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# Illusory Correlations in School Psychologists' Diagnoses of Learning Disabilities

Master's Thesis

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Of the School Psychology Program

College of Liberal Arts

ROCHESTER INSTITUTE OF TECHNOLOGY

By

Marc A. Renzoni

In Partial Fulfillment of the Requirements

For the Degree of

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Approved: \_\_\_\_\_ Nicholas DiFonzo \_\_\_\_\_

(Committee Chair)

\_\_\_\_\_ Illegible \_\_\_\_\_

(Committee Member)

Dean: \_\_\_\_\_

Running head: ILLUSORY CORRELATIONS IN L.D. DIAGNOSES

Illusory Correlations in  
School Psychologists' Diagnoses  
Of Learning Disabilities  
Marc A. Renzoni

Rochester Institute of Technology

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### Abstract

Illusory correlation is the perception of an association between two uncorrelated variables such as intersubtest scatter on the Wechsler Intelligence Scale for Children – Third Edition (WISC-III) and the presence of a learning disability. This study assessed the extent to which school psychologists are influenced by this illusory correlation. Three independent variables were varied systematically. One variable was relevant to the diagnosis of a learning disability (a discrepancy between expected and actual levels of achievement on the Wechsler Individual Achievement Test (WIAT)). Another was irrelevant to the diagnosis (intersubtest scatter on the WISC-III). The third independent variable was used as a warning to those participants who had an illusory belief that intersubtest scatter on the WISC-III is a valid indicator of a learning disability. Certified school psychologists randomly received case study material for a child referred for a psychological evaluation. It was found that participants based their diagnostic decisions about learning disabilities on the illusory belief that intersubtest scatter on the WISC-III is a valid indicator of a learning disability in the no warning condition only. When warned of this illusory belief, this effect disappeared. This illusory belief, therefore, could effect school psychologists' diagnostic decisions and therefore falsely identify children as learning disabled.

## Illusory Correlations in School Psychologists'

### Diagnoses of Learning Disabilities

Although school psychologists are constantly faced with tasks requiring diagnostic decisions, little research has been conducted to explore the clinical judgments underlying those decisions. For example, when a child is referred for a psychological evaluation, a variety of decision points are encountered that include the selection of assessment devices, interpretation of results, classification and placement determinations, implementation of intervention strategies, and evaluation of those strategies. School psychologists depend on clinical judgment when selecting assessment strategies, sorting through the resultant data to distinguish predictive from non-predictive information, and combining this information in order to reach classification and treatment decisions.

### Illusory Correlation

Previous research in other fields has suggested that one of the most important sources of judgment error is the failure to properly analyze relationships between variables. The term *illusory correlation* refers to the tendency to assume that there is a relation among two variables, such as an observed symptom and a problem, when no such relationship exists (Chapman & Chapman, 1967, 1969). An illusory correlation represents a reported correlation between two classes of events that, in reality, are not correlated, correlated to a lesser extent or in the direction opposite to that reported (Chapman & Chapman, 1967). An illusory correlation occurs when clinicians fail to observe the actual relation between two variables and then develop incorrect conclusions.

Research investigating the accuracy of clinical judgment has often yielded surprising results. In an early study on this subject, Goldberg (1959) examined the

effectiveness in which decision-makers (including psychologists) could distinguish between patients with and without organic brain damage based on patient performances on a visual-motor coordination test. The judgment accuracy of the psychologists was found to be narrowly above chance levels. In a more recent study, Werner, Rose, and Seeman (1983) demonstrated low levels of accuracy in the prediction of violent behavior. Psychologists and psychiatrists with over fifteen years of experience were asked to make short-term predictions of violence for a group of psychiatric patients. The overall accuracy of these professionals was found to be surprisingly low, and in almost all cases accuracy did not exceed chance levels. In addition, Werner et al. found that when reaching judgments, the professionals tended to ignore data that had predictive value for violent behavior and instead tended to emphasize variables that were not related to violent behavior. These results are representative of the low performance level found in many judgment studies (e.g., Oskamp, 1965; Faust, 1986).

Chapman & Chapman's (1967) research on illusory correlation provides a basis for understanding this kind of judgment error in psychology. The Chapmans used the Draw-A-Person Test (DAP) in which the client draws a picture of a man or woman. Then, the psychologist attempted to link particular drawing characteristics with the client's personality characteristics. For example, it is commonly assumed that highly detailed drawings of eyes are an indication of paranoia. Although research has failed to validate this and similar kinds of sign-diagnosis relationships on the DAP, clinicians still often use such correlates of DAP performance in their diagnoses (Ziskin & Faust, 1988) and continue to use the DAP frequently (Gnys, 1992).

Also in the Chapmans' study, subjects received a drawing and two diagnostic statements that supposedly described the emotional state or characteristics of the person who drew the picture. The drawings were paired randomly with diagnostic statements such that no systematic relationship existed between any of the diagnostic statements and drawing characteristics. Participants were asked to report which drawing characteristics were correlated with the diagnostic statements. Subjects "discovered" many of the invalid sign-diagnosis relationships they had assumed existed before seeing the data, and that practicing psychologists often report. Thus, not only were illusory beliefs maintained despite non-supportive data, but participants believed that non-supportive data were, in fact, supportive. The consistent, yet invalid, nature of these observations suggests a systematic judgment error. Specifically, there appears to be a definite bias in the clinical judgments of many practicing psychologists.

Chapman and Chapman (1969) also demonstrated that the phenomenon of illusory correlation generalized beyond the Draw-A-Person Test. They showed that experienced clinicians and naïve observers who used the Rorschach inkblot test also perceived relationships that did not exist. In addition, both groups failed to observe valid sign-diagnosis relationships that were present in the data. In other words, they failed to recognize participant comments on certain inkblots that have been clinically supported as signs of a particular disorder.

Further studies have verified the occurrence of illusory correlations in the professional judgment of psychologists. In an extensive replication of Chapman and Chapman's (1969) study, Golding and Rorer (1972) demonstrated the existence of illusory correlations. Moreover, the investigators found that little change occurred in the



participants' false associations even when valid signs were paired with symptom statements 100% of the time, whereas the invalid signs remained randomly paired with the symptom statements. In addition, when provided with feedback and information about different symptom base rates, participants still formed illusory correlations, leading the authors to conclude that training had a negligible effect on reducing such false beliefs. Golding and Rorer (1972) suggested that when psychologists perceive a frequent co-occurrence between a particular sign and diagnosis, they may be sensitized to that sign as a function of previous biases about the sign-diagnosis relationship. These biases may arise from theoretical preconceptions or from more widely shared personality theories.

### Impression Perseverance

In a more general investigation, Walster, Berscheid, Abrahams, and Aronson (1967) observed that when experimental subjects were told that the information they received in a study was false, they often continued to base their judgments on it nonetheless. Ross, Lepper, and their colleagues (1975) have since incorporated this phenomenon into a general model of *impression or belief perseverance*. According to this model, people fail to adjust their impressions sufficiently when they encounter information that discredits the evidence on which the impressions are based. The model asserts that this failure occurs when people have formed an attribution or explanation for the observed evidence. In essence, it is argued that the attribution remains as a basis for inference even when the evidence is discredited (Wegner, Coulton, & Wenzlaff, 1985).

Wegner et al. (1985) further explains impression perseverance through the concept of *denial transparency*. Denial transparency is a term that expresses the ineffectiveness of denial in negating propositions. They argue that denials are, in

essence, “transparent” in that people “see through them,” and therefore denials are ineffective. The theory states that persons classify all propositions as true initially, regardless of how briefly they were mentioned. Ideas believed to be false are then marked as “not true” and are generally more difficult to remember than the true proposition. For example, in the absence of other information, a statement like “Bob Talfert is not connected with the Mafia” will tend to be recalled as “Bob Talfert is connected with the Mafia.” According to Wegner et al. (1985), a denial does not erase a proposition, rather it accompanies it.

In another study, Ross et al. (1985) suggested that varying the time that the proposition is discredited (before or after the impression is formed) should help to lessen the perseverance effect from general tendencies to discount evidence contrary to dispositional inferences. In an experiment by Hubbard (1984), forewarning subjects that a persuasive message was false did not appear to eliminate its persuasive impact. In its replicated study, Hubbard (1984) found that in the no-deception condition, relative belief did not persevere while absolute belief did. Hubbard suggested that the feedback provided was used by the subjects, despite knowing that it was unrelated to actual performance, “as though it were generally informative” (p. 54). It appeared that the subjects’ self-impressions polarized after feedback, as well as their impressions about the average student’s performance.

In addition, Wegner et al. (1985) found strong evidence for perseverance in no-deception conditions. They found perseverance in all dependent measures for both briefing and debriefing conditions except for ability attributions. Briefing condition subjects’ ability attributions did not persevere, while their estimates of current and future

performance did. Briefing apparently stopped the ability attribution, but the impression remained for estimates of future and current performance.

Denial transparency, then, would predict that forewarning subjects that evidence is false should not dramatically reduce perseverance of belief based on that evidence. Therefore, forewarning subjects that, contrary to what many school psychologists believe, there is no significant evidence of a correlation between intersubtest scatter on the WISC-III and the presence of a learning disability should not significantly reduce perseverance of belief based on this illusory correlation.

### Training Studies

Several studies have examined the effects of training on countering illusory correlations. Kurtz and Garfield (1978) provided explicit training to participants, showed them examples of such illusory correlations, and warned them to be on guard against them. Nevertheless, subjects still maintained illusory beliefs and associated invalid signs with diagnoses. Waller and Keeley (1978) also investigated the effects of training on countering illusory correlations. They attempted to attenuate illusory beliefs about Draw-A-Person relations through training on the Rorschach. Participants were informed about the nature of illusory correlation and research findings related to this phenomenon prior to viewing Rorschach cards. The subjects were warned that illusory correlations might bias their own judgments of the stimulus materials and were cautioned to avoid this kind of bias. These attempts to sensitize participants to illusory correlations were found to be ineffective in countering such beliefs.

## Relevance to School Psychology

Correct decision-making strategies and accurate assumptions about relations among variables are essential for identifying children with disabilities. Poor decision strategies and their resulting errors will adversely effect the delivery of appropriate educational services to children with disabilities and their families.

As suggested previously, illusory correlation is a key source of error in professional decision-making, resists corrective interventions, and generalizes across a variety of tasks and professionals. With this evidence taken into account, it is reasonable to assume that illusory correlations also effect the judgments of school psychologists. Most school psychologists spend a significant amount of time with children who have been referred because of psychoeducational problems. Exposure to such a skewed sample makes it difficult for school psychologists to compare the relative frequency of symptoms or behaviors among referred children and those who have not been referred (Ziskin & Faust, 1988). As a result, there is a tendency to believe that behaviors commonly observed among referred children are indicative of referral status or disorder, when such behavior may be no more common among these children than the general population. In fact, some studies have shown that some symptoms clinicians assume are specific to disordered individuals, or assume occur with greater frequency among the disordered, are common among normal populations (Gouvier, Uddo-Crane, & Brown, 1988). If school psychologists form false associations, such as between a particular response pattern on a psychological test and a specific classification, erroneous decisions are likely to result.

## Purpose

The present study was designed to investigate the extent that school psychologists misclassify children and youth as learning disabled based on an illusory correlation. Current research has shown that some school psychologists believe there are systematic relations between patterns of subtest scores on the Wechsler Intelligence Scale for Children – Revised (WISC-R) and a learning disability when, in fact, studies do not support these relationships (Kaufman, 1979). According to Kaufman, there is an illusory correlation between the subtest score pattern (often termed subtest scatter) and a learning-disabilities classification. Students who are falsely identified as learning disabled on the basis of this illusory correlation are likely to be placed incorrectly in special education programs, whereas those in need of services may not be detected and therefore would be deprived of the services they need (Ysseldyke, Algozzine, Regan, McGue, 1981).

The overidentification of learning disabilities in school-age children continues to be a problem in psychological assessment. Research has revealed several factors that may lead to the identification of a child as learning disabled, such as referral specificity (Heubner, 1987), test content (Heubner, 1989), and referral content (Cummings, Heubner & Mclesky, 1986). The WISC-R (Wechsler, 1974) was used frequently to attempt to identify a common profile for children with a learning disability.

Kaufman (1976) evaluated this issue by conducting an analysis of the WISC-R standardization sample. He found that far more intersubtest scatter existed in the normal population than previously was believed. Kaufman mentioned that although considerable subtest scatter often is considered to covary with learning disabilities, this assertion commonly has been made without reference to (or awareness of) subtest score

fluctuations that are characteristic of normal profiles. The notion of scatter has long been associated with a variety of abnormal conditions. Thus, it is frequently surprising to psychologists to learn the results of investigations of subtest scatter with normal children (Kaufman, 1976).

Kaufman (1976) reported the degree of subtest scatter characterizing the 2,200 children that comprised the WISC-R standardization sample. For each child, Kaufman examined the range between their highest and lowest subtest scores ( $M = 10$ ,  $SD = 3$ ). The informally obtained estimates of these ranges from experienced clinicians tended to cluster around three to four points. However, the actual ranges for the standardization group averaged seven points ( $SD = 2.00$ ). In practical terms, a scaled-score range of seven means that for a child of average intelligence, the child's subtest scores would range from 6 or 7 to about 13 or 14. And because one standard deviation from the mean is often considered the definition of normality, even a scaled score range as large as nine points can be considered normal (Kaufman & Reynolds, 1990). These findings, and other related investigations (e.g., Anderson, Kaufman, & Kaufman, 1976; Gutkin, 1979; Kavale & Forness, 1984), have shown that despite popular clinical belief that intersubtest scatter is associated with learning disabilities, it is not unique to students with learning disabilities. Therefore, this belief is of questionable value in a classification decision. Kaufman (1976) cautioned that classification decisions for children with learning disabilities should not be based, even partially, on levels of subtest scatter that frequently occur in the normal population.

The investigation also examined if these illusory correlations persevere in the presence of more valid information. A large body of evidence (see Hooper & Willis,

1989) suggests that there is no characteristic pattern of WISC-R subtest scatter that serves to distinguish all students with learning disabilities from those without this condition. Instead, contemporary definitions of learning disabilities emphasize their heterogeneous nature. A more valid characteristic symptom for children with learning disabilities would be that their actual levels of academic achievement are significantly poorer than the levels that would be expected based on their better-developed academic aptitude. This is known as a significant discrepancy between actual and expected academic achievement (Hooper & Willis, 1989).

In a recent investigation of this issue, Gnys, Willis, and Faust (1995) sent case study material about a hypothetical student and a brief decision-making questionnaire to a random sample of over 300 school psychologists. Participants were asked to make a decision on whether the child presented was learning disabled based on the information provided. Gnys et al. (1995) found that school psychologists were likely to base diagnostic decisions about learning disabilities on an illusory belief that WISC-R subtest scatter is associated with learning disabilities. Moreover, this illusory belief persevered in the presence of more valid information (i.e., a significant discrepancy between actual and expected levels of academic achievement) bearing on the learning disability diagnosis (Gnys et al., 1995).

### Hypotheses

A major hypothesis of this investigation was that school psychologists were likely to perceive subtest scatter on the WISC-III as indicating a high probability of a learning disability. Moreover, this illusory belief was likely to persevere in the presence of more valid information (i.e., a reliable discrepancy between actual and expected levels of

academic achievement) bearing on the learning disability diagnosis. Therefore, it was predicted that school psychologists reviewing a case with greater subtest scatter on the WISC-III would be more likely to diagnose a learning disability than those examining a case with less subtest scatter.

A second hypothesis of the present study was that the belief that subtest scatter on the WISC-III indicates a high probability of a learning disability was likely to persevere when information disputing this illusory belief (i.e., Kaufman's research on subtest scatter on the WISC-R) is mentioned in the survey. Therefore, it was predicted that school psychologists who were presented with information disputing this illusory belief would be as likely to diagnose a learning disability as those who were not presented this information.

In summary, the goal of the present study was to contribute to a better understanding of school psychologists' decision making and, in particular, their identification of learning disabilities. School psychologists make major contributions to educational decisions that effect children and their families. However, if they rely on invalid assumptions to make clinical judgments about learning disabilities, many students may be misclassified. The present study was designed to investigate the extent and scope of this problem that in turn might contribute to misclassification and ineffective interventions.



## Method

### Subjects

Information packets were mailed to a random sample of 488 school psychologists selected from the membership list of the New York Association of School Psychologists. Student affiliates were excluded from the sample.

### Materials

Materials consisted of information packets and a brief decision-making questionnaire (see Appendix). There were eight different information packets. Each school psychologist received one packet containing a cover page requesting information and guaranteeing anonymity. Also included were scores of a hypothetical examinee on (a) the Wechsler Intelligence Scale for Children – Third Edition (WISC-III) (Wechsler, 1991), (b) the Wechsler Individual Achievement Test (WIAT) (Psychological Corporation, 1992); (c) the Behavior Assessment System for Children – Teacher Rating Scale (BASC-TRS) (Reynolds & Kamphaus, 1992); as well as (d) a brief description of each of these tests, and (e) some identifying information about the examinee.

WISC-III scores were varied in reporting either high or low intersubtest scatter. Levels of intersubtest scatter were based on information from Kaufman (1979); and Reynolds and Kaufman (1990). Ranges of subtest scores were 3 and 13 scaled-score points ( $M = 10$ ,  $SD = 3$ ) for the low- and high-scatter conditions, respectively. All WISC-III profiles had identical Verbal, Performance, and Full Scale IQ scores. WISC-III profiles were presented (instead of WISC-R profiles like in the Gnys et al. (1995) study) because it was believed participants would currently be more familiar with the latest edition of this instrument.

Age-based standard scores for the Reading, Mathematics, Language, and Writing composites from the WIAT varied in reporting either low or average levels of reading and math achievement. To satisfy varying definitional criteria for learning disabilities (Fletcher, 1992), levels of achievement were determined in two ways. First, in accordance with a low-achievement criterion for a learning disability diagnosis, Reading and Mathematics composite age-based standard scores in the low-achievement condition were 2 standard deviations below the mean for the test. In the average-achievement condition, age-based standard scores for all composites were within 1 standard deviation from the mean for the tests. Second, in accordance with an IQ-discrepancy criterion for a learning disability diagnosis, IQ-achievement differences were calculated using a regression-discrepancy model for determining a reliable difference between WISC-III IQs and WIAT Reading and Mathematics composite age-scale scores (Evans, 1990; Reynolds, 1990). For the low-achievement condition, the differences between all three WISC-III IQs (i.e., Verbal, Performance, and Full Scale) and the Reading and Mathematics composite age-scale scores were statistically significant ( $p < .05$ ). In the average-achievement condition, these differences were not significant.

One half of the packets included a paragraph stating that research by Alan S. Kaufman has shown that there is little systematic relationship between intersubtest scatter on the WISC-III and learning disabilities. The second half of the packets did not include the Kaufman paragraph.

All questionnaires included identical information regarding a hypothetical child's name (Chris), age (11 years, 6 months), grade (fifth), and brief descriptions of the WISC-III, WIAT and BASC-TRS. On all surveys, results from the BASC-TRS indicated that

the hypothetical student had no statistically significant behavior problems. Case scenarios such as these have been previously used to investigate clinical decision-making, and have been found to represent valid, actual cases. Kirwan, De Saintonge, Joyce, and Currey (1983), for example, reported that results from these kinds of scenarios were highly correlated ( $r = .90$ ) with results derived from actual patients.

The questionnaire also contained demographic items requesting the participating school psychologist's gender, age, level of education, year of highest degree, average number of psychological assessments performed per month, familiarity with the assessment materials presented, number of psychological assessments conducted per month, and years of experience as a school psychologist.

### Design

Each participating school psychologist was assigned randomly to one of eight conditions created by varying the levels of the three independent variables. One independent variable, intersubtest scatter on the WISC-III (an invalid sign of a learning disability), compared two levels: (a) high and (b) low. The second independent variable, academic achievement (considered to be a valid sign of a learning disability), comprised of two levels: (a) low and (b) average. The final independent variable, Kaufman warning, compared two levels: (a) warning and (b) no warning. The levels of these three independent variables were completely crossed, resulting in a two-by-two-by-two between-groups factorial design. The dependent variables are (a) a classification decision that the child was or was not learning-disabled, and (b) a confidence rating in the classification decision.

## Procedure

The packets of information were mailed to the participating school psychologists, who were asked to complete a brief decision-making questionnaire. The participants were first asked to read brief descriptions of the referred child and the three psychological tests. One half of the subjects also read the warning about Kaufman's research on intersubtest scatter. All participants were asked to review the assessment results from the WISC-III, WIAT and BASC-TRS. Next, they were requested to indicate whether or not they would classify the child represented by the information given as learning disabled or non-learning disabled. The participants rated their confidence in their classification decision on a scale ranging from 50% (50% confident) to 100% (100% confident). In addition, they displayed how many psychological assessments they performed per year using the WISC-III and WIAT.

The respondents were also asked to complete some demographic items requesting information about their gender, age, level of education, highest degree earned, number of psychological assessments performed per month, and years of experience as a school psychologist.

Several manipulation checks were included in the questionnaire. To ensure that all participants read the descriptions of the three psychological tests (the WISC-III, WIAT and BASC-TRS), subjects were asked to place a check ( $\checkmark$ ) next to each description. This process was included in order to deter the possibility that participants unfamiliar with the tests made their decisions based on false interpretations of the test data. For example, a participant unfamiliar with the WIAT may have believed that the test's mean score was 50 instead of 100.

In a pilot study, participants were also given a definition of intersubtest scatter. They were asked to indicate whether the hypothetical examinee's scores on the WISC-III were best described as having low or high intersubtest scatter on a Likert-type scale ranging from 1 (low intersubtest scatter) to 7 (high intersubtest scatter). Next, they were requested to display whether the scores reported for the hypothetical examinee's WIAT were best described as showing low or high levels of achievement on a Likert-type scale ranging from 1 (low achievement) to 7 (high achievement). These two questions were utilized to test the face validity of the WISC-III and WIAT scores. Results indicated that participants identified low or high intersubtest scatter and low or average levels of achievement scores in concordance with the predicted design. Therefore, the scores given in the questionnaires were good representations of achievement level (either low or average) and intersubtest scatter (either low or high).

### Results

Of the 480 surveys mailed, 230 were returned, yielding a return rate of 47.92%. As seen in Table 1, the majority of respondents held master's degrees plus an additional 30 graduate semester-hours of credit and were female. The mean number of assessments

conducted by the respondents per month was 6.62 ( $SD = 5.06$ ). The mean number of years since graduation experience was 12.48 ( $SD = 8.32$ ). The mean number of Wechsler Intelligence Scales for Children (WISC-III) conducted in the past year by the respondents was 36.79 ( $SD = 27.41$ ). The mean number of Wechsler Individual Achievement Tests (WIAT) conducted in the past year by the respondents was 20.55 ( $SD = 27.43$ ). These characteristics indicate that the sample was moderately experienced, not only with school psychology in general, but with the WISC-III and WIAT in particular.

A one-way analysis of variance (ANOVA) for confidence in diagnostic decision was conducted in order to ensure participant differences were not due to differing high scatter patterns on the WISC-III results given on the questionnaire. Results confirmed this; no significant effects for type of high scatter pattern were obtained ( $F(2, 111) = 2.16$ ,  $p > .05$ ). Consequently, the three high scatter patterns were collapsed for further analyses.

Table 2 presents means, standard deviations, and 95% confidence intervals for all cells. Hypothesis 1, that school psychologists reviewing a case with greater subtest scatter on the WISC-III would be more likely to diagnose a learning disability than those examining a case with less subtest scatter, was supported for the no warning conditions, but not the warning condition. As shown in Table 3, a two (warning/no warning) by two (low/high scatter) by two (low / average achievement) ANCOVA for confidence in diagnostic decision was conducted with years experience as a covariate. It was proposed that the years of experience as a school psychologist could possibly have an effect on the other variables. However, analysis revealed no significant effect for years of experience ( $F(1, 217) = 0.14$ ,  $p > .05$ ).

Analysis showed a scatter x warning interaction ( $F(1, 217) = 7.46, p < .01, r = .18$ ). Simple effects, therefore, were examined and indicated a significant effect for scatter in the no warning conditions only. This is depicted in Figure 1. When not warned, high scatter subjects were much more likely than low scatter subjects to predict that the student was learning disabled ( $F(1, 109) = 7.63, p < .01, r = .26$ ). Participants within the no warning, high scatter condition had a higher rate of learning disability diagnoses ( $M = 55.09$ ) than those within the no warning, low scatter condition ( $M = 38.62$ ) ( $F(1, 109) = 7.63, p < .01, r = .26$ ). When warned, this difference evaporated ( $F(1, 113) = 0.00, p > .05$ ). Participants within the warning, high scatter condition ( $M = 44.60$ ) were equally likely to diagnose their students as learning disabled as those participants in the warning, low scatter condition ( $M = 44.81$ ). Therefore, participants who were given a warning on the misconceptions surrounding scatter level on the WISC-III were equally likely to diagnose students as learning disabled, regardless of the student's scatter level. However, participants who were not given a warning were more likely to diagnose students as learning disabled if they were presented a case with a high level of intersubtest scatter on the WISC-III than those given a case with a low level of intersubtest scatter on the WISC-III.

Hypothesis 2 proposed that school psychologists who were presented with a warning that high intersubtest scatter is not a valid indicator of a learning disability would be as likely to diagnose a learning disability as those who were not warned. As with the results for Hypothesis 1, this was only partially supported because a warning effect was obtained only for high scatter conditions. This is also depicted in Figure 1.

Further analysis indicated a statistical significance for achievement ( $F(1, 217) = 291.19, p < .0001, r = .76$ ). These statistics indicate that students with low achievement scores were more likely to be judged as learning disabled than those with average achievement scores. No interaction effects with achievement were found.

### Discussion

The present study was designed to investigate the likelihood that school psychologists would state a higher probability of a learning disability diagnosis based on an illusory belief about the relationship between learning disability diagnosis and levels of intersubtest scatter on the WISC-III, a test of cognitive ability. Given previous research in clinical psychology and psychiatry (e.g., Chapman & Chapman, 1967, 1969; Golding & Rorer, 1972), it was predicted that the classification decisions of school psychologists, like other mental health professionals, would be influenced by long-held, but inaccurate, assumptions about the utility of using a particular response pattern to diagnose a disorder when, in fact, the actual correlation between these variables is negligible.

In addition, the study analyzed the possible moderating effects of a more valid, and empirically better grounded predictor associated with learning disabilities, namely a discrepancy between actual and expected levels of academic achievement, as estimated from common psychometric instruments. It was hypothesized that the classification judgments of the school psychologists would be influenced by their illusory belief despite the presence of a more valid indicator of a learning disability.

Finally, this investigation examined the possible effects of impression perseverance on the classification judgments of school psychologists. According to the



model of impression perseverance, people fail to adjust their impressions sufficiently when they encounter information that discredits the evidence on which the impressions are based. The model asserts that this failure occurs when people have formed an attribution or explanation for the observed evidence. It was therefore predicted that the classification judgments of the school psychologists would be influenced by their illusory beliefs despite the presence of information discrediting those beliefs.

Results of the present study led to the rejection of the null hypothesis of no differences in probability ratings across the two scatter conditions (high/low) for the no warning condition only. Therefore, a main effect was found for intersubtest scatter in the no warning condition, indicating that, when not warned, school psychologists participating in the present investigation were more likely to state a higher probability of a learning disability diagnosis when there was a relatively high degree of scatter on the WISC-III than when there was a relatively low degree of scatter. This result supports the illusory correlation that there is an association between intersubtest scatter on the WISC-III and therefore a learning disability was present. The result of this investigation is in support of previous research (Gnys, 1992) which found a significant main effect for intersubtest scatter, using a similar survey and analysis.

Further analysis indicated a main effect for level of achievement (low/average). It was revealed that school psychologists sampled were more likely to state a higher probability of a learning disability diagnosis when there were relatively low scores on the Wechsler Individual Achievement Test (WIAT), a test of achievement level, than when relatively average scores were present. This result supports previous research (Gnys, 1992) which showed similar relationships between participant confidence in their

learning disability diagnoses and level of achievement presented. It also demonstrates that school psychologists participating in the study diagnosed the child's abilities according to recent research (i.e., Kaufman, 1979) which supports an association between achievement level and a learning disability. The lack of a significant interaction between achievement and the other two independent variables suggests that this effect occurred regardless of whether a high level of scatter was present or absent, as well as whether a warning was given regarding the illusory correlation between scatter and a learning disability. Given the results of this study, it can be assumed that participants, once warned, used information other than scatter level to make their diagnostic decisions. This information could have been either the achievement data from the WIAT or the behavioral data from the BASC. However, the student's behavior was purposefully rated as average overall in the case study. Therefore, it can be assumed that participants, once warned, used information from the achievement data to make their diagnostic decisions.

Results lead to the rejection of the null hypothesis of no differences in probability ratings across the two warning conditions (warning/no warning). Analysis of the data revealed a significant warning by scatter interaction. This interaction revealed that the effect of scatter level on participants' diagnostic decisions was somehow effected by level of warning condition. Therefore, simple effects tests were performed to explore the direction of this effect. Simple effects tests indicated a significant effect for scatter on participant probability ratings when no warning was given. This shows that, when not warned, participants were more likely to diagnose students as learning disabled if there was a high level of scatter on the WISC-III than when there was a low level of scatter. This result follows previous research (i.e., Gnys, 1992) supporting the presence of an

illusory belief among school psychologists that a high level of intersubtest scatter on the WISC-III is a valid indicator of a learning disability. The result of this investigation suggests that the warning given on the illusory correlation affected the process participants used to make their diagnoses. This result further supports the assumption that, when a warning was given, participants utilized the achievement data to make their diagnostic decisions.

No significant simple effects were found for scatter when a warning was given. In other words, participants who were given a warning on the misconceptions surrounding scatter level on the WISC-III were equally likely to diagnose students as learning disabled, regardless of the student's scatter level. This information did not support current research (Hubbard, 1984; Wegner et al., 1985) which states that forewarning subjects that, contrary to what many school psychologists believe, there is no significant evidence of a correlation between intersubtest scatter on the WISC-III and the presence of a learning disability would not significantly reduce perseverance of belief based on this illusory correlation. Major differences in participant diagnoses were observed between those who were warned about the illusory correlation and those who were not warned. Therefore, forewarning school psychologists about this illusory correlation may have affected participant diagnostic decisions in the current investigation.

There are several limitations to the present study. First, the sample only included school psychologists from New York State. This sample limits the external validity and generalization of the results. However, the sample of school psychologists was confined

to those living in New York in order to rule out the construct created by different qualifications for a learning disability diagnosis between states.

Another limitation is lack of control. For example, one participant may fill out the questionnaire at home with a television playing in the background, while another may complete the survey in the quiet of his or her school office. This may have an effect on the participants' clinical judgments, and would therefore effect the outcome of this investigation.

A possible limitation to the present study is that, unlike the Gnys (1992) study, the achievement measure in the case study was not the Woodcock-Johnson Tests of Achievement-Revised (WJ-R). Rather, the WIAT was utilized in order to increase the generalization of the Gnys (1992) study's results. However, a number of participants indicated that they had not used the WIAT in the past year. This would, theoretically, affect the validity of the present investigation's results. However, the results regarding the effects of achievement level on participant diagnostic decision were statistically significant, indicating that it is unlikely that recent experience with the WIAT had a significant effect on participant diagnostic decision-making. Furthermore, information was provided in the surveys describing the achievement test and what the scores mean.

A final limitation to this study is the possibility of a nonresponse bias. If the participants who failed to return the questionnaire differ in significant ways from those who did return it, the survey may have yielded answers that do not represent the opinions and clinical judgments of the intended population, in this case professional school psychologists. Several strategies were utilized in the present study to increase return rate and therefore decrease the effects of a nonresponse bias. First, a cover letter was used to

introduce the participants to the survey and explain its purpose. In addition, the survey could be completed in a short amount of time. Self-addressed envelopes were included in the packets for the participants' convenience.

The results of the present study showed the importance and impact of school psychologists' beliefs on their clinical decisions on learning disability diagnoses. These illusory beliefs may have a significant impact on diagnostic decisions among school psychologists, and thus warrants investigation. Correct decision-making strategies and correct assumptions about relations among variables are essential for identifying children and youth with disabilities. Decision strategies poor in quality and their resulting errors will adversely effect the delivery of appropriate educational services to children and youth with disabilities and their families.

The present investigation should be duplicated in a larger sample size, perhaps by sending the survey nationwide or conducting face-to-face interviews. Further analyses should include more information regarding the student to make the case study appear more realistic. This could include teacher reports, a student interview, the student's report card, health record, and previous psychological testing results.

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Table 1

Sample Characteristics

Characteristics	<u>n</u>	%
<u>Educational Level</u>		
Master's	24	10.4
Master's + 30	124	53.9
Doctoral	63	27.4
Other	17	7.4
<u>Number of Assessments Conducted Per Month</u>		
1-5	45	19.7
6-10	127	55.5
11-15	49	21.4
16 +	8	3.5
<u>Gender</u>		
Male	56	24.7
Female	171	75.3

Table 2

Mean Confidence Ratings That Student is Learning Disabled

Achievement Level	Scatter Condition	
	Low	High
	Warning	
<u>Low</u>		
<u>M</u>	70.71	67.50
<u>SD</u>	20.53	18.58
<u>n</u>	28	28
<u>Average</u>		
<u>M</u>	14.58	26.29
<u>SD</u>	15.59	18.96
<u>n</u>	24	35
	No Warning	
<u>Low</u>		
<u>M</u>	57.50	79.23
<u>SD</u>	29.40	14.68
<u>n</u>	32	26
<u>Average</u>		
<u>M</u>	15.38	31.85
<u>SD</u>	13.34	24.50
<u>n</u>	26	27

Note. The values represent mean confidence percentages in participant diagnoses of learning disabilities, ranging from 0% (not learning disabled) to 100% (learning disabled).

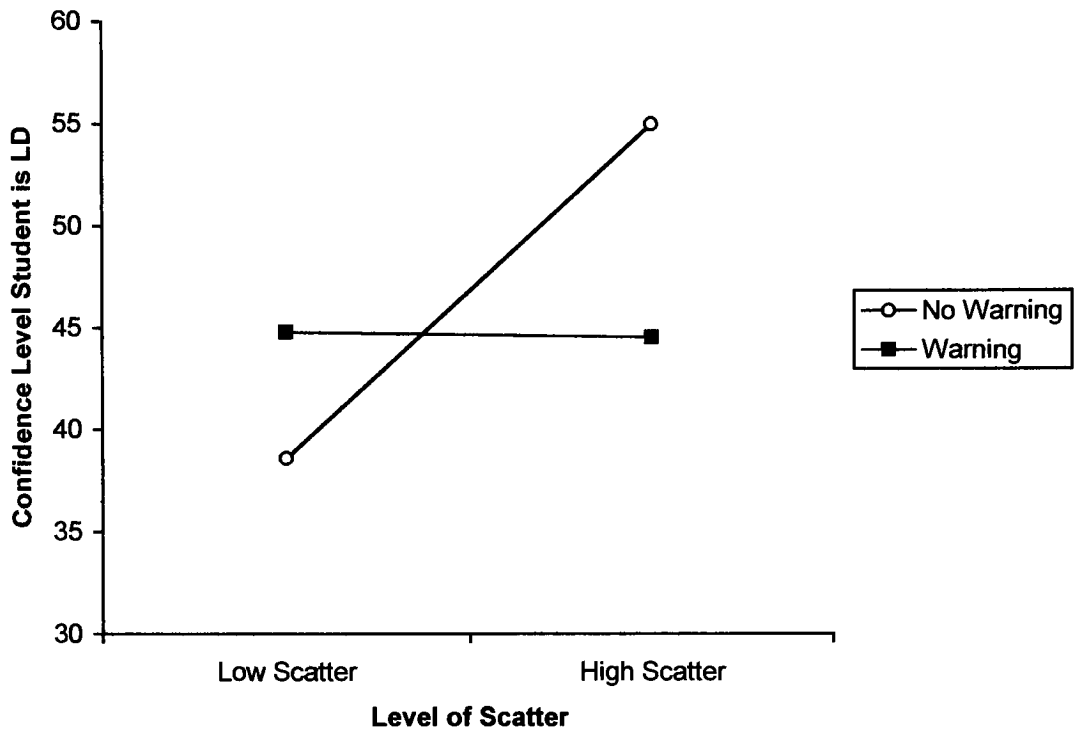
Table 3

ANCOVA Table for Confidence in Diagnostic Decision, with Years of Experience as Covariate Variable

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Warning	84.12	1	84.12	0.20	>.05
Scatter	7615.82	1	7615.82	18.22	< .0001
Achievement	121714.14	1	121714.14	291.19	< .0001
Years Experience	58.52	1	58.52	0.14	>.05
Warning	3118.01	1	3118.01	7.46	<.01
X Scatter					
Warning	214.09	1	214.09	0.51	> .05
X Achievement					
Scatter	329.36	1	329.36	0.79	> .05
X Achievement					
Error	90703.34	217	417.99		

## Figure Caption

Figure 1. Mean level of confidence in learning disability diagnosis as a function of scatter and warning conditions.



## Appendix

Dear Fellow School Psychologist:

School psychologists are constantly faced with tasks requiring diagnostic decisions. For example, when a child is referred for a psychological evaluation, a variety of decision points are encountered that include the selection of assessment devices, interpretation of results, classification and placement determinations, implementation of intervention strategies, and evaluation of those strategies. Little research has been conducted to explore the clinical judgements underlying those decisions. However, clinical judgments are important at each of these decision points.

You are one of a small number of school psychologists who are being asked to give their perspective on these matters. The sample was randomly selected from the New York Association of School Psychologists Membership List. In order that the results will truly represent the thinking of school psychologists across New York State, it is important that each questionnaire be completed and returned.

You may be assured of complete confidentiality and anonymity. Do not identify yourself on any part of the enclosed questionnaire. The results of this research will be made available to officials in the field of school psychology and all interested citizens. You may receive a summary of the results by writing "copy of results requested" on the back of the return envelope, and printing your name and address below it (these will be separated from the questionnaire). Again, please do not put this information on the questionnaire itself.

When you have completed the questionnaire, please return it to me in the enclosed Business Reply Envelope. I would be happy to answer any questions that you may have. Please write to the above address, call (716-334-8991), or send e-mail (mar7666@rit.edu). Thank you for your assistance.

Sincerely,

Marc A. Renzoni  
School Psychology Intern  
Rochester Institute of Technology



Chris, an 11-year-old child in the fifth grade, was referred for a psychological evaluation due to academic concerns from the child's teacher. Please examine the results of the following psychological tests and determine whether Chris is learning disabled. Then, please answer all subsequent questions.

The following are brief descriptions of the assessment tools used in the psychological evaluation of Chris. Even though you may be familiar with the following tools, please read their descriptions to ensure uniformity.

1. READ THIS FIRST → The Wechsler Intelligence Scale for Children - Third Edition (WISC-III) is a comprehensive, individually administered test for assessing the intelligence of children. The WISC-III contains twelve subtests. Six of the tests form the Verbal Scale (Information, Similarities, Arithmetic, Vocabulary, Comprehension, and Digit Span) and the other six form the Performance Scale (Picture Completion, Picture Arrangement, Block Design, Object Assembly, Coding, and Mazes). The resulting scaled scores have a mean of 100 and a standard deviation of 15.

2. READ THIS NEXT → The Wechsler Intellectual Achievement Test (WIAT) is a comprehensive individually administered battery for assessing the achievement of children. The WIAT contains eight subtests that are used to assess a wide variety of skills including mathematics, reading, language, and writing. The resulting scaled scores have a mean of 100 and a standard deviation of 15.

3. READ THIS THIRD → The Behavior Assessment System for Children – Teacher Rating Scale (BASC-TRS) is a comprehensive measure of both adaptive and problem behaviors in the school setting. The BASC-T assesses clinical problems in the broad domains of Externalizing Problems, Internalizing Problems, and School Problems. The resulting T scores have a mean of 50 and a standard deviation of 10.

“I have read the three preceding paragraphs.”

PLEASE CHECK HERE: \_\_\_\_\_

Research by renowned psychologist Alan S. Kaufman (1979) has found that there is little systematic relationship between intersubtest scatter on the Wechsler Intelligence Scale for Children - Revised (WISC-R) and learning disabilities.

Kaufman, A.S. (1979). Intelligent testing with the WISC-R. New York: Wiley-Interscience.

Testing Results for Chris**Wechsler Intelligence Scale for Children – Third Edition (WISC-III)**M = 100, SD = 15

Verbal Scale	Scaled Score	Performance Scale	Scaled Score
Information	9	Picture Completion	7
Similarities	8	Coding	11
Arithmetic	7	Picture Arrangement	8
Vocabulary	7	Block Design	18
Comprehension	16	Object Assembly	9
Scale	IQ	Percentile	95% C.I.
Verbal	97	42	91-103
Performance	104	61	96-112
Full Scale	100	50	94-106

**Wechsler Individual Achievement Test (WIAT)**M = 100, SD = 15

Composites	Standard Score	95% C. I.	%ile Rank
Reading	68	61 - 75	2
Mathematics	69	62 - 76	2
Language	93	85 - 101	32
Writing	88	79 - 97	21
Total	76	72 - 80	5

**Behavior Assessment System for Children – Teacher Rating Scale**

Mean = 50, SD = 10

SCALE	T-SCORE	90% C.I.	%ILE	RANGE
EXTERNALIZING PROBLEMS	44	40-48	31	Average
Hyperactivity	46	42-50	45	Average
Aggression	43	39-47	27	Average
Conduct Problems	43	35-51	17	Average
INTERNALIZING PROBLEMS	47	42-52	46	Average
Anxiety	48	40-56	56	Average
Depression	48	42-54	55	Average
Somatization	46	38-54	48	Average
SCHOOL PROBLEMS	55	51-59	72	Average
Attention Problems	51	47-55	60	Average
Learning Problems	59	54-64	81	Average
ADAPTIVE SKILLS	45	42-48	34	Average
Adaptability	51	44-58	51	Average
Social Skills	42	37-47	24	Average
Leadership	46	41-51	37	Average
Study Skills	51	47-55	51	Average
ADDITIONAL SCALES				
Atypicality	53	46-60	77	Average
Withdrawal	51	43-59	65	Average
BEHAVIORAL SYMPTOMS INDEX	53	50-56	69	Average

- Q-1 We realize that more information is required normally for a learning disability diagnosis. However, based upon the materials provided, please classify the child represented by these materials as either learning disabled or non-learning disabled: (check one only)

LEARNING DISABLED

NON-LEARNING DISABLED

- Q-2 Please indicate your confidence in the rating you just gave on a scale where 50% means 50% confident and 100% means 100% confident: (circle one percentage)

50%                  60%                  70%                  80%                  90%                  100%

- Q-3 Please indicate how many psychological assessments you perform per year using the Wechsler Intelligence Scale for Children - Third Edition (WISC-III):

Write estimated number per year: \_\_\_\_\_

- Q-4 Please indicate how many psychological assessments you perform per year using the Wechsler Individual Achievement Test (WIAT):

Write estimated number per year: \_\_\_\_\_

- Q-5 What is your gender?     MALE                   FEMALE

- Q-6 What is your age?: \_\_\_\_\_ YEARS

- Q-7 What is your level of education?     MASTERS     MASTERS + 30

DOCTORATE                   OTHER (please specify): \_\_\_\_\_

- Q-8 When did you earn your highest degree? (Enter year of latest degree): 19\_\_\_\_

- Q-9 On the average, how many psychological assessments do you conduct per month?

(Enter average number per month): \_\_\_\_\_

- Q-10 How many years have you worked as a school psychologist?

(Enter total number of years): \_\_\_\_\_ YEARS

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*Your contribution to this effort is greatly appreciated. If you would like a summary of the results, please print your name and address on the back of the return envelope (NOT on this questionnaire). We will see that you receive it.*