Comparison of Eligibility Status and Severe Discrepancy Criterion under Current Guidelines by Grade Level

		With Severe Discrepancy		Without Severe Discrepancy	
Factor	n	Elig	Not Elig	Elig	Not Elig
Early El	165	96	22	12	35
Later El	142	64	26	19	33
Secondary	37	8	9	2	18

TABLE 24

Frequencies of Students Showing a Severe Discrepancy Under Current Guidelines by Grade and Eligibility Decision

ELIGIBILITY	Early El	Later El	Secondary
Eligible	96	64	8
Ineligible	22	26	9

N = 225, df = 2, X^2 = 10.243, p = .0060

TABLE 25

Frequencies of Students Not Showing a Severe Discrepancy Under Current Guidelines by Grade and Eligibility Decision

ELIGIBILITY	Early El	Later El	Secondary
Eligible	12	19	2
Ineligible	35	33	18

N = 119, df = 2, X^2 = 5.264, p = .0719

provide the needed academic support otherwise received in special education.

On the other hand, for those students who were found eligible without demonstrating a severe discrepancy, there does not appear to be a significant difference in the proportions represented by early elementary, later elementary, or secondary students, X^2 (2, N=119) = 5.264, $p < .05$ (See Table 25).

I. Eligibility and Achievement

The last factor to be examined for its influence on IEPC decision-making is achievement. Do achievement levels alone, aside from their role in the calculation of a severe discrepancy, influence IEPC participants to find a student eligible or ineligible as learning disabled? Table 26 displays the WJ-R mean achievement scores in each of the five achievement areas identified in this study for consideration in LD diagnoses. Students are grouped, as before, by eligibility status and the severe discrepancy criterion.

Observable differences are noted between the eligible and ineligible students when the severe discrepancy criterion is held constant. While achievement means for eligible students can generally be described as below average, achievement means for ineligible students appear to be primarily (70%) in the average range. Further hypotheses

TABLE 26

Comparison of Eligibility Status and Severe Discrepancy Criterion under Current Guidelines by WJ-R Mean Achievement Scores

Achievement Area	With Severe Discrepancy		Without Severe Discrepancy	
	Elig	Not Elig	Elig	Not Elig
Basic Reading	74.89	86.72	84.42	90.76
Reading Comp	78.80	94.04	86.81	93.22
Math Calculation	82.10	92.53	90.36	93.89
Math Reasoning	88.60	98.38	88.55	96.31
Written Language	70.85	82.02	80.27	86.30

testing was completed to determine if the observable group differences represent real group differences in achievement.

Using one-way analysis of variance and post hoc comparisons (Tukey's), the "misclassified" students were again compared against the "correctly" classified students on achievement levels, using the severe discrepancy as key to the diagnosis of LD. One might hypothesize that no true differences between group achievement means would be observed, based on the assumption that achievement levels are not weighed separately from the severe discrepancy criterion by decision makers in the determination of eligibility.

Results of the data analyses suggest otherwise. In all five achievement areas, significant F-ratios ($P < .0001$), ranging from 12.51 to 46.50 (see Tables 27 - 31) were noted, indicating true differences in achievement between groups. Post hoc comparisons, using the Tukey method with a significance level of .05, showed that, of the students with a severe discrepancy, those found ineligible had significantly higher achievement scores in all five achievement areas than those found eligible. Consequently, there is some evidence that would indicate higher achievement scores may influence IEPC's to forgo special education services, even though a severe discrepancy between ability and achievement exists.

Post hoc analyses also showed some differences in achievement levels between students found eligible and those

TABLE 27

Analysis of Variance of WJ-R **Reading Recognition** Student Achievement Scores by Eligibility Status and Severe Discrepancy Criterion

With Severe Discrepancy		Without Severe Discrepancy	
Elig	Not Elig	Elig	Not Elig
$\bar{X}$ = 74.89	$\bar{X}$ = 86.72	$\bar{X}$ = 84.42	$\bar{X}$ = 90.76
SD = 11.73	SD = 10.21	SD = 6.08	SD = 11.01
n = 168	n = 57	n = 33	n = 86

df = 3, 343

F = 46.50

P < .0001

TABLE 28

Analysis of Variance of WJ-R **Reading Comprehension** Student Achievement Scores by Eligibility Status and Severe Discrepancy Criterion

With Severe Discrepancy		Without Severe Discrepancy	
Elig	Not Elig	Elig	Not Elig
$\bar{X}$ = 78.80	$\bar{X}$ = 94.04	$\bar{X}$ = 86.81	$\bar{X}$ = 93.22
SD = 13.66	SD = 10.73	SD = 8.76	SD = 10.68
n = 168	n = 57	n = 33	n = 86

df = 3, 343

F = 38.40

P < .0001

TABLE 29

Analysis of Variance of WJ-R **Math Calculation** Student Achievement Scores by Eligibility Status and Severe Discrepancy Criterion

With Severe Discrepancy		Without Severe Discrepancy	
Elig	Not Elig	Elig	Not Elig
$\bar{X}$ = 82.10	$\bar{X}$ = 92.53	$\bar{X}$ = 90.36	$\bar{X}$ = 93.89
SD = 16.06	SD = 13.75	SD = 14.89	SD = 12.68
n = 167	n = 55	n = 33	n = 85

df = 3, 339

F = 15.22

P < .0001

TABLE 30

Analysis of Variance of WJ-R **Applied Problems (Math)** Student Achievement Scores by Eligibility Status and Severe Discrepancy Criterion

With Severe Discrepancy		Without Severe Discrepancy	
Elig	Not Elig	Elig	Not Elig
$\bar{X}$ = 88.60	$\bar{X}$ = 98.38	$\bar{X}$ = 88.55	$\bar{X}$ = 96.31
SD = 12.72	SD = 13.42	SD = 10.74	SD = 13.23
n = 167	n = 55	n = 33	n = 85

df = 3, 339

F = 12.51

P < .0001

TABLE 31

Analysis of Variance of WJ-R **Broad Written Language** Student Achievement Scores by Eligibility Status and Severe Discrepancy Criterion

With Severe Discrepancy		Without Severe Discrepancy	
Elig	Not Elig	Elig	Not Elig
$\bar{X}$ = 70.85	$\bar{X}$ = 82.02	$\bar{X}$ = 80.27	$\bar{X}$ = 86.30
SD = 14.20	SD = 10.64	SD = 7.81	SD = 9.66
n = 167	n = 57	n = 33	n = 86

df = 3, 342

F = 35.18

P < .0001

found ineligible when a severe discrepancy was not documented. Significantly lower achievement levels in basic reading, reading comprehension and math reasoning were identified among those who received an LD label and those who did not, suggesting that low achievement in some areas may have played in role in bending the rules for special education eligibility. At this point, however, it becomes very difficult to determine if it was low IQ or low achievement that influenced placement, as they are highly related among those students without a severe discrepancy.

In summary, when comparing the IEPC decisions for eligibility and the severe discrepancy criterion, there is evidence of a high level of agreement not only with the current guidelines, but also with the proposed guidelines which employ the regression method and a more severe cut-off value. In both cases, the rate of agreement between the severe discrepancy criterion and the IEPC eligibility decision is approximately 75 percent. This finding suggests that IEPCs are making informal decisions under the current guidelines, probably when considering students of higher and lower intellectual ability, that appear in some cases to result in an outcome similar to that observed when regression is employed.

With regard to specific student characteristics, over-representation of white students and students who were in the later elementary or secondary grades was observed among those who demonstrated a severe discrepancy but were found

ineligible. These students also appeared to be more academically able, earning higher achievement scores in all areas of qualification, than those students who were found eligible.

Among the students found eligible without a severe discrepancy, a disproportionate number were female. Low achievement scores in basic reading skills, reading comprehension, and math reasoning also may have played a role in the eligibility decision. The following discussion will attempt to explore reasons, draw conclusions and suggest implications for these findings.

V. DISCUSSION

Although the intent of this study was not to examine the extent to which achievement testing is desirable in LD evaluations, methodological concerns led to some comparisons being made. These comparisons are of interest to diagnostics, including psychologists, teacher consultants, and LD classroom teachers who regularly administer the Woodcock-Johnson-Revised Achievement Tests. For school professionals, the amount of time needed to test each student and the adequacy of the achievement information gained are variables always under scrutiny. For this reason, it may be worthwhile to digress briefly from the main focus of the research to comment.

In this sample, less than 5 percent of the students changed status, with respect to the severe discrepancy criteria, when the current cutoff score and method for determining a severe discrepancy were applied to data containing the supplementary testing. If the proposed guidelines had been in place, the proportion would have shrunk to 3.5 percent. Consequently, for diagnosticians who routinely administer the Supplementary Battery of the WJ-R ACH to all students in fear that if they do not, their results may be inadequate and/or leading to false labels, there is evidence from this study that suggests such an outcome is unlikely and the additional testing may be

unnecessary. Given the very high correlations between the standard and supplementary test scores and the data from overlap analysis, indicating that a very low incidence of change in severe discrepancy status as a result of the additional testing, one might conclude that only the most questionable or borderline cases warrant the administration of supplementary test(s). This conclusion appears consistent with information presented in the WJ-R manual that recommends the use of selective testing, based on the information needs of the examiner. Based on the large percentage of LD students given the Standard and Supplementary Battery, it appears that the practitioners in the study were not as selective in their use of supplementary tests as the manual recommends.

A. Identification Rates

What information does the current study add to a research base that could guide school districts who are feeling the constraints of limited resources and need to restrict their services to only the most severely learning disabled students? How will a change in the method for determining a severe discrepancy and the level of severity, as described by a cutoff score, affect their identification rates?

The results of this research indicated an increase in the number of students identified as having a severe discrepancy if the method for determination was changed from

a simple difference to a regression formula and the cutoff was held constant. This outcome was true at both levels of severity. When the change also included moving to a more severe cutoff score, as proposed in the intermediate school district studied, the pattern reversed. The number of students identified in the sample then decreased by over 20 percent. Thus, while regression increased numbers, a more severe cutoff offset the increase and actually decreased the total number of students who met the severe discrepancy criterion.

These findings are not consistent with other published work on identification rates. Evans (1992), whose research used the same tests, achievement areas for qualification, formulas, and cutoff levels, reported a 10.7 percent increase in students identified with a severe discrepancy when regression **and** the more severe cut-off were used. (The increase was from 15 points to 2 standard deviations, which is equivalent to 22 points, given the tests used.) Why might this discrepancy between studies occur? Possibly it is due to differences in the characteristics of the students referred. Evan's sample included re-evaluations (55%) and a much greater proportion of high school students (40% vs. 4% in this study). He reported a mean FSIQ more than 5 points below that of the current research (88.73 vs 94.14) and a more restricted range, with no student earning an IQ over 111. His students' average achievement scores in the five academic areas were from 4 to 8 standard score points below

those of students currently studied. Overall, Evan's sample was a less intellectually and academically capable group.

The work of Clarizio and Phillips (1989) also contradicts the current findings, as well as those reported by Evans (1992). They found a substantial decrease of 45 percent in the number of students identified when a regression formula was used over the simple difference method and the cutoff was held constant. Different formulas for calculating discrepancies, including adjustments for measurement error, may be one explanation. Another might be their restriction to reading as the only achievement area considered for LD qualification. Again, the differences in the referred populations would seem to be significant. Clarizio and Phillips used a referred sample of predominantly white, suburban and rural students, with a mean FSIQ of 96.4. The extent to which above and below average students were included in their sample is unknown. In contrast, the current study included more diverse populations with regard to setting (urban, suburban and rural school districts) and race. A lower mean IQ for the sample would also be a relevant factor.

Thus, inconsistencies in the literature suggest that school districts would be wise to look at the characteristics of students referred before attempting to predict what might happen to their identification rates if a change in method for calculating a severe discrepancy were

established. Intelligence factors play a role as we see in the discussion which follows.

B. Intelligence Factors

The findings in this investigation add to a growing body of literature that demonstrates the effect of IQ on the determination of a severe discrepancy. As in previous studies by Bradding and Weiss (1988) and Evans (1992), a correlation between IQ and the discrepancy was found, pointing to an advantage experienced by students in the higher IQ ranges to demonstrate a severe discrepancy than students in the lower IQ ranges when the simple difference method is used. No correlation between IQ and the discrepancy, when discrepancies were calculated by the regression method, suggests a more equitable method for calculating severe discrepancies. No ability group is given an advantage.

Further evidence to support this relationship between IQ and the standard difference score was provided through comparison of mean FSIQs of students who met the severe discrepancy criterion and those who did not. Unlike the outcome reported by Clarizio and Phillips (1989), the simple difference method did identify students who were statistically different from each other with regard to measured intelligence. Those with a severe discrepancy had FSIQs almost 8 points higher. Regression, on the other hand, identified groups that displayed no significant IQ

difference. The reason for the difference in findings between the two studies is unclear, but may relate to factors already identified above.

For school districts who are leery of regression formulas, fearing they would open the floodgates for low ability students into their learning disabilities programs and classrooms, this study suggests otherwise. A lower ability student would have no greater chance of meeting the severe discrepancy requirement than a student of higher ability. Resistance to the use of a regression formula, instead, appears to produce more limited access for low ability students, at least with regard to meeting the severe discrepancy criterion, and an unfair system of selection maintained by misconception.

There are those, however, who would argue that the label, itself, is handicapping. What follows for labeled students, they might say, are decreased expectations, placement in special programs that are isolating but not "special", and lowered self-esteem. Therefore, students who escape this fate are really fortunate, rather than unfairly treated. While there may be some truth to their concerns, these are separate issues that need to be debated on their own. Additional dollars come with labels. Students who are overlooked in the certification process because of unfair selection practices are denied the financial support due them. Using these dollars in ways most advantages to students with special needs is another challenge, but one

that should be not confused with best practices for identification of the learning disabled.

C. Racial Factors

Another line of inquiry in this research focused on how students of different racial backgrounds would be affected by a change in procedures for identifying a severe discrepancy. Formulas that would clearly result in disproportionate numbers of either black or white students meeting an eligibility criterion would be viewed as unacceptable to school districts with ethnically diverse populations who are concerned with equal access to special education services for all students.

Unlike other investigations (Evans, 1992; McLeskey, Waldron & Wornhoff, 1990; Bradding and Weiss, 1988; Furlong, 1988) the present study failed to find any influence of method on race. No comparison between black and white students by method or cutoff value identified a significant proportion of one race over the other as meeting the severe discrepancy requirement. These results are particularly surprising in light of a significant lower mean FSIQ for the black students in the sample.

Although this outcome was not hypothesized for the simple difference method, the results might be explained by an aggregation bias. The present study does not look at the number of severe discrepancies a student might show across subject areas or the severity of the discrepancies beyond

the cutoff value, but simply, if he/she qualifies in at least one academic area. A substantial amount of information is aggregated to produce a dichotomous variable of either meeting or not meeting the severe discrepancy criterion in any academic area. If we were to analyze the data by the size of the discrepancies or the number of areas in which a student could qualify, we might find evidence of the IQ influence upon race. This level of analysis, however, would not be as important to school districts who are concerned with examining racial representation in special education programs by making comparisons between those who are labeled and those who are not.

Another possible explanation for why the current study failed to show an expected effect for race may be the size of the correlation between IQ and the dichotomous variable of meeting or not meeting the discrepancy requirement. Using the simple difference method, this investigator found point biserial correlation coefficients of .33 (15-point cutoff) and .36 (22-point cutoff), which portray a weak relationship between the variables. IQ explained only an approximate 11 - 12 percent of the variation in the discrepancy decision. Thus, the correlation may not have been strong enough to pick up group differences in further analyses when a factor secondary to IQ, namely race, was examined.

D. Eligibility Decisions

A second major objective of the study involved comparing the IEPCs' eligibility decisions against the severe discrepancy criterion using current and proposed guidelines. In what percentage of the cases was eligibility consistent with the presence of a severe discrepancy and ineligibility consistent with the absence of one?

Under the current guidelines, in 75 percent of the cases, the eligibility decision was consistent with the severe discrepancy criterion. This figure is higher than those reported by McLesky (1992), Clarizio and Phillips (1989), Furlong (1988) and Valus (1986) and may suggest that decision making teams are relying more on test data, and specifically severe discrepancies, than previously thought by Ysseldyke and his colleagues (1983).

A greater reliance on severe discrepancies may exist for a number of reasons. It may be the result of the clarification by measurement experts as to the most appropriate scores to be used in the calculation of a severe discrepancy (i.e., standard scores). It may also come as a gatekeeping measure against the growing number of students who are referred for LD consideration. Allowing large numbers of students into LD programs, sometimes as many as 43 percent (Furlong, 1988) without a severe discrepancy, could result in uncontrollable growth and undermine a school district's ability to make even the broadest predictions about the amount of services needed. Still another reason

for greater reliance on severe discrepancies might be found in the need for consistency. The concept of learning disabilities has come under fire by those who point out that LD students look no different than other groups, such as slow learners or unmotivated students. Care in meeting the present rules and criteria may not eliminate, but could certainly reduce the broad mix of students who have filled the ranks of the learning disabled, thereby adding validity and integrity to the diagnosis.

How consistent was the eligibility decision with the severe discrepancy criterion when the proposed guidelines were applied to the data? Reasonably, we might assume that the comparisons made using data calculated under current guidelines would produce the highest agreement. After all, these were the data available to IEPCs at the time eligibility decisions were made. Changing the guidelines for the purpose of this study meant changing the data, but not the eligibility decision. Thus, we would expect less agreement between the eligibility decision and severe discrepancy status when the proposed guidelines were applied.

Interestingly, such assumptions did not prove to be true. Agreement was observed in three-fourths of the cases, **regardless** of the guidelines used. What these results seem to suggest is that there are other factors being weighed that tend to produce results in the direction of those

produced by the regression method, even when it is not being used in the school districts studied.

It should be noted that Clarizio and Phillips (1989) also found similar, although lower, rates of agreement (65%) between a simple difference and regression method when comparing the severe discrepancy to eligibility. It is not known, however, which method their evaluation teams used to determine a severe discrepancy, or if it was consistent across all districts in their sample.

When comparing the results using current guidelines and proposed guidelines with the eligibility decision, it is interesting to note that although the agreement rate remained constant at approximately 74 percent, the type of misclassification changed. Under the current guidelines, the greatest number of misclassifications, totaling 16 percent, occurred among those students with a severe discrepancy, but found ineligible (false negatives). When the proposed guidelines were applied, the opposite situation occurred. Under proposed guidelines, 16 percent of the misclassifications were those students without a severe discrepancy, but found eligible (false positives). This type of situation raises a question regarding the preferred type of error. Is it a more serious mistake to serve children as LD who are not actually LD or to forgo services when a student may, in fact, be disabled?

Compliance with the intent of the federal law, or IDEA, would suggest that all handicapped children must be served.

Thus, guarding against false negatives would be a primary concern. However, given the expanding population in recent years of LD students and the failure of special education to meet our expectations for positive treatment effects, administrators may question the wisdom of a zero reject approach. Setting a more severe cutoff seems to be their way of saying that they will risk an increasing number of false negatives by serving only the most handicapped students.

In an attempt to understand some of the factors being weighed by the IEPCs when determining eligibility, a closer look was then taken of those students who were found to be ineligible despite evidence of a severe discrepancy.

1. Ineligible Students

Using current guidelines, the IEPCs found 16.6 percent of the sample ineligible, although a severe discrepancy was observed in at least one subject area. This finding is only slightly below the percentage of false negatives (20%) reported by Clarizio and Phillips (1989).

There are a number of reasons why the IEPC might have reached such a decision. One reason might be found in federal and state law which specifically directs the multidisciplinary evaluation team to ascertain whether services in special education are required to address the needs associated with a student's identified severe discrepancy. Some multidisciplinary team members from

school districts participating in the study stated that they have interpreted this directive to mean that students with higher FSIQ's, specifically over 100, may not need special education services. Likewise, students whose achievement scores remain within one standard deviation below the mean (i.e., standard score of 85), which they consider "average", may also not require special education placement, regardless of the size of their discrepancy scores. It is such interpretations that, in part, would seem to account for the 57 students (16.6%) who were not labeled, but showed a severe discrepancy in this sample when the current guidelines were applied. This conclusion is supported by the findings that show significantly higher IQs and achievement scores for those students found ineligible than those found eligible when the severe discrepancy criterion was met. Furlong and Feldman (1992) reported a similar finding with regard to IQ. They noted that higher IQ students, even those who obtained scores between 100 to 110, were less likely to be placed than lower IQ students when a severe discrepancy exists. The research by Clarizio and Phillips (1989) supported the notion that achievement levels, alone, can influence eligibility decisions.

It may be argued, however, what the law really seems to be asking school districts to do in determining the need for special education is to guarantee that appropriate alternative learning experiences have been tried with the student's educational program before any further

determination is made about the existence of a specific disability. (Michigan Association of Learning Disabilities Educators, 1992) Pre-referral teams can address this issue through the documentation of alternative intervention strategies and their duration before the referral is made. The success or failure of good intervention stratagems in regular education would seem to be the most appropriate measure of a student's need for special education services. Thus, the need for special education should have been fairly well established before a referral for service is made and the student is tested.

A second reason that the IEPC might fail to find a student eligible in the presence of a severe discrepancy might be found in other factors that could explain the difference between ability and achievement, but are excluded by state and federal law. The law specifically states that the IEPC shall not identify a child as having a specific learning disability if the severe discrepancy between ability and achievement is primarily the result of (a) a visual, hearing, or motor handicap, (b) mental retardation, (c) emotional disturbance, (d) autism, and (e) environmental, cultural, or economic disadvantage. However, students who were found mentally retarded (EMI), hearing impaired (HI), visually impaired (VI), physically and otherwise health impaired (POHI) and autistically impaired (AI) were not included in this study. While environmental, cultural, or economic disadvantage could be factors for

exclusion of students in this study, they are often known in advance of referral, indicated through circumstances such as significant family trauma, frequent school changes, continued unexplained absenteeism, or bilingual background. They would more likely be used when screening students before the referral process than after a costly evaluation has taken place.

Emotional disturbance, on the other hand, may explain some of the cases where students were not found eligible as learning disabled despite the presence of a severe discrepancy. A review of individual records, in fact, revealed that the severe discrepancy was attributed to emotional impairment in 13 cases, resulting in an EUR label over an LD label in each case.

In addition, the exclusionary clause for emotional disturbance may help to explain the study's finding that a significantly greater proportion of students who demonstrated a severe discrepancy, but were found ineligible, were older students from the later elementary and secondary levels. It seems reasonable to suggest that IEPCs might be more comfortable finding young children in the primary grades learning disabled over emotionally impaired when a severe discrepancy is present because they perceive it to be a less harsh label. Older children, possibly with more difficult to manage behavior problems, might be more likely to receive the EUR label, even though a severe discrepancy exists.

Other than the notion just put forth, it is difficult to explain the effect for grade observed in this study. In contrast, Furlong and Feldman (1992) found that younger children were not placed as frequently as older students with similar profiles, despite meeting the severe discrepancy criterion. Further research is needed to explain why, despite the reliability concerns associated with a severe discrepancy in very young children (reduced exposure to formal education, unevenness of developmental stages, and considerable variability in standard scores among tests at young ages), students found ineligible with a severe discrepancy were more likely to be those at the later elementary or secondary levels.

Although black and white students were represented proportionately in groups demonstrating a severe discrepancy, regardless of the method or cutoff score used, the same was not true with regard to the eligibility decision. IEPCs found significantly more white than black youngsters with a severe discrepancy ineligible. It may well be that within this small subgroup of the total sample, the effect of an IQ difference between races had a greater impact.

Thus, the students with a severe discrepancy in the ineligible group were more likely to be white, older, and of higher intelligence and achievement than those found eligible. What profile emerges when students without a severe discrepancy are examined, particularly those found

eligible? To what extent is failure to meet the severe discrepancy requirement overlooked in the labeling process?

2. Eligible Students

Using current guidelines, the IEPCs found 9.6 percent of the total sample eligible without evidence of a severe discrepancy, which is less than the 16 percent (Clarizio and Phillips, 1989), 33 percent (Valus, 1986) and 43 percent (Furlong, 1988) reported in other studies where simple difference scores were used. What circumstances might lead to such a decision when the law is clear about the need for a severe discrepancy between ability and achievement in one or more of the specified achievement areas?

Again, the results of this study suggest that a student's ability and achievement levels may affect the way decision makers view a case and cause them to bend the rules. Just as higher IQ students were less likely to be found eligible than lower IQ students when a severe discrepancy was observed, lower IQ students were more likely to be labeled LD than higher IQ students without evidence of a severe discrepancy. The same pattern was true when comparing achievement levels. It may be that IEPCs are feeling pressure from teachers, principals and parents to provide special education services for lower ability students and/or lower achieving students who traditionally have experienced limited success in regular education where their curriculum needs (more individualized instruction,

adapted materials, a slower pace) are difficult to meet. Although the data collected do not indicate if a student had previously been evaluated, it would have been interesting to note how many of those students found eligible without a severe discrepancy had one or more previous evaluations in their school history, thereby placing additional pressure on IEPCs to provide a solution to their academic problems.

What the informal adjustments with regard to eligibility criteria for lower and higher IQ students have produced is an approach to qualifying students that is more in line with a regression method than a simple difference score method for determining a severe discrepancy. In part, it provides an explanation for the similar levels (75%) of agreement in this study between the elibility decision and the severe discrepancy criterion regardless of the guidelines used. It also points out, that despite a resistance on the part of some school districts to move to a regression approach because they believe it will qualify too many low IQ students as LD, IEPCs are already seeing the need to provide special education support services to these students and are qualifying them without evidence of a severe discrepancy.

It should be noted that there is a possibility, in some cases, that IPECs were not using the FSIQ as recommended in their current guidelines. When a very large discrepancy between the Verbal and Performance IQ's occurs, the lower score may be more indicative of the child's handicap than an

accurate representation of overall ability. In such cases, the examiner might have selected the measure which most favorably reflected the child's abilities to use in the calculation of a severe discrepancy, which resulted in the child meeting the criterion, although a similar result would not have occurred using the FSIQ. Since large VIQ - PIQ discrepancies occur infrequently, with a 20-point difference observed in only 12 percent of the population (Kaufman, 1979), this situation would be likely to explain only a few "misclassifications", if any.

In addition to low ability and achievement, gender appeared to play a role in decisions made by the IEPCs to label a student LD without a severe discrepancy. Unlike the negative findings reported by Clarizio and Phillips (1986) in their study of sex bias in the diagnosis of LD students, this study did find an effect for gender. Girls who did not meet the severe discrepancy criterion were more likely than boys with the same profile to be found eligible. Why this occurred is not clear. Possibly the academic problems experienced by boys can be more easily explained by other conditions when a severe discrepancy is not found, particular at the elementary school ages where the majority of the referrals occurred. For example, boys are more likely than girls to be diagnosed with an attention deficit and hyperactivity (Barkley, 1990) or display acting out behaviors (Clarizio, 1983) which might lead to specific interventions outside of special education, such as

counseling or medication. Academic problems experienced by girls may not be as easily explained and addressed through outside interventions, leading to a reliance on special education services through an unjustified label. Unlike gender, ability and achievement, race or grade level did not make a significant difference in eligibility decisions for those students who failed to meet the severe discrepancy criterion.

VI. Conclusions and Implications

The purpose of this research was to apply two of the more highly recommended models for determining a severe discrepancy to data already collected on children referred for possible learning disability services. The influence of method upon identification rates, ability levels, and race was a major focus of the study. In addition, a comparison between the severe discrepancy criterion and the eligibility decision was made to determine if student characteristics, particularly those which could be influenced by method, were significant factors in IEPC decisions for eligibility.

Depending on student characteristics and referral practices, school districts moving from a simple difference method to a regression method may see an increase in the number of students meeting the severe discrepancy criterion when the cutoff value is held constant. Given financial limitations, this increase could be dealt with by raising the cutoff value to identify only the most severely learning disabled, as proposed in the intermediate school district studied.

Evidence has been provided that suggests moving to a regression approach would be fairer, giving all students, regardless of their ability levels, a more equitable chance of meeting the severe discrepancy criterion. No evidence of differential treatment, based on race, was observed using either method. Given a significant difference in mean IQ

between black and white students in the study, this outcome was not anticipated and should be viewed cautiously. Rather, it was expected that racial differences would be influenced in the same manner as IQ differences by the simple difference method, as previous research has demonstrated.

A pattern for eligibility was observed with regard to IEPC decisions when the simple difference method was used which favored providing services to students in the lower IQ ranges without evidence of a severe discrepancy. As IQ's increased beyond the mean, students were less likely to be found eligible, even though a severe discrepancy was demonstrated. The result is a selection process that may have a mitigating effect on the tendency of the simple difference method to select higher IQ students. In doing so, it resembles a regression approach.

More research is needed to understand why the IEPCs might have treated girls differently than boys, overlooking the severe discrepancy requirement in favor of an LD diagnosis in a disproportionately large number of cases. Given the decreased expectations for girls that have been observed in other areas of schooling, such as science and math, decision makers need to take care in applying the same standards for LD diagnosis across all students.

Evidence from this study suggests that school districts may support a philosophy of early identification and treatment for learning disabilities. Highest referral rates

and LD diagnoses were reported at the early elementary level, including first and second grades. Situations in which students demonstrated a severe discrepancy, but were found ineligible as LD, were more likely to occur with older students than youngsters from the early grades. Given the recent movement toward a developmental, or non-graded approach to curriculum in the primary grades, it will be interesting to observe if future research reports a change in referral and identification patterns. Individual differences in skill development may not present the concerns they currently elicit in the early years. Rather than looking for intervention in special programs, the differences may be accommodated with developmentally appropriate curriculum within the regular education program.

In analyzing the eligibility decision, it becomes apparent that school districts could reduce high evaluation costs by using the prereferral screening process effectively. A number of the exclusionary conditions can be determined through early intervention strategies and a careful review of student records, reducing the chances that a costly evaluation is done only to decide that the severe discrepancy is the result of factors known in advance.

Finally, the higher levels of agreement than previously reported between the severe discrepancy criterion and eligibility decisions are encouraging, suggesting greater consistency in the diagnosis of LD is occurring in some school districts. There are those, however, who would not

be impressed. They might argue that a severe discrepancy needs to founded on more than simple calculation by formulas using standardized test data, and that clinical judgment needs to play an important role in the decision making process. A focus on formulas overlooks the complexity of the decision making, which must consider not only factors within the child, but factors outside the child, such as learning environments, teaching practices and parent support, which influence achievement. While it is recognized that many diagnostic dilemmas may be faced by those using this complex process, they must at least begin with the most statistically sound and fairest method for calculating a severe discrepancy and proceed from there.

Socioeconomic status was a desired, but unavailable factor in this study. Future research might address the influence of SES on the calculation of a severe discrepancy, as it may well represent subgroups that differ by mean IQ. While race has been studied by a number of investigators, it has been primarily limited to black and white student populations. Similar research with other minority groups, such as Hispanic students, may provide guidance to school districts in other parts of the country who wish to examine their identification practices.

The introduction of the Third Edition of the Wechsler Intelligence Scale for Children (WISC-III) raises questions regarding what impact the new test might have on identification rates. The WISC-III manual (Wechsler, 1991)

reports research results that indicate an average of five points less on the WISC-III FSIQ than on the WISC-R FSIQ when both tests are administered to the same students. The ranges of the expected WISC-III FSIQ scores associated with a particular WISC-R score are relatively narrow near the middle of the IQ distribution and wider at the upper and lower score levels, with as much as eight to nine points less on the WISC-III at the extreme levels of the distribution. Given this information, one might assume a decrease in the number of students demonstrating a severe discrepancy when the WISC-III has been administered, regardless of the method used. Validation of this assumption and knowledge regarding the extent of change in identification rates might be of interest to future researchers.

Inclusion of the new Wechsler Individual Achievement Test (WIAT) as a measure of achievement in future studies would be interesting, as it has been linked to the WISC-III by a common sample of over one thousand children (Psychological Corporation, 1992). Having the same standardization sample allows for a more direct and precise calculation of ability-achievement differences for use in severe discrepancy determinations by comparing students tested on intelligence and achievement at the same point in time. The standardization sample also provides a school district with some idea of how many students they might expect to show discrepancies of a given size, particularly

if characteristics of the local population do not differ dramatically from the standardization sample. Since school districts often have a set percentage of students in mind when planning for special education services, the WIAT may prove to be a very useful instrument in helping administrators anticipate and control their need for special education services.

APPENDIX A

Data Collection Form

Data Collection Form

SEVERE DISCREPANCY STUDY

District _____ Student Code Number _____

Building _____

Age at evaluation _____ Gender _____ Grade _____ Years Retained _____

Ethnicity: _____ Causasian _____ Hispanic _____ African American

_____ Native American _____ Asian _____Other

Resides with _____

SES:

Reason for Referral: _____

_____

Intellectual Assessment: WISC-R FSIQ _____ PIQ _____ VIQ _____

Other Intelligence Tests:

_____

Scores: _____

Achievement Assessment: WJ-R Norms based on _____age _____ grade

Broad Reading _____

Letter-Word Identification _____

Passage Comprehension _____

Broad Mathematics _____

Calculation _____

Applied Problems _____

Broad Written Language _____

Dictation _____

Writing Sample _____

Supplementary Tests _____

_____

Other Achievement Tests Administer: _____

_____

Severe Discrepancy Summary

	Standard Score	Discrepancy	Eligible	Regressed Score	Discrepancy	Eligible
Ability	_____					
Achievement						
oral expression	_____	_____	_____	_____	_____	_____
listening comprehension	_____	_____	_____	_____	_____	_____
basic reading	_____	_____	_____	_____	_____	_____
reading comprehension	_____	_____	_____	_____	_____	_____
written expression	_____	_____	_____	_____	_____	_____
math calculation	_____	_____	_____	_____	_____	_____
math reasoning	_____	_____	_____	_____	_____	_____

IEPC Determination

_____ Ineligible _____ Eligible in _____oral expression

_____listening comprehension

_____basic reading

_____reading comprehension

_____written expression

_____math calculation

_____math reasoning

APPENDIX B

Database

Database

	A	B	C	D	E	F	G	H
1	ID	District	Age	Gender	Grade	Retension	Ethnicity	FSIQ
2	1	1	900	2	1	2	3	94
3	2	1	1010	2	3	2	3	88
4	4	1	1307	2	6	2	3	88
5	3	1	1007	1	4	1	3	100
6	5	1	806	2	2	1	1	89
7	6	1	1102	2	4	2	1	90
8	7	1	900	2	2	2	3	83
9	8	1	803	1	2	1	2	83
10	9	1	1100	2	4	2	3	91
11	10	1	708	2	1	1	1	81
12	11	1	1501	2	9	1	3	89
13	12	1	704	2	1	1	1	104
14	13	1	707	1	1	2	1	70
15	14	1	808	2	2	1	3	81
16	15	1	1009	2	3	2	3	68
17	16	1	702	2	1	0	3	89
18	17	1	906	1	3	1	3	97
19	18	1	802	2	2	1	3	96
20	19	1	904	2	3	1	3	88
21	20	1	811	2	3	0	3	96
22	21	1	1111	2	1	2	3	80
23	22	1	1500	2	10	0	3	102
24	23	1	902	2	2	2	1	102
25	25	1	1002	2	4	1	1	111
26	26	1	908	2	2	2	1	117
27	27	1	1104	1	5	1	1	99
28	28	1	905	2	2	1	3	80
29	29	1	1008	2	3	2	3	80
30	30	1	1601	2	8	3	1	80
31	31	1	707	2	1	0	1	79
32	32	1	1304	2	7	1	1	101
33	33	1	1209	2	7	0	3	106
34	34	1	806	2	1	2	1	85
35	35	1	1002	2	3	1	1	90
36	36	1	801	2	1	2	1	93
37	37	1	1106	2	4	2	3	94
38	38	1	911	2	3	2	3	84
39	39	1	800	2	2	1	3	97
40	40	1	1103	2	3	3	3	83
41	42	1	702	1	1	1	2	112
42	43	1	806	2	1	2	1	87
43	44	1	1403	2	7	2	3	76
44	45	1	909	2	4	1	3	87
45	46	1	805	1	2	1	1	98
46	47	1	808	1	1	2	3	78
47	48	1	1008	2	4	1	1	98
48	49	1	811	2	2	1	1	100
49	50	1	1011	1	4	2	3	87

	A	B	C	D	E	F	G	H
50	51	1	905	2	3	1	1	95
51	52	1	1300	2	6	1	1	100
52	53	1	901	1	3	1	3	89
53	54	1	905	2	1	0	1	89
54	55	1	803	2	2	1	3	89
55	56	1	706	1	1	1	3	83
56	57	1	710	2	1	1	1	81
57	58	1	700	2	1	1	1	87
58	59	1	506	2	1	1	1	105
59	60	1	905	2	3	1	3	89
60	61	1	701	2	1	0	3	113
61	62	1	1201	2	6	1	3	89
62	63	1	1109	2	5	1	1	98
63	64	1	905	2	2	1	1	80
64	65	1	804	2	2	2	1	101
65	66	1	1004	2	3	2	1	92
66	67	1	810	2	1	2	3	72
67	68	1	811	2	1	2	1	86
68	69	1	904	2	2	2	3	89
69	70	1	1002	1	3	2	3	87
70	71	1	1003	1	3	2	2	77
71	72	1	1302	2	5	2	3	78
72	73	1	602	2	0	0	2	79
73	74	1	806	2	2	1	1	89
74	75	1	911	1	2	2	1	98
75	76	1	1309	2	7	1	1	116
76	77	1	702	1	1	1	3	74
77	78	1	1206	2	5	2	2	88
78	79	1	905	1	2	2	1	90
79	80	1	1211	2	5	2	1	90
80	81	1	1302	2	5	2	1	100
81	82	1	802	2	2	1	3	112
82	83	1	1005	2	3	2	1	111
83	84	1	910	1	2	2	1	91
84	85	1	806	2	2	1	1	109
85	86	1	703	2	1	1	3	80
86	87	1	905	1	2	2	3	90
87	88	1	807	2	2	1	3	80
88	89	1	1706	1	11	0	1	113
89	90	1	1003	1	4	1	3	91
90	91	1	1209	2	6	1	3	84
91	92	1	1206	2	5	2	3	87
92	93	1	806	1	2	1	1	104
93	94	1	711	1	1	1	3	78
94	95	1	703	2	1	1	3	106
95	96	1	804	2	2	1	1	108
96	97	1	705	2	2	0	3	105
97	98	1	1207	1	5	2	1	95
98	99	1	1101	2	4	1	3	87

	A	B	C	D	E	F	G	H
99	100	1	900	1	2	1	4	87
100	101	1	1108	2	6	1	3	90
101	102	1	1211	2	6	1	3	94
102	103	1	906	2	4	0	1	114
103	104	1	807	2	2	1	3	96
104	107	1	1006	1	4	1	1	94
105	108	1	1003	2	3	1	3	79
106	109	1	711	1	1	1	3	85
107	110	1	1108	2	4	2	3	106
108	111	1	906	1	3	1	1	102
109	112	1	605	2	1	0	3	84
110	113	1	1204	2	6	1	4	102
111	114	1	705	1	1	0	1	91
112	115	1	803	2	1	2	1	97
113	116	1	1205	1	5	1	1	85
114	117	1	704	2	1	1	3	104
115	118	1	711	2	1	2	1	93
116	119	1	806	1	1	2	1	89
117	120	1	1011	1	4	1	3	81
118	121	1	705	1	1	1	1	116
119	122	1	800	2	1	1	3	89
120	123	1	704	2	1	1	3	85
121	124	1	1000	2	2	2	3	82
122	125	1	702	2	1	1	1	105
123	126	1	1200	1	5	1	3	90
124	127	1	1208	2	5	2	3	92
125	128	1	709	2	1	1	3	86
126	129	1	708	2	1	1	3	84
127	130	1	901	1	2	2	3	86
128	131	1	1209	2	5	2	3	90
129	132	1	1000	2	3	2	3	106
130	133	1	606	2	0	1	3	88
131	134	1	901	2	3	1	3	93
132	135	1	906	2	2	1	3	76
133	136	1	1603	1	8	2	3	75
134	137	1	1202	2	6	1	3	87
135	138	1	1109	2	6	0	3	88
136	140	1	1109	1	5	1	3	85
137	141	1	1511	2	10	0	1	104
138	142	1	1305	2	5	2	3	78
139	143	1	805	2	2	1	3	92
140	145	1	804	1	2	1	2	91
141	146	1	805	1	2	0	1	102
142	147	1	1103	2	4	1	3	100
143	148	1	908	2	3	1	3	98
144	149	1	1202	2	5	1	1	79
145	150	1	1003	2	4	1	3	87
146	151	1	1109	2	5	1	3	89
147	152	1	1007	2	3	2	3	81

	A	B	C	D	E	F	G	H
148	153	1	602	1	0	0	1	107
149	154	1	605	1	0		1	73
150	155	1	811	1	1	2	3	73
151	156	1	905	2	3	1	3	107
152	157	1	905	2	3	1	3	124
153	158	1	1207	2	4	3	3	90
154	159	1	1301	2	6	1	3	96
155	160	1	1306	2	5	1	3	92
156	161	1	704	1	0	1	3	90
157	162	1	706	1	1	1	3	104
158	163	1	1508	1	9	0	1	103
159	164	1	903	2	2	1	3	100
160	165	1	805	2	2	1	3	83
161	166	1	1000	2	5	0	1	136
162	167	1	904	2	2	1	1	96
163	168	1	710	2	1	1	1	112
164	169	1	1306	1	6	2	3	76
165	170	1	705	2	2	0	3	105
166	171	1	1208	1	6	1	2	89
167	172	1	1401	2	7	1	2	89
168	173	1	1408	1	7	1	1	92
169	174	1	709	1	2	0	1	94
170	175	1	1604	1	10	0	1	99
171	176	1	1707	2	11	1	1	90
172	177	2	901	1	3	1	3	87
173	178	2	811	1	4	0	1	91
174	179	2	807	1	1	1	1	85
175	180	2	806	2	2	1	1	91
176	181	2	808	2	3	0	3	96
177	182	2	1402	1	7	2	1	85
178	183	2	1104	1	6	0	1	100
179	184	2	910	1	3	2	1	84
180	185	2	809	1	3	0	1	101
181	186	2	708	2	2	0	1	109
182	187	2	804	2	2	0	3	93
183	188	2	1402	1	8	0	1	87
184	189	2	1703	2	11	1	1	92
185	190	2	810	2	2	1	2	86
186	192	2	1007	2	5	0	2	108
187	193	2	803	2	2	0	1	90
188	194	2	906	2	2	1	1	92
189	195	2	811	1	3	0	1	96
190	196	2	805	1	2	0	1	85
191	197	2	1305	2	7	1	1	86
192	198	2	1311	2	7	1	1	105
193	199	2	606	1	1	0	1	69
194	200	2	803	2	2	1	1	87
195	202	2	803	1	3	0	3	91
196	203	2	1204	2	6	0	1	109

	A	B	C	D	E	F	G	H
197	204	2	903	2	4	0	1	117
198	205	2	809	2	2	1	1	87
199	206	2	803	2	2	0	3	87
200	207	2	1002	2	3	1	1	89
201	208	2	609	2	1	0	1	73
202	209	2	906	2	2	2	1	89
203	210	2	1111	2	6	0	1	89
204	211	2	705	2	1	1	1	72
205	212	2	1010	1	4	1	1	87
206	213	2	1009	1	5	0	4	102
207	214	2	607	1	1	0	1	101
208	215	2	710	1	2	0	1	101
209	216	2	910	2	4	0	1	102
210	218	2	802	1	2	0	1	96
211	219	2	906	2	3	1	1	106
212	220	2	1111	1	5	1	1	113
213	221	2	608	2	1	0	1	102
214	222	2	1604	2	10	0	1	98
215	223	2	1106	1	5	1	1	81
216	224	2	1003	2	3	1	1	83
217	225	2	910	1	3	1	1	92
218	227	2	806	1	2	1	1	88
219	228	2	1300	2	6	1	1	95
220	229	2	810	2	2	1	1	101
221	230	2	907	1	3	1	1	89
222	231	2	707	2	1	0	1	101
223	232	2	911	1	3	1	1	96
224	233	2	902	2	2	1	1	87
225	234	2	1006	1	4	1	1	80
226	235	3	810	1	2	1	1	107
227	236	3	902	2	4	0	1	112
228	237	3	803	2	2	1	2	105
229	238	3	609	2	1	0	1	94
230	239	3	803	2	2	1	1	104
231	240	3	1110	1	5	1	1	81
232	241	3	909	2	4	0	1	118
233	242	3	1309	2	8	0	3	81
234	243	3	607	2	1	0	1	83
235	244	3	1008	2	4	1	1	98
236	245	3	1706	2	10	2	2	89
237	246	3	711	1	2	0	1	99
238	247	3	1503	1	9	0	1	104
239	248	3	703	2	2	0	1	107
240	249	3	802	2	2	0	1	98
241	250	3	702	2	1	0	1	95
242	251	3	1010	1	4	1	1	85
243	252	3	1201	2	5	1	1	81
244	253	3	808	2	2	1	1	99
245	254	3	1611	2	10	1	1	96

	A	B	C	D	E	F	G	H
248	255	3	703	2	1	0	1	108
247	256	3	809	1	2	1	1	101
248	257	3	711	2	2	0	1	101
249	258	3	810	2	3	0	1	107
250	259	3	1507	2	9	1	1	95
251	260	3	701	1	1	1	1	107
252	261	3	808	2	3	0	1	116
253	262	3	808	2	3	0	1	120
254	263	3	1501	2	9	0	1	112
255	264	3	611	1	1	0	1	97
256	265	3	805	2	2	1	1	109
257	266	3	907	1	3	1	1	95
258	267	3	809	2	2	0	1	102
259	268	3	705	2	1	0	1	98
260	269	4	1409	1	9	0	1	79
261	270	4	807	2	2	1	1	89
262	271	4	609	2	1	0	1	79
263	272	4	1601	2	9	1	1	80
264	273	4	1200	1	5	1	2	77
265	274	4	707	2	2	0	1	102
266	275	4	706	1	1	1	1	91
267	276	4	605	2	1	1	1	109
268	277	4	1110	2	5	1	1	85
269	278	4	911	2	3	1	1	101
270	279	4	808	1	2	0	1	87
271	280	4	704	2	2	0	1	85
272	281	4	900	2	2	1	1	87
273	282	4	803	2	1	0	1	92
274	283	4	704	2	1	0	1	100
275	284	4	610	2	0	0	1	64
276	285	4	911	1	4	0	1	106
277	286	4	809	1	3	0	1	83
278	287	4	806	2	2	1	1	112
279	288	4	701	1	1	0	1	80
280	289	4	711	2	2	0	1	124
281	290	4	1211	2	7	0	1	97
282	291	4	905	2	2	2	1	116
283	292	4	711	2	2	0	1	80
284	293	4	705	2	1	1	1	89
285	294	4	701	2	1	0	1	101
286	295	4	805	1	2	0	1	91
287	296	4	705	2	1	0	1	92
288	297	4	606	2	0	0	1	80
289	298	4	1002	2	4	0	1	92
290	299	4	811	2	3	0	1	104
291	300	4	803	1	1	1	1	96
292	301	5	711	1	1	1	1	91
293	302	5	709	2	1	1	1	92
294	303	5	1203	2	6	1	3	99

	A	B	C	D	E	F	G	H
295	304	5	607	2	1	0	1	89
296	305	5	903	2	3	1	1	98
297	306	5	811	1	3	0	1	92
298	307	5	711	2	2	0	1	104
299	308	5	905	1	3	1	1	91
300	309	5	908	2	4	0	1	111
301	310	5	1000	2	4	0	1	105
302	312	5	708	1	2	0	1	104
303	313	5	1608	2	11	0	1	72
304	314	5	1210	2	7	0	1	101
305	315	5	707	2	2	0	1	111
306	316	5	1003	1	3	1	1	88
307	317	5	1307	2	7	1	1	106
308	318	5	1800	2	12	1	1	99
309	319	5	709	1	2	0	1	128
310	320	5	1404	2	7	2	1	96
311	321	5	1608	2	9	2	1	95
312	322	6	900	2	3	1	1	83
313	323	6	908	2	3	1	1	88
314	324	6	1202	2	6	1	1	100
315	325	6	1009	2	5	0	1	113
316	326	6	1004	2	4	1	1	89
317	327	6	806	1	2	1	1	102
318	328	6	910	2	4	0	1	119
319	329	6	703	2	1	0	1	107
320	330	6	706	2	1	0	1	89
321	331	6	1106	2	5	0	1	101
322	332	6	610	2	1	0	1	89
323	333	6	1208	2	6	1	1	101
324	334	6	810	2	3	0	1	108
325	335	6	1210	2	6	1	1	80
326	336	6	608	2	0	1	1	83
327	337	6	1000	1	3	0	1	99
328	338	6	902	2	3	0	1	103
329	339	6	611	2	1	0	1	110
330	340	6	1511	2	11	0	1	124
331	341	6	703	1	1	0	1	87
332	342	6	809	2	2	1	1	104
333	343	6	809	2	2	1	1	84
334	344	6	702	1	1	1	1	99
335	345	6	706	2	1	1	1	118
336	346	6	811	2	3	0	1	88
337	347	6	1001	1	4	0	1	102
338	348	6	1205	2	5	1	1	106
339	349	6	911	2	3	1	1	95
340	350	6	905	2	3	0	1	116
341	351	6	1208	2	5	2	1	89
342	352	6	1005	2	3	1	1	94
343	353	6	911	2	3	1	1	118

	A	B	C	D	E	F	G	H
344	354	6	1006	2	4	0	1	92
345	355	6	1202	2	6	0	1	96

	I	J	K	L	M	N	O	P
1	PIQ	VIQ	WJR-RR	WJR-RC	WJR-MC	WJR-MA	WJR-WE	WJR-BRS
2	98	92	56	55	57	79	43	56
3	91	87	72	79	86	96	63	
4	96	82	78	91	91	91	79	
5	104	96	77	88	95	99	77	72
6	82	98	71	68	91	83	58	68
7	101	82	74	77	90	90	57	
8	85	81	81	95	77	88	73	80
9	91	78	69	65	85	78	66	67
10	96	87	93	94	93	90	83	99
11	77	88	46	38	43	69	44	
12	90	90	94	91	96	104	82	96
13	105	103	64	72	73	88	80	68
14	55	87	52	79	47	55	64	58
15	85	81	66	77	70	75	44	
16	80	59	84	77	62	65	63	84
17	87	92	48	74	76	73	77	57
18	108	88	74	72	96	84	75	
19	100	94	70	63	79	75	67	
20	86	92	74	76	83	93	79	78
21			90	85	97	113	86	90
22	85	79	84	84			51	83
23	123	86	98	93	106	94	92	106
24	105	100	84	100	71	88	78	
25	129	95	94	98	104	105	85	89
26	130	103	71	78	74	94	67	64
27	101	97	89	93	77	85	80	86
28	78	85	63	64	71	98	56	59
29	78	82	57	53	84	79	41	58
30	80	82	87	86	86	91	75	96
31	77	84	71	78	77	75	80	70
32	104	98	90	97	80	94	91	
33	109	102	70	72	88	91	56	
34	73	100	69	60	61	77	60	67
35	95	87	83	50	67	74	79	80
36	96	92	71	64	88	50	75	77
37	88	101	76	80	77	96	65	
38	80	91	70	74	82	77	65	70
39	101	95	73	84	92	91	74	70
40	95	74	80	77	76	88	59	78
41	114	108	66	79	105	91	77	67
42	95	81	64	63	73	80	51	
43	81	74	81	96	81	78	66	81
44	75	101	91	94	101	98	74	
45	100	97	81	79	80	91	76	82
46	86	73	48	44	46	75	42	55
47	100	97	95	102	96	101	82	95
48	102	98	66	79	81	86	60	68
49	91	85	67	72	82	87	70	66

	I	J	K	L	M	N	O	P
50	105	87	74	85	78	96	71	73
51	105	94	100	92	81	91	89	110
52	87	92	84	90	77	92	75	
53	101	79	68	61	69	80	69	73
54	88	91	82	94	87	71	78	
55	74	94	83	84	96	74	85	78
56	77	88	54	66	74	83	52	58
57	93	84	85	75	109	92	88	79
58	104	106	84	83	101	97	87	78
59	90	90	81	100	86	101	79	
60	111	113	63	65	77	76	78	66
61	88	91	81	80	85	92	77	76
62	100	97	84	99	88	95	74	
63	67	96	67	80	78	84	64	70
64	111	94	69	57	50	78	69	74
65	90	96	78	84	77	109	67	82
66	49	97	73	66	77	84	67	71
67	88	86	65	73	78	94	62	77
68	96	84	78	85	78	89	81	77
69	85	91	92	94	63	74	84	88
70	83	76	73	85	58	71	63	68
71	90	69	63	58	96	88	42	60
72	67	95	64	80	76	68	74	70
73	91	88	67	64	85	86	57	66
74	102	95	63	55	58	88	60	60
75	124	105	82	99	88	102	78	86
76	63	88	64	71	54	56	82	
77	101	80	79	79	63	86	61	78
78	101	83	80	97	78	84	77	76
79	95	87	74	95	79	84	74	75
80	112	88	102	103	89	88	70	106
81	109	112	73	83	97	115	75	70
82	111	109	70	80	96	102	68	
83	93	90	67	81	86	87	68	
84	101	114	105	110	85	98	88	98
85	71	92	74	64	95	79	74	
86	90	92	74	78	77	106	67	66
87	84	79	72	72			64	72
88	117	109	87	101	98	107	89	
89	88	95	78	76	101	90	77	
90	88	81	75	81	85	82	49	72
91	92	85	83	90	100	105	73	
92	101	107	86	95	92	103	90	85
93	69	87	59	70	93	69	65	
94	107	105	73	74	85	87	79	77
95	106	108	90	99	88	105	92	88
96	100	109	96	96	115	137	99	86
97	96	95	94	96	81	90	88	96
98	95	82	79	81	91	90	68	80

	I	J	K	L	M	N	O	P
99	88	88	61	72	75	89	71	65
100	115	77	48	50	68	68	23	
101	100	91	85	99	96	99	70	85
102	93	130	112	112	103	120	85	107
103	100	95	92	98	95	96	85	92
104	104	87	101	103	79	88		
105	75	85	76	84	98	95	72	78
106			62	76	88	81	69	63
107	112	101	74	82	97	88	74	67
108	102	103	79	78	102	101	91	
109	80	91	91	82	117	90	95	
110	105	101	100	97	69	89	84	
111	82	101	82	63	97	91	69	
112	87	107	78	78	87	99	69	
113	92	81	78	77	83	91	72	
114	115	95	65	74	103	78	84	68
115	107	83	76	76	86	88	75	
116	101	81	85	78	71	72	64	
117	91	75	89	96	85	90	84	
118	126	106	77	73	99	94	75	76
119	95	86	72	63	66	78	77	77
120	77	95	47	63	90	75	61	58
121	81	86	78	88	69	108	83	78
122	117	96	69	74	100	106	82	
123	93	100	87	89	99	92	77	85
124	96	91	81	96	102	94	77	82
125	70	103	68	57	92	91	83	
126	80	90	69	75	43	60	66	68
127	84	90	86	90	55	76	63	82
128	90	92	70	78	83	91	58	70
129	114	100	81	83	101	112	85	80
130	80	98	61	81	70	53	16	
131	92	95	91	81	94	88	83	88
132	85	72	59	63	64	87	54	56
133	78	75	84	79	66	67	75	84
134	88	88	90	96	98	104	70	77
135	86	92	94	94	88	88	71	99
136	92	81	85	86	91	96	80	84
137	112	97	109	102	100	95	94	
138	84	74	86	80	69	76	83	86
139	98	90	88	95	89	106	81	
140	93	91	80	82	126	97	95	87
141	111	96	67	58	112	94	82	76
142	118	96	88	97	93	93	80	
143	98	98	82	85	93	93	78	83
144	80	81	77	80	84	89	73	69
145	73	103	94	93	88	98	78	96
146	95	86	75	84	94	86	61	
147	87	78	77	93	79	84	79	77

	I	J	K	L	M	N	O	P
148	108	106	68	102	101	82	71	
149	74	75	82	74	89	83	65	
150	74	75	72	85	81	79	68	
151	118	97	86	98	109	92	90	85
152			106	123	104	106	94	
153	96	86	81	86	84	92	80	79
154	95	98	80	89	81	91	85	77
155	90	96	73	97	85	92	74	71
156	98	86	93	94	93	84	102	91
157	106	102	81	81	106	93	90	77
158	117	92	87	108	99	96	83	92
159	111	90	73	79	79	84	62	69
160	84	85	67	69	89	87	71	66
161	141	125	98	108	120	116	94	95
162	104	91	67	66	74	89	64	66
163	120	105	86	81	93	83	87	81
164	89	70	87	73	88	81	82	
165	100	109	96	96	115	137	99	86
166	102	80	87	94	106	94	75	90
167	87	92	91	87	66	91	86	93
168	106	82	80	78	64	82	74	81
169	93	96	84	96	104	118	92	
170	98	100	105	100			91	116
171	98	86	93	88			73	93
172	70	107	70	85	54	70	27	
173	90	94	87	91	94	89	87	
174	81	92	52	61	40	73	42	57
175	86	98	56	67	81	89	30	63
176	93	98	92	113	93	88	103	92
177	85	88	85	83	79	88	93	83
178	101	100	114	110	95	99	94	111
179	85	86	67	74	76	105	76	72
180	111	92	77	83	73	87	75	80
181	114	103	91	93	105	101	92	85
182	84	105	84	86	91	91	89	83
183	88	87	85	96	98	88	88	
184	100	88	96	96	86	67	85	
185	86	88	78	83	77	81	82	78
186	95	118	89	107	105	117	77	
187	88	94	78	72	73	96	74	78
188	87	98	90	97	92	105	85	
189	102	92	89	90	100	93	92	91
190	98	77	69	76	75	81	65	
191	91	84	91	96	91	93	79	92
192	88	119	102	103	84	93	78	
193	60	81	89	95	76	74	83	
194	88	88	61	65	64	74	52	
195	84	101	82	78	106	96	81	78
196	95	119	89	100	91	97	75	

	I	J	K	L	M	N	O	P
197	96	131	81	94	112	109	81	81
198	86	90	74	83	78	91	68	78
199	86	90	94	101	95	96	91	
200	87	92	67	59	72	77	54	
201	74	75	79	79	77	77	81	
202	93	87	64	68	61	78	48	68
203	95	85	91	94	79	97	73	
204	65	84	72	63	69	59	74	
205	96	81	91	89	65	87	80	92
206	102	102	93	97	123	115	93	
207	84	118	86	72	94	107	89	
208	108	96	76	78	98	87	84	72
209	107	96	99	95	115	117	91	95
210	93	100	95	92	97	105	88	93
211	98	113	79	91	94	105	80	
212	117	108	78	92	88	102	93	75
213	109	97	96	106	117	119	90	
214	100	97	95	100	87	100	102	
215	73	91	85	89	36	84	77	88
216	92	77	78	89	78	88	71	
217	86	100	89	102	94	89	89	87
218	88	90	71	73	91	98	86	70
219	100	92	96	99	94	99	86	
220	95	106	73	82	87	99	75	
221	82	98	83	89	94	89	80	77
222	102	101	78	84	86	104	81	74
223	93	98	80	84	96	105	79	73
224	84	92	79	94	71	81	74	82
225	64	100	85	93	92	89	75	
226	92	100	84	94	96	95	103	
227	111	111	129	127	129	124	116	
228	106	103	82	85	114	114	84	
229	105	86	81	76	111	100	83	
230	117	94	84	85	92	77	68	
231	73	91	102	99	93	90	82	
232	114	118	99	117	113	107	87	
233	93	72	123	91	96	89	80	
234	88	80	92	104	119	101	101	
235	109	88	87	89	93	101	84	
236	99	82	85	85	80	88	61	
237	100	98	87	94	96	85	92	
238	114	96	95	94	99	96	78	
239	109	105	92	96	111	128	95	
240	96	100	69	71	89	84	75	
241	102	90	85	83	101	98	95	
242	104	72	85	88	94	92	78	
243	85	80	94	94	87	96	79	
244	96	101	80	90	89	95	86	
245	100	94	96	97	98	99	87	

	I	J	K	L	M	N	O	P
246	108	107	92	101	111	105	102	
247	118	87	79	83	87	97	72	
248	101	101	92	97	100	109	96	
249	114	101	98	98	95	115	102	
250	90	101	107	103	93	97	94	
251	95	117	111	116	116	130	106	
252	121	108	89	103	110	124	90	
253	112	122	91	99	97	117	94	
254	108	112	105	114	98	106	79	
255	102	94	102	103	117	100	99	
256	101	115	97	113	97	101	106	
257	91	100	84	88	101	94	83	
258	101	103	87	99	92	115	95	
259	90	106	102	105	108	108	96	
260	78	82	93	107	94	99	82	
261	91	90	73	85	82	85	75	72
262	78	82	80	68	92	82	90	
263	82	81	84	85	76	85	80	
264	86	72	92	92	83	81	72	
265	101	105	111	112	98	110	100	
266	96	88	83	86	79	84	86	
267	112	106	95	93	122	102	95	
268	81	92	80	93	81	102	78	
269	95	107	92	89	79	101	79	
270	87	88	65	69	78	87	53	
271	93	80	89	87	103	78	88	
272	93	84	69	79	70	86	81	
273	105	84	64	75	83	83	78	64
274	102	98	82	87	103	88	82	78
275	67	66	78	90	61	79	85	
276	105	107	77	87	71	85	87	80
277	90	79	89	90	88	99	80	86
278	109	112	79	76	85	91	77	81
279	100	66	92	90	104	80	93	84
280	130	114	79	82	100	99	88	77
281	100	96	84	99	94	102	82	
282	130	101	77	81	73	85	74	
283	90	73	77	84	97	99	83	
284	86	94	79	85	87	97	82	
285	95	106	79	84	104	99	85	
286	96	88	69	73	93	87	69	
287	96	90	71	83	96	94	85	
288	77	85	84	73	83	77	86	
289	88	97	92	98	85	94	69	
290	115	95	88	97	115	128	93	
291	109	86	77	82	77	98	77	
292	95	88	83	82	93	104	79	75
293	87	98	73	57	91	80	72	70
294	104	95	88	92	88	88	63	

	I	J	K	L	M	N	O	P
295	82	97	76	81	67	86	79	
296	96	100	78	93	86	111	83	81
297	98	88	79	81	96	96	77	81
298	123	88	83	84	100	92	92	87
299	93	90	74	76	88	94	68	
300	108	112	82	95	94	123	89	81
301	106	105	82	93	116	99	77	78
302	114	96	92	95	99	98	90	86
303	69	80	95	90	67	81	51	
304	96	105	99	120	92	99	87	99
305	104	115	95	96	100	109	85	94
306	96	82	80	86	65	93	84	80
307	112	101	95	98	91	87	91	96
308	108	91	85	98	104	106	89	
309	121	130	98	98	93	111	98	95
310	84	109	109	103	102	95	83	110
311	95	96	110	90	106	95	83	
312	86	82	77	79	96	89	68	
313	98	81	65	58	52	87	56	61
314	95	97	88	103	100	96	75	83
315	132	95	88	95	83	104	73	86
316	92	87	74	81	77	86	65	70
317	100	106	63	65	72	97	58	
318	117	117	84	91	108	105	80	88
319	95	117	74	75	87	93	79	
320	91	80	60	75	49	77	78	
321	100	102	84	104	79	99	79	85
322	90	91	68	75	61	80	85	
323	100	103	92	92	84	99	79	91
324	98	115	105	108	91	110	96	105
325	73	90	101	90	85	87	74	108
326	82	86	57	69	67	49	76	
327	98	100	64	64	64	76	62	63
328	104	102	79	83	80	88	64	81
329	108	111	89	87	108	98	91	
330	126	118	101	114	102	122	94	
331	96	81	81	71	52	89	87	77
332	109	100	81	94	83	101	71	80
333	95	75	76	83	78	78	71	78
334	100	98	82	76	96	91	88	
335	114	117	81	93	99	97	90	
336	98	81	97	95	110	108	96	96
337	104	102	90	98	94	96	88	82
338	109	103	95	95	85	93	79	100
339	95	96	81	86	99	117	80	83
340	104	123	93	103	97	101	92	94
341	84	97	88	90	75	90	79	89
342	96	94	92	96	90	88	75	91
343	114	117	89	106	90	105	89	

	I	J	K	L	M	N	O	P
344	95	92	82	90	108	94	78	77
345	90	103	86	96	110	104	82	87

	Q	R	S	T	U	V	W	X
1	WJR-BRC	WJR-BMS	ELIG-BR	ELIG-RC	ELIG-WE	ELIG-MC	ELIG-MR	ELIG-any
2	56		1	1	1	1	1	1
3			1	1	1	0	0	1
4			1	0	1	0	0	1
5	86		1	1	1	0	0	1
6	81		1	0	1	0	0	1
7			1	1	1	0	0	1
8	90	73	0	0	1	1	0	1
9	71	66	1	0	1	0	0	1
10	100	89	0	0	0	0	0	0
11			1	1	1	1	1	1
12	92		0	0	0	0	0	0
13	73		0	0	0	0	0	0
14	74		1	1	0	1	1	1
15			0	1	1	1	0	1
16	77		0	0	0	1	1	1
17	75		1	1	0	1	1	1
18			1	1	1	0	0	1
19			1	1	1	1	1	1
20	77		0	0	0	0	0	0
21	85		0	0	0	0	0	0
22	79		0	0	0	0	0	0
23	91		0	0	0	0	0	0
24			0	0	1	1	0	1
25	98	92	0	0	0	0	0	0
26	74	76	1	1	1	1	0	1
27	94	74	0	0	0	1	0	1
28	68		1	1	1	0	0	1
29	46		1	1	1	0	0	1
30	84	79	0	0	0	0	0	0
31	74	78	0	0	0	0	0	0
32			0	0	0	0	0	0
33			1	1	1	0	0	1
34	69	68	1	1	1	1	1	1
35	63	75	0	1	1	1	1	1
36	61	89	1	1	1	0	1	1
37			1	1	1	0	0	1
38	75	76	1	1	1	1	1	1
39	92	92	1	0	1	0	0	1
40	72		0	1	1	0	0	1
41	78	93	1	1	1	0	0	1
42			1	1	1	0	0	1
43	88	73	0	0	0	0	0	0
44			0	0	0	0	0	0
45	82	85	0	0	0	0	0	0
46	51	43	1	1	1	1	1	1
47	100	91	0	0	0	0	0	0
48	77	79	1	0	1	0	0	1
49	67	72	1	1	1	0	0	1

	Q	R	S	T	U	V	W	X
50	81	78	1	1	1	1	0	1
51	94	78	0	0	1	1	0	1
52			1	1	1	1	0	1
53	60	71	1	1	1	1	0	1
54			0	0	0	1	1	1
55	88	91	0	0	0	0	0	0
56	61	73	1	1	1	0	0	1
57	77	98	0	0	0	0	0	0
58	83	100	0	0	0	0	0	0
59			0	0	0	0	0	0
60	71	54	1	1	1	1	1	1
61	83		0	0	0	0	0	0
62			0	0	0	0	0	0
63	65	76	1	1	1	0	0	1
64	64	47	1	1	1	1	1	1
65	84	76	0	0	0	0	0	0
66	67	76	1	0	1	0	0	1
67	70	79	0	1	1	0	0	1
68	84	77	0	0	0	0	0	0
69	89	73	0	0	0	1	1	1
70	76	66	0	0	1	1	0	1
71	53	74	1	1	1	1	1	1
72	80	54	1	0	1	1	1	1
73	68	80	1	1	1	0	0	1
74	62	68	1	1	1	1	0	1
75	97	88	0	0	1	0	0	1
76			1	1	0	1	1	1
77	75	65	0	0	1	1	0	1
78	92	76	0	0	0	0	0	0
79	88	70	1	0	1	1	0	0
80	108	82	0	0	1	1	0	1
81	82		1	1	1	0	0	1
82			1	1	1	0	0	1
83			1	1	1	0	0	1
84	101	90	0	0	0	0	0	0
85			1	1	1	0	0	1
86	74	76	1	1	1	0	0	1
87			0	0	0	0	0	0
88			0	0	0	0	0	0
89			1	1	1	0	0	1
90	72		1	0	1	0	0	1
91			0	0	0	0	0	0
92	89	96	0	0	0	0	0	0
93			1	1	0	0	0	1
94		75	1	1	1	1	1	1
95	92	86	0	0	0	0	0	0
96	95	115	0	0	0	0	0	0
97	105	79	0	0	0	0	0	0
98	83	89	0	0	0	0	0	0

	Q	R	S	T	U	V	W	X
99	72	71	1	1	1	0	0	1
100			1	1	1	1	0	1
101	100	91	0	0	0	0	0	0
102	101	113	0	0	0	0	0	0
103	93	99	0	0	0	0	0	0
104		85	0	0	0	1	1	1
105	84	91	1	1	1	0	0	1
106	69	73	1	1	1	1	1	1
107	77	81	1	1	1	0	0	1
108			1	1	0	0	0	1
109			1	1	1	1	1	1
110		71	0	0	0	1	1	1
111			1	1	1	0	0	1
112			1	1	1	0	0	1
113			1	1	1	1	0	1
114	75	85	1	1	1	0	1	1
115			1	1	1	0	0	1
116			0	0	1	1	0	1
117			0	0	0	1	1	1
118	72	72	1	1	1	0	0	1
119	58	71	0	1	1	1	0	1
120	71	69	1	1	1	0	1	1
121	84	74	0	0	0	0	0	0
122			1	1	1	0	0	1
123	84		0	0	1	0	0	1
124	92		0	0	1	0	0	1
125			1	1	0	0	0	1
126		42	1	1	1	1	1	1
127		67	0	0	1	1	0	1
128	79		1	0	1	0	0	1
129	89		1	0	0	0	0	1
130			1	1	1	1	1	1
131	97	124	0	1	1	0	0	1
132		63	1	1	1	0	0	1
133	83	66	0	0	0	1	1	1
134	92	89	0	0	1	0	0	1
135	89	85	0	0	1	0	0	1
136	88	85	0	0	0	0	0	0
137			0	0	0	0	0	0
138	71	58	0	0	0	1	0	1
139			0	0	1	0	0	1
140	76	111	1	1	1	0	0	1
141	69	99	1	1	1	0	0	1
142			0	0	0	0	0	0
143	80	83	0	0	0	0	0	0
144	73	76	0	0	0	0	0	0
145	88	83	0	0	0	0	0	0
146			1	1	1	0	1	1
147	84		0	0	0	0	0	0

	Q	R	S	T	U	V	W	X
148			0	0	0	0	0	0
149			0	0	0	0	0	0
150			0	0	0	0	0	0
151	90	99	0	0	0	0	0	0
152			0	0	1	0	0	1
153	79		0	0	0	0	0	0
154	90		0	0	0	1	0	1
155	90	74	0	0	0	0	0	0
156	106	88	0	0	0	0	0	0
157	80	94	0	0	0	0	0	0
158	103	89	0	0	0	0	0	0
159	77	69	1	1	1	1	0	1
160	72	76	1	0	1	0	0	1
161	106	112	0	0	0	0	0	0
162	68	71	1	1	1	0	0	1
163	79	87	1	0	1	0	0	1
164			0	0	0	0	0	0
165		115	0	0	0	0	0	0
166	93	97	0	0	0	0	0	0
167	88	65	0	0	0	0	0	0
168	83	68	0	0	0	0	0	0
169			0	0	0	0	0	0
170	99		0	0	0	0	0	0
171	89		0	0	1	0	0	1
172			0	0	1	1	1	1
173			0	0	0	0	0	0
174	59	38	1	1	1	1	0	1
175			1	0	1	0	0	1
176			0	0	0	0	0	0
177	90		0	0	0	0	0	0
178	109	92	0	0	0	0	0	0
179	73		1	0	0	0	0	1
180	80		0	0	0	0	1	1
181	98		1	0	1	0	0	1
182	89	88	0	0	0	0	0	0
183			0	0	0	0	0	0
184			0	0	0	0	0	0
185	79	74	0	0	0	0	0	0
186			0	0	1	0	0	1
187	74	80	1	1	1	1	0	1
188			0	0	0	0	0	0
189	90		0	0	0	0	0	0
190			1	0	1	0	0	1
191	94		0	0	0	0	0	0
192			0	0	1	1	1	1
193			0	0	0	1	1	1
194			1	1	1	1	1	1
195	78	91	1	1	0	0	0	1
196			1	1	0	1	1	1

	Q	R	S	T	U	V	W	X
197	91		1	1	1	0	0	1
198	79	77	0	0	1	0	0	1
199			0	0	0	0	0	0
200			1	1	1	1	1	1
201			0	0	0	0	0	0
202	69	62	1	1	1	1	0	1
203			0	0	1	1	0	1
204			1	1	1	1	1	1
205		78	0	0	0	1	1	1
206			0	0	0	0	0	0
207			1	1	0	0	0	1
208	79	91	1	1	1	1	1	1
209	97	114	0	0	0	0	0	0
210	94	88	0	0	0	0	0	0
211			1	1	1	0	0	1
212	92	87	1	1	0	0	0	1
213			0	0	0	0	0	0
214			0	0	0	0	0	0
215	89	49	0	0	0	1	1	1
216			1	0	1	1	0	1
217	99	91	0	0	1	0	0	1
218	73	91	1	1	1	0	0	1
219			0	0	0	0	0	0
220			1	1	1	0	0	1
221	86		0	0	1	0	0	1
222			1	1	1	0	0	1
223	79	88	1	1	1	0	0	1
224	93	73	0	0	1	1	0	1
225			1	1	1	0	0	1
226			1	0	0	0	0	1
227			0	0	0	0	0	0
228			1	1	1	0	0	1
229			0	0	0	0	0	0
230			1	1	1	0	1	1
231			0	0	0	0	0	0
232			0	0	0	0	0	0
233			0	0	0	0	0	0
234			0	0	0	0	0	0
235			0	0	1	0	0	0
236			0	0	1	0	0	1
237			1	0	1	0	1	1
238			0	0	1	0	0	1
239			1	1	1	0	0	1
240			1	1	1	0	0	1
241			0	0	0	0	0	0
242			0	0	0	0	0	0
243			0	0	0	0	0	0
244			0	0	0	0	0	0
245			0	0	0	0	0	0

	Q	R	S	T	U	V	W	X
246			0	0	0	0	0	0
247			0	0	0	0	0	0
248			0	0	0	0	0	0
249			0	0	0	0	0	0
250			0	0	0	0	0	0
251			0	0	0	0	0	0
252			0	0	0	0	0	0
253			0	0	0	0	0	0
254			0	0	0	0	0	0
255			0	0	0	0	0	0
256			0	0	0	0	0	0
257			1	1	1	0	0	1
258			0	0	0	0	0	0
259			0	0	0	0	0	0
260			0	0	0	0	0	0
261			0	0	0	0	0	0
262			0	0	0	0	0	0
263			0	0	0	1	1	1
264			0	0	0	0	0	0
265			0	0	0	0	0	0
266			0	0	0	0	0	0
267			0	0	0	0	0	0
268			0	0	0	0	0	0
269			0	0	1	0	0	1
270	76	82	1	1	1	0	0	1
271			0	0	0	0	0	0
272			1	1	0	1	0	1
273			1	1	1	0	0	1
274	87		1	0	1	0	0	1
275	94	66	0	0	0	0	0	0
276	84		1	1	0	1	0	1
277	87	94	0	0	0	0	0	0
278	80	85	1	1	1	0	0	1
279	85	98	1	0	1	0	0	1
280			1	1	1	0	0	1
281			0	0	1	0	0	1
282			1	1	1	1	1	1
283			1	0	1	0	0	1
284			0	0	0	0	0	0
285			1	1	1	0	0	1
286			1	1	1	0	0	1
287			1	0	0	0	0	1
288			0	0	0	0	0	0
289			0	0	0	0	0	0
290			0	0	0	0	0	0
291			1	1	1	0	0	1
292	82	91	1	0	1	0	0	1
293	58	85	1	1	1	0	0	1
294			1	0	1	0	0	1

	Q	R	S	T	U	V	W	X
295		76	1	1	1	1	0	1
296	91	92	1	0	1	0	0	1
297			1	0	1	0	0	1
298	87		1	1	1	0	0	1
299			1	1	1	0	0	1
300	93		1	0	1	0	0	1
301	89		1	1	1	0	0	1
302			0	0	1	0	0	1
303			0	0	0	0	0	0
304			0	0	0	0	0	0
305	92	103	0	0	0	0	0	0
306	84	69	0	0	0	0	0	0
307			0	0	0	0	0	0
308			0	0	0	0	0	0
309	90	91	0	0	0	0	0	0
310			0	0	0	0	0	0
311			0	0	0	0	0	0
312			0	0	1	0	0	1
313		57	1	1	1	0	0	1
314	97	96	1	0	1	0	0	1
315	103		1	0	1	1	0	1
316	75	66	1	1	1	1	0	1
317			1	1	1	0	0	1
318			0	0	0	0	0	0
319			1	1	1	0	0	1
320		46	1	1	0	1	0	1
321	98	77	1	0	1	1	0	1
322			1	1	0	1	0	1
323	92	81	0	0	0	0	0	0
324	100	97	0	0	0	0	0	0
325	93	84	0	0	1	0	0	1
326		33	0	0	0	0	0	0
327	64	62	1	1	1	1	1	1
328	82	83	1	1	1	1	1	1
329			1	1	1	0	0	1
330			1	0	1	1	0	1
331		59	1	1	0	1	0	1
332			0	0	0	0	0	0
333		71	0	0	0	0	0	0
334			1	1	0	0	0	1
335			0	0	0	0	0	0
336	96	108	0	0	0	0	0	0
337			1	0	1	0	0	1
338		83	0	0	1	0	0	1
339			0	0	0	0	0	0
340	107		0	0	0	0	0	0
341	92	72	0	0	0	0	0	0
342		83	0	0	0	0	0	0
343			0	0	0	0	0	0

	Q	R	S	T	U	V	W	X
344		97	1	0	1	0	0	1
345	97		0	0	1	0	0	1

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