THE VISION SCREENING of ACADEMICALLY & BEHAVIORALLY AT-RISK PUPILS

ROGER A. JOHNSON, PH.D.
DERICK NOTTINGHAM, M.S.
RANDI STRATTON, M.S.
JOEL N. ZABA, O.D.

Abstract

The New York State Optometric Association Vision Screening Battery (NYSOA) was administered to 81 at-risk elementary, middle school, and high school students in order to rule out vision difficulties as contributing to academic difficulties. Thirty-e were classified as both academically and behaviorally at risk. Ninety- seven percent of the students with behavioral problems failed at least one of the NYSOA subtests. A chi-square statistical analysis revealed that students who were academically and behaviorally at risk scored significantly lower on the tracking, stereopsis, hyperopia, and color vision subtests. The results of this screening were also compared to several measures of academic achievement and subjective visual and academic assessment questionnaires.

Key Words

vision screening, at-risk students, problem behavior

Vast numbers of American school pupils are academically "at-risk." Hundreds of publications in diverse academic fields have been written about students with unsatisfactory academic achievement. According to Donmoyer and Kos,[1] 700,000 students drop out of high school each year. Dropout rates for minority youth are twice that of white students. The vast majority of academically at-risk students are from low socio-economic backgrounds and often display characteristics such as poor school attendance and anti-social behavior. Many at-risk students come from dysfunctional families characterized by substance abuse, psychotic disorder, and family violence.[2]

Several types of school programs (supplemental, whole-school restructuring, therapy, intervention team approaches, and community/home/school partnership programs) have addressed the needs of at-risk students. Supplemental programs include pull out programs such as Chapter One reading programs and all-day kindergartens. Non-graded schools and site-based management are examples of whole-school restructuring programs. Therapy programs include effective education programs that attempt to apply humanistic psychology to educational practices. Intervention teams comprised of teachers, administrators, guidance counselors, and school psychologists have focused on potential dropouts. Lastly, community/home/school partnerships enhance the self esteem and cultural identity of at-risk students.[1] Despite the implementation of these programs, the Education Commission of the States estimates that 30% of our nation's youth fail to acquire a sufficient education to obtain adequate employment.[3]

None of these educational programs can be effective if pupils lack adequate vision. Although the school nurse tests most youngsters using a Snellen screening, few schools utilize a comprehensive vision screening program. Important visual skills such as tracking that are necessary for learning may not be measured. Undetected visual problems may lead to academic difficulties.

In spite of the importance of vision to the learning process, limited studies have screened special populations. Suchoff and Mozlin[4] noted significant visual problems among a population of inner city adolescents. Johnson and Zaba[5,6] found significant visual difficulties among illiterate adults and among at-risk college students. There is a need, however, to screen additional special populations, particularly inner city elementary, middle, and high school students who have been assigned to special alternative school settings for behavioral reasons.

This study has three purposes. The first purpose was to screen pupils who had been designated as academically at-risk, aged 8 to 18, in order to rule out vision difficulties as contributing to academic difficulties. The second purpose was to examine the prevalence of visual difficulties among pupils with both academic and behavioral problems. Students who attended three alternative public school programs designed for students who were both academically and behaviorally at risk were compared with their counterparts who were only academically at risk, in order to determine whether behavioral

status related to vision. A third purpose was to determine whether there was a significant relationship between passing the "Literacy Passport Exam" (a statewide exam that must be passed before being admitted to a regular high school program) and success on the NYSOA subtests.

METHODS

Subjects

Thirty-three of 81 at-risk students who were selected for visual screening attended alternative school settings due to their behavioral problems, while 48 of the 81 attended traditional schools. One of the alternative school settings was on the elementary level, one on the middle school level, and one at the secondary level. Students who attended the alternative elementary or middle schools had been assigned to these schools because of behavioral and/or social problems. Students chose to attend the secondary vocational school or had been assigned there because of behavior problems. The 81 students ranged in age from 8 to 18 with a median age of 14; 41 were males and 40 were females; 62 were African-American, while 19 were Caucasian. One of five individuals in this city is on public assistance with 60% of the city's students qualifying for free or reduced lunch. The median family income is less than $27,000 and seven in 10 students come from minority families. Approximately a million-and-one-half people live in this metropolitan area.

Screening Procedures

One of the researchers, assisted by local volunteers screened the students, using the New York State Optometric Association Vision Screening Battery (NYSOA).[7] The NYSOA (1983) includes the following nine tests:

1. Tracking: The ability to move the eyes across a sheet of paper
2. Fusion: The ability to use both eyes together at the same time
3. Acuity-Distance: Visual acuity at 20 feet (far)
4. Stereopsis: Binocular depth perception
5. Acuity-Near: Near visual acuity for reading distance
6. Convergence: The ability of the eyes to work together as a team
7. Hyperopia: A refractive condition that makes it difficult to focus, especially at near viewing distances
8. Color Vision: The ability to differentiate colors
9. Visual Motor Integration: The ability to transform images from a vertical to horizontal plane

The Fusion subtest was not included in the data analysis. A student data sheet containing various demographic data and test scores was completed on each student. In addition, each student completed a student appraisal form that contained attitudinal questions concerning the student's school and reading, and questions concerning whether he or she had seen an eye doctor or had ever worn glasses. Lastly, teachers completed a teacher appraisal form and a checklist of visual problems (see Appendices 1 and 2). The teacher appraisal form asked teachers to agree or disagree with a series of statements concerning student achievement in relation to peer ability, individual ability, referrals to the school nurse, etc. A modified checklist of possible visual problems was utilized for teacher observations.

Results

Table 1 depicts the number and percentages of subjects that failed NYSOA subtests. Eighty-five percent of the subjects failed one or more of the visual tests, with more subjects failing the Tracking subtest (37%) than any other subtest. As can be seen from Table 1, a significant number of subjects failed Visual Acuity-Far, Visual Acuity-Near, Stereopsis, and Visual Motor Integration.

Table 2 portrays the failure rate on the NYSOA subtests of 33 academically and behaviorally at- risk students who attended alternative schools compared with students who were academically but not behaviorally at risk and attended traditional schools. Fifty-two percent of the alternative students failed the Tracking subtests, while only 27% of the traditional students failed Tracking. In addition, more alternative students than traditional students failed Visual Acuity-Far, Stereopsis, Visual Acuity-Near, Hyperopia, Color Vision and Visual Motor Integration. Furthermore, 97% of the alternative students failed at least one subtest.

A chi-square analysis determined the statistical significance of failure rates of students who attended alternative schools vs. traditional schools on the NYSOA subtests. This analysis indicated the greater failure rate of the alternative students was at the .01 level of significance for the Stereopsis subtest and at the .05 level for the Tracking, Hyperopia, and Color Vision subtests. The greater number of alternative students failing one or more subtests was at the .05 level of significance. Furthermore, a chi-square statistical analysis determined that the failure rates on the Reading portion of the "Literacy Passport Exam" for students who attended alternative schools were significantly higher (.05) than for their counterparts who attended traditional schools.

On the other hand, no significant relationship was found between failing one or more of the NYSOA subtests and the Writing (essay) and Math sections of the "Literacy Passport Exam" nor failing the NYSOA subtests and current language and math grades. In addition, no significant relationship was found between failing one or more of the NYSOA subtests and dropping out of school nor being absent from school. No significant relat' ship was found between failing one .. more of the NYSOA subtests and items on

Table 1
Number and Percent of Subjects Failing NYSOA Subtests
N=81

Subtests	Number	Percenta
Tracking	30	37
Visual Acuity-Far	28	35
Stereopsis	23	28
Visual Acuity-Near	25	31
Convergence	0	0
Hyperopia	3	4
Color Vision	3	4
Visual Motor Integration	23	29
Failed at least one subtest	69	85

Table 2
The Percentage of Failure at At-Risk Alternativly vs. Traditionally School-based Students on the NYSOA
Alternative N = 33
Traditional N = 48

Subtest	Alternative	Traditional
Tracking	52[b]	27
Visual Acuity-Far	42	29
Stereopsis	51[a]	13
Visual Acuity-Near	33	29
Convergence	0	0
Hyperopia	9[b]	0
Color Vision	9[b]	0
Visual Motor Integration	39	21
Failed at least one subtest	97[b]	77

[a] indicates $p < .01$ and [b] indicates $p < .05$

a modified teacher checklist. (See Appendix 1 for the Teacher's Checklist of Observable Clues to Classroom Vision Problems.) No significant relationship was found between failing one or more of the NYSOA subtests and items on the Teacher Appraisal Form (see Appendix 2) concerning the teacher's estimate of the student's achievement and attitude toward reading. No significant relationship was found between failing one or more of the NYSOA subtests and a student self-appraisal form (see Appendix 3) that asked students to measure their own achievement compared with their classmates.

Discussion

The most significant finding of this research was the 85% failure rate on one or more tests among these at-risk students. Moreover, they experienced significant failures on the Tracking (37%), Visual Acuity-Far (35%), Stereopsis (28%), Visual Acuity-Near (31%), and on the Visual Motor Integration (29%) subtests. Tracking, Visual Acuity-Near, and Visual Motor Integration are very important tests because they detect visual problems at the reading distance of 13 to 16 inches, a distance at which most school learning experiences occur.

Tracking is particularly important in learning to read. Since reading incorporates language acquisitions, the visual verbal process, and tracking, if one lacks the ability to efficiently move one's eyes across a page of print, this is likely to interfere with one's reading development. Thus, passing the reading scale of the "Literacy Passport Exam" is likely to be difficult. Therefore, the finding of a significant relationship between failing the reading scale of the "Literacy Passport Exam" and Tracking and measures of nearpoint vision such as Visual Acuity-Near (31%), Visual Motor Integration (29%), and Stereopsis (29%) lends credence to Johnson and Zaba's[5,6] earlier studies. These found a significant relationship between failure on various NYSOA subtests and academic failure among illiterate adults and college freshmen.

Many at-risk students may not be aware that they have a visual problem. Instead, they may simply believe that they have a reading or learning problem. This self-perceived learning problem along with undetected visual problems is likely to frustrate many of these students. In spite of work-

Appendix 1
Teacher's Checklist
OBSERVABLE CLUES TO CLASSROOM VISION PROBLEMS

Student _____ Subject/Grade Level _____
Teacher _____ Date _____
Please indicate which behaviors exhibited by this student you have observed.

1. _____ Loses place often during reading.
2. _____ Needs finger or marker to keep place.
3. _____ Turns head when reading across page.
4. _____ Omits "small" words.
5. _____ Rereads or skips lines.
6. _____ Displays short attention span while reading or copying.
7. _____ Reverses letters and/or words in writing and copying.
8. _____ Tilts head excessively while working at desk.
9. _____ Writes with very irregular letter size and spacing.
10. _____ Misaligns both horizontal and vertical series of numbers.
11. _____ Complains of seeing double.
12. _____ Rubs eyes after short periods of visual activity.
13. _____ Blinks excessively at desk tasks and/or reading, but not elsewhere.
14. _____ Appears clumsy, uncoordinated.
15. _____ Displays overactive behavior in class.
16. _____ Displays lethargic behavior in class.

Appendix 2
Phi Delta Kappa
Teacher Appraisal Form

Student's Name _____
Teacher's Name _____
School _____

Thank you for participating in this study of the impact of poor visual performance on scholastic performance. We need your professional opinion about your student's progress to complete our initial evaluation. While we realize that many of your judgments must necessarily be subjective, we appreciate your thoughtful response. Please take a moment to complete this questionnaire. Questionnaires should be inserted in the Student Portfolios to be picked up from your school's office on June 3, 1994.

Please indicate your degree of agreement with each statement by circling the correct letter.

	Strongly Disagree		Neutral		Strongly Agree
1. This student achieves at a level commensurate with his or her ability	1	2	3	4	5
2. This student achieves at a level commensurate with most of my other students	1	2	3	4	5
3. This student's achievement has improved during the course of this study	1	2	3	4	5
4. This student's behavior is commensurate with that of my other students	1	2	3	4	5
5. This student's behavior has improved during the course of this study	1	2	3	4	5
6. This student's self esteem is commensurate with that of my other students	1	2	3	4	5
7. This student's self esteem has improved during the course of this study	1	2	3	4	5
8. This student's referrals to the nurse are commensurate with those of my other students	1	2	3	4	5

Appendix 3
Phi Delta Kappa
Student Appraisal Form

Student's Name_____Age___Grade___

Please answer the following questions.

1. Compared to other students in your class, are you a good student?
2. Compared to other students in your class, are you a good reader?
3. What are you best at in school?
4. What do you like best about school?
5. How much do you like school?
6. Has an eye doctor ever examined your eyes? Yes No
   If so, when?
7. Do you wear glasses or contact lenses now? Yes No
8. Have you ever worn glasses or contact lenses before?
   Yes No
   If so, why did you stop wearing them: Lost Broken Don't need
   Other

ing hard at their studies, these children may be unable to keep up with their classmates. Unless students with these undetected visual problems are properly diagnosed and treated, they may become behavioral problems. Provisions for alternative schools may need to be made. Thus, the 97% failure rate of the academically and behaviorally at-risk population in the present study is understandable.

In an at-risk population a general or modified academic and behavioral appraisal of a student's performance is usually not sufficient. Even though teacher observations of student behavior are very important, these observations alone will not always detect visual difficulties. Therefore, with at-risk populations it is essential that classroom teachers work closely with visual care professionals, community volunteers, and organizations in order that each pupil receive a comprehensive vision screening and appropriate follow-up care.

Acknowledgments

The authors are most appreciative of the contributions of Dr. Katherine Devine and Phi Delta Kappa for funding this research.

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Corresponding author:
Roger A. Johnson, Ph.D.
Old Dominion University
Darden College of Education
Norfolk, VA 23529-0161

Date accepted for publication:
July 26, 1995

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hear a weak, watered-down version of the behavioral vision story.

If your communications regarding behavioral care are weak, too detailed, convoluted or technical, few people will understand that the need for VT is urgent.

If you communicate that the decision to start VT is in any way contingent upon insurance company approval, the parent is left with the clear understanding that therapy is NOT urgent.

If you are overly cautious about stating the probable outcome of therapy, the parent or patient is likely to decide that it is an optional (and expensive) procedure that can be postponed without serious consequences.

I urge you to speak boldly the need for and benefits of behavioral care. Build what you say on a solid foundation of science, but remember that you are speaking people who haven't a clue what the simp.. term "accommodation" means. You are speaking to people who daily hear and see powerfully delivered messages that a face cream will transform their lives—yes, empty promises—but delivered powerfully.

By comparison to the TV ad, how does your recommendation sound?

I commonly hear complaints that parents aren't willing to spend money. Yet, orthodontists are filling their books with children whose treatment is not covered by insurance. Perhaps the opinion that parents won't spend money on their children is self-fulfilling prophecy?

I implore you to develop your ability to effectively demonstrate common visual conditions using fingers, simple lenses, filters, prisms or Brock Strings.

Speak about observable signs of vision problems, give parents an opportunity to recognize for themselves that you are perfectly describing their child!

Develop ways of speaking that teach parents how to screen a child for learni. related vision problems. Give that talk as often as possible, and make sure that each person who recognizes that his or her child has a problem is asked, "Let me take your name and number. I'll have someone call you tomorrow to set up an evaluation."

Perhaps it is time to take a stand and let your potential VT patients and parents know that the price of not doing VT will be paid by the child for a lifetime.

In a world of fierce global competition for jobs and resources, every child you can reach must be provided every possible advantage.

Gather your courage and speak out.

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Guest editor:
Thomas D. Lecoq
4701 Carmonita Lane
Yorba Linda, CA 92686