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CHARACTERISTICS OF SUCCESSFUL MAINSTREAMED HEARING-IMPAIRED STUDENTS: A REVIEW OF SELECTED RESEARCH

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For almost sixteen years the National Technical Institute for the Deaf (NTID) has cross-registered many of its students into the courses and programs of the other colleges of the Rochester Institute of Technology (RIT), a practice more commonly known elsewhere as mainstreaming. Since NTID was established in the late 1960's, the number of hearing-impaired students who receive all or part of their education among the normally-hearing has increased dramatically (Quigley & Kretschmer, 1982). This increase is the result both of the impetus toward regular class placement given by Public Law 94-142 and of the growing interest in providing more options in post-secondary schooling to able hearing-impaired persons.

It is important to identify the factors that foster effective education in mainstreamed settings as we seek to improve programs and expand opportunities for hearing-impaired students at all levels. Over the years much has been learned through practical experience about these students and the services provided for them. Many newly established programs have benefited from the expertise which has been developed at NTID, such as interpreting and the tutor-notetaker program. Research results, also, can point out important factors to consider in the effort toward improving the education of hearing-impaired students in the regular classroom.

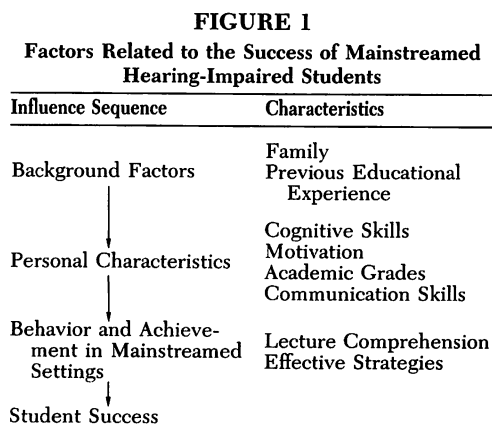
The article which follows presents, in a topical manner, research findings that identify characteristics of students who have been successful in mainstreamed programs. Most of the work reviewed here has been carried out at NTID. The research conducted outside NTID that is discussed has generally dealt with post-secondary, hearing-impaired students and is therefore comparable to that done at NTID.

This is termed a selective review because only those studies which describe the characteristics of successful mainstreamed, hearing-impaired students have been included. Furthermore, especially with respect to the NTID

research, the review focuses on the most recent work and is as much of a progress report as it is a review. Although we have learned much about successful mainstreamed students, the gaps in our knowledge will become readily apparent to the reader.

We define successful mainstreaming in terms of its most obvious criteria – academic achievement and attainment of a college degree. We are well aware of the important personal and social dimensions associated with student role which will affect mainstreaming success. Yet, little work has been done which addresses these dimensions for hearing-impaired students. The intellectual, social, affective, and linguistic factors which influence effective mainstreaming are all closely bound to one another, even though they may be dealt with individually. We realize that considering any one in isolation is artificial, but necessary.

We have developed a general, educational model to organize the factors that influence the success of mainstreamed students. This model is shown in Figure 1.



A child's background and his or her school experiences influence the academic, personal, and social characteristics the student brings to post-secondary education. These experiences, in turn, influence the student's behavior in the

CHARACTERISTICS OF SUCCESSFUL MAINSTREAMED HEARING-IMPAIRED STUDENTS: A REVIEW OF SELECTED RESEARCH

mainstreamed setting. In that setting, certain academic and social behaviors may be more effective than others. The final dimension is the outcome, defined here as the extent to which a student is academically successful and graduates. This paper is organized in terms of these dimensions.

BACKGROUND

Background factors can relate to success in the mainstreamed setting as mediated by the personality and academic skills of the student.

Family Background

The influence of family background on student success has usually been explained in terms of socio-economic status. In their study of NTID graduates, Welsh and Schroedel (1982) found that Father's SES, as measured by the Duncan Socioeconomic Index (SEI), was one of the best predictors of a student's degree level attainment. These results are similar to those found for normally-hearing populations.

Research conducted outside of NTID has drawn attention to the possible educational benefits to hearing-impaired children of having hearing-impaired parents. In a current summary of work done in this area, Quigley and Kretschmer (1982) point out that the benefits may be affective and social as well as academic. Such children may have the advantage of early language development and a more positive parental attitude toward their deafness than do hearing-impaired children of hearing parents.

Research on NTID students has shown this advantage to hearing-impaired children of hearing-impaired parents only as an association with reading and writing test scores (Saur, Hurley & Popp, 1983). A comparison study conducted at NTID using a sample of data on elementary and secondary students (Saur & Long, 1981) did show a positive relationship as well.

Previous Educational Experience

A positive relationship between previous experience with educational mainstreaming at the high school level and level of degree earned at RIT has been shown in at least two studies (Welsh

& Shroedel, 1982; Saur, Coggiola & Long, 1982). There is some evidence from these and other studies that high school mainstreaming is positively related to skills such as reading, writing and mathematics (Saur, Hurley & Popp, 1983; Allen & Osborn, 1984). Whether in addition to these skills there are other, social advantages to high school mainstreaming has not been documented. This is an area which future research should explore.

PERSONAL CHARACTERISTICS

The academic skills a student brings to the classroom will affect his or her performance there. In addition, certain personality characteristics are related to academic success. This is no less true for mainstreamed, hearing-impaired students than for those who are normally hearing. In this section, we consider four sets of characteristics that relate to academic success. Three of these characteristics are those which are traditionally related to academic achievement among hearing-impaired students. These are cognitive skills, motivation, and measures of speech and hearing. The fourth measure, previous course grades, is really a reflection of these skills. By personal characteristics, we mean those aspects of individual behavior which are, to a large extent, predictable and enduring. What we are considering here are characteristics the student brings with him to the mainstream setting.

Cognitive Skills

Cognitive skills include aptitude, I.Q., and achievement test performance. In a study of the predictors of academic achievement at NTID, Long and Coggiola (1980), using discriminant analysis, found that students could be classified by program area (40% accuracy) and by academic level (80% accuracy) on the basis of their scores on a group of five standardized tests. These tests assess reading comprehension, writing, mathematics, spatial ability and abstract reasoning.¹

The aforementioned tests accounted for as much as 25% of the variance in Cumulative Grade Point Average (CGPA), for the students

¹Specifically, the tests included were the Reading Comprehension subtest of the California Achievement Test (CAT), the NTID writing test, the Mathematics subtest of the Comparative Guidance and Placement Program (CGPP), Spatial Relations (And the Abstract Reasoning Subtests) of the Differential Aptitude Test (DAT).

CHARACTERISTICS OF SUCCESSFUL MAINSTREAMED HEARING-IMPAIRED STUDENTS: A REVIEW OF SELECTED RESEARCH

in the study. Two other studies (Welsh & Schroedel, 1982; Saur, Hurley & Popp, 1983) corroborate these findings. These studies indicate that reading and writing test scores are predictive of CGPA for both mainstreamed and non-mainstreamed NTID students.

These findings indicate that NTID's hearing-impaired students in cross-registered programs show characteristics which vary according to the type of program in which the student is enrolled. From our own experience, however, we know that ability or skill level does not account entirely for student success. The internal pressure to succeed, more commonly referred to as motivation, is another factor to consider.

Motivation

Motivation is generally regarded as an important contributor to success of students (Walberg and Uguogwu, 1979). Dimensions of the construct which are important to consider in this context are, exertion or effort, willingness to take the initiative, valuing education, and persistence in the mainstream setting. All of these may be linked to a student's feelings of personal effectiveness.

Research conducted by Quigley, Jenne, and Phillips, (1968) suggests that hearing-impaired students who have been successful in mainstreamed college settings recognize that being in control of and responsible for learning outcomes is essential for college success. This realization is probably more true for hearing-impaired than for normally-hearing students. They must exert extra effort to compensate for information missed and must arrange for necessary special services. Quigley's survey of hearing-impaired students attending regular colleges included questions about perceived reasons for success. Among the most frequent responses were (a) being self-confident, (b) taking the initiative in getting special help, and (c) having good study habits. These responses can be interpreted as indicating a sense of personal control. The implications for student persistence and, conversely, for withdrawal from school are strong. If students clearly see the relationship between their own efforts and achievement

they are more likely to exert themselves than if they do not.

Some of the work which has been done at NTID on Locus of Control (Internal vs. External) has relevance to this motivation issue (Dowaliby, Curwin & Quinsland, 1982). NTID students in general tend to be more external than are RIT hearing students (Dowaliby, Burke & McKee, 1983). That is, they tend to attribute responsibility for their success and failure to powerful others. However, there are indications that the more successful hearing-impaired students have a greater sense of control than do the less successful. In addition, Dowaliby and Saur (1984) found that hearing-impaired students in mainstreamed programs tended to have greater internality. That is, they see outcomes as more causally related to ability and effort than do students in non-mainstreamed programs. Bachelor's level hearing-impaired students were similar to normally-hearing students in terms of their locus of control orientation, also. Welsh and Schroedel (1982) found that heavier course loads tended to be associated with high grade point averages. This may be interpreted to indicate that course load reflects motivation, and motivation is associated with a sense of efficacy.

For the mainstreamed student, however, academic success is influenced by more than ability and motivation. Also important is the degree to which a handicapping condition affects achievement. This statement is no less true for hearing-impaired college students than for other groups. Research has shown in general that when all degrees of hearing loss are considered, degree of loss clearly has an impact on students (Goetzinger, 1972). Thus, communication skills in terms of speech and hearing factors must be considered for their impact on student success.

Speech, Hearing, and Communication Skills

As is well known, NTID was established specifically to provide educational opportunity for those individuals whose degree of hearing loss would prevent them from being successful in an ordinary college setting.² Or, in other words,

²Criteria for admission to NTID from May, 1970, includes the following statement: "Hearing impairment that seriously restricts opportunities for success in regular post-secondary programs. There is general agreement that an average hearing level of 60dB(ASA) or 70dB(ISO) or greater, across the 500 to 2,000Hz range constitutes a major educational deafness."

CHARACTERISTICS OF SUCCESSFUL MAINSTREAMED HEARING-IMPAIRED STUDENTS: A REVIEW OF SELECTED RESEARCH

NTID was to mitigate the effect of hearing loss on educational attainment. A look at the research would indicate that, in terms of educational achievement, this effort has been largely successful. No research study reviewed thus far has been able to link degree of hearing loss to academic achievement either in terms of CGPA or in grade earned in a specific course (Welsh & Schroedel, 1982; Saur, Coggiola & Long, 1982; Saur, Hurley & Popp, 1983). Other studies (Sims, Gottermeier & Walter, 1980) indicate that speech intelligibility is also unrelated to academic achievement and degree level. Rather, the studies demonstrate that the communication skills of reading and writing are the ones directly related to student achievement.

The work just cited does *not* imply that having good speech and developing residual hearing is not important for hearing-impaired students. However, the studies do mean that it is possible to create an environment where such students can learn and achieve well regardless of speech capability or hearing loss. The social advantage held by the student with good oral/aural skills and the interaction between the social and the academic have been little explored. Some descriptive, observational work (Saur, Layne & Hurley, 1981) suggests that it is easier, in classroom social situations, for students with good speech and hearing skills to keep up with the group.

Previous Course Grades

As is the case for normally-hearing students, the best predictor of present achievement is past achievement. A study conducted among mainstreamed students (Saur, Hurley & Popp, 1983) looked, in part, for the best predictors of student course grades. Regression analysis of a number of student background, classroom interaction, communication, and achievement variables indicated that Cumulative Grade Point Average (CGPA) was the best predictor of course grade. (CGPA, in turn, was best predicted by a student's reading and writing test scores.) A second variable useful in predicting a student's course grade was a measure of the student's classroom behavior. This variable, known as initiation, accounted for the number of times a student introduced a new topic in a class discussion. As such, it may be considered a behavioral measure of student assertiveness

and self-confidence.

Both of the studies which have been discussed seem to point to the importance of the processes and strategies which students use to be successful in the mainstream situation. These will be discussed in the section which follows.

ACHIEVEMENT AND STRATEGIES FOR MAINSTREAMED STUDENTS

This final portion of the paper is concerned with what students learn, how they conduct themselves, and how they contend with the demands of the regular college classroom. Studies addressing four areas of concern will be discussed here: lecture comprehension, student participation, use of support services, and social interaction.

Lecture Comprehension

Research which has been conducted on lecture comprehension points to the importance of the background which students bring to the learning situation.

Hearing-impaired students are often required to learn from interpreted lectures in mainstreamed classrooms. Even with an interpreter, however, hearing-impaired students in general do not comprehend and remember as much lecture information as their normally-hearing peers (Jacobs, 1977). One assumption of the research conducted is that students who receive more information from interpreted lectures will achieve at high levels in class than do those who receive less. Therefore, under this assumption it would be important to identify the particular communication skills that are related to effective comprehension and retention of lecture information.

A study on lecture comprehension conducted by Stinson & Ng (1983) related students' recall of lecture material to measures of communication skill. Results of the study showed that subjects who had higher reading and writing scores tended to recall more of the material than those who did not. None of the correlations between the other measures of communication skill – speechreading with sound, speechreading without sound, manual communication reception, and simultaneous communication reception was statistically significant. These findings suggest, again, that a key skill for achieving in the regular classroom is reading comprehension. The findings also support the conclusion that many of

CHARACTERISTICS OF SUCCESSFUL MAINSTREAMED HEARING-IMPAIRED STUDENTS: A REVIEW OF SELECTED RESEARCH

the same cognitive or linguistic processes are involved in the comprehension and retention of printed and of interpreted prose material.

Student Participation

The ability to participate in a class session at some level – asking or answering questions, initiating new ideas, or responding to the ideas of others – is an integral part of being a student. Studies have been conducted which emphasize the importance of participation in classroom activities to the cross-registered NTID student. One qualitative, observational study (Saur, Layne & Hurley, 1981) pointed to two important aspects of participation for hearing-impaired students. The first is the obstacles to active involvement – typically the lag in the interpreted message and the natural, rapid flow of class discussion. The second aspect is that of instructor control and responsibility for facilitating the participation of all students, particularly the hearing-impaired.

The study referred to in the previous section on achievement (Saur, Hurley & Poppo, 1983) also showed, quantitatively, the constraints on participation by hearing-impaired students. This study compared the amount of student/teacher interaction on the part of hearing-impaired students with that of a matched group of normally-hearing students. In five of the classes observed, the participation rate of the hearing-impaired student was 0% to 30% of that of the normally-hearing students. In the remaining classes, the instructors signed for themselves and the participation of the hearing-impaired students was equal to or greater than that of the normally hearing.

Two observations emerge from this study. First, the study dispels or casts doubt on the prevalent stereotype of hearing-impaired students as passive and unresponsive in the regular classroom. Their seeming passivity may be attributable to the communication environment of the classroom. A second observation is that direct contact between instructor and student is the most desirable teaching situation. Structured interviews were conducted as a part of the above study with a sample of the students who had been observed. They corroborated the observational findings about the seeming advantages to hearing-impaired students of having instructors sign for themselves. Most students said they felt more a part of the class, closer

to the instructor, and more sure of the information received. It may not be reasonable to expect all regular classroom instructors to sign for themselves because of the skill and commitment needed to do so. However, it would seem the more directly an instructor deals with hearing-impaired students the more responsive students can be.

The Use of Support Services

One may question the benefits of providing support services (tutoring and notetaking, in particular) to hearing-impaired students. On one hand, such services would seem to be necessary for the student to be successful in the regular classroom. On the other hand, the unlimited availability of support might make students dependent and less able to deal with the real world where less support is to be found. Studies by Stinson and his colleagues (Stinson, 1981; Stinson, Saur & Panara, 1982) have dealt with the perceptions of students of the value of tutoring and notetaking and their own uses of the services provided. The results of the study indicate that successful, experienced students understand and appreciate the value of tutoring. Use of a tutor was selective, generally for the classes where students expected a low grade. In addition to using the tutor, students indicated an understanding of their own responsibility. If they used the tutor they also realized they would have to study hard to get a good grade.

The overall interpretation of the results of this study is that experienced mainstreamed students seem to have an understanding of their own needs and limitations. They also have personal standards for the course grades they find acceptable. Therefore, they have acquired the ability to evaluate an instructional situation and to determine whether they will need to use a tutor in order to meet their personal grade standard. The basis for their decisions seems to be an analysis of themselves and the classroom situation in which they find themselves. This study offers some evidence that successful mainstreamed students have a sense of personal control and an accurate self-perception of their needs. These traits allow them to use tutoring and other support selectively and effectively.

Social Interaction

The isolation of hearing-impaired students

CHARACTERISTICS OF SUCCESSFUL MAINSTREAMED HEARING-IMPAIRED STUDENTS: A REVIEW OF SELECTED RESEARCH

from their normally hearing peers and instructors can be a problem in mainstreamed classrooms as has been noted in at least two studies (Saur, Layne & Hurley, 1981; Johnson & Johnson, 1981). Developing good relationships with others is important to hearing-impaired students and may be best facilitated by the instructor (Saur, Layne & Hurley, 1982).

In a study of the social climate of the classroom, Saur, McKee and Neumann (1984) found a distinction between the classroom perceptions of mainstreamed versus non-mainstreamed students. Mainstreamed NTID students at the baccalaureate level tended to view the classroom in a manner more similar to that of their hearing peers than to that of non-mainstreamed hearing-impaired NTID students. Mainstreamed students did have the tendency to say they felt more isolated than did normally-hearing students, however.

Outside of these studies, very little research has been done on social relationships between normally-hearing and hearing-impaired students and how they may affect desirable student outcomes. Other factors which may influence the quality of social interaction are (a) social isolation, (b) lack of understanding about deafness, and (c) problems of fear, hostility, and aversion to the hearing-impaired. These are problems which often arise with the lack of positive action toward integration or positive attitudes toward people with handicaps (Zola, 1982). Work with mainstreamed, handicapped students other than the hearing-impaired has highlighted many of these factors (Guingh, 1980; Handlers & Austin, 1980; Hoben, 1980; Penn & Dudley, 1980).

CONCLUSION

This paper has drawn together and reviewed research conducted primarily at NTID which identifies the characteristics of successful mainstreamed hearing-impaired students. The most significant ideas raised in this review are the following:

1. When hearing-impaired students are provided with appropriate support in the regular classroom, their achievement reflects their ability and background experiences rather than their degree of hearing loss, ability to understand speech, or their ability to speak.
2. A sense of personal control and responsibility for success is important for the motivation of mainstreamed students. The importance of these factors is suggested by the manner in which cross-registered NTID students use support services.
3. Reading and writing skills are the skills most consistently associated with student lecture comprehension, academic achievement, and degree level attained.
4. Although good support services in the classroom are important, it is the responsibility and initiative of the instructor that makes it possible for hearing-impaired students to participate fully in classroom activities and discussion.
5. The academic aspects of effective mainstreaming are easier to achieve than are the social aspects. Little is known about the many aspects of this important variable dimension.

REFERENCES

- Dowaliby, F., Burke, N. & McKee, B. (1981). *Hearing-impaired versus normally-hearing students' learning styles, study habits, and attitudes*. (Paper Series #45) Rochester, NY: Department of Educational Research and Development, National Technical Institute for the Deaf.
- Dowaliby, F., Curwin, R. & Quinsland, L. (1981). *Classroom structure and student participation: An aptitude-by-treatment interaction approach to instructional research for the hearing-impaired*. (Paper Series #47) Rochester, NY: Department of Educational Research and Development, National Technical Institute for the Deaf.
- Dowaliby, F. & Saur, R. (1984). *Locus of control characteristics of mainstreamed students*. Unpublished manuscript. National Technical Institute for the Deaf at the Rochester Institute of Technology.
- Goetzinger, C. P. (1972). Psychology of Hearing-impairment. In J. Katz (ed.), *Handbook of clinical audiology*. Baltimore: Williams & Wilkens.
- Guingh, B. (1980, September). The social integration of the handicapped children. *Phi Delta Kappan*, 62, 1, 27-29.
- Handlers, A. & Austin, K. (1980, November). Improving attitudes of high school students toward their handicapped peers. *Exceptional Children*, 47, 3, 228-229.
- Hoben, Mollie. (1980, October). Toward integration in the mainstream. *Exceptional Children*, 47, 3, 100-105.

Saur and Stinson: Characteristics of Successful mainstreamed Hearing-Impaired Students
**CHARACTERISTICS OF SUCCESSFUL MAINSTREAMED
HEARING-IMPAIRED STUDENTS: A REVIEW OF SELECTED RESEARCH**

REFERENCES, Cont.

- Jacobs, L. (1977). The efficiency of interpreting input for processing lecture information by deaf college students. *Journal of Rehabilitation of the Deaf*, 11, 235-247.
- Johnson, R. & Johnson, D. W. (1981). Building friendships between handicapped and nonhandicapped students: Effects of cooperative and individualistic instruction. *American Educational Research Journal*, 18, 415-424.
- Long, G & Coggiola, D. (1980, April). *Prediction of academic performance and student classification using five cognitive skill measures*. Paper presented at the annual meeting of the American Educational Research Association, Boston, Massachusetts.
- Quigley, S., Jenne, W. and Phillips, S. (1969). *Deaf Students in Colleges and Universities*. Washington, D.C.: A.G. Bell Association.
- Quigley, S. P. & Kretschmer, R. E. (1982). *The Education of Deaf Children*. Baltimore: University Park Press.
- Saur, R. E., Coggiola, D. C., Long, G. L. & Simonson, J. (in press). Educational mainstreaming and the career development of hearing-impaired students. *Volta Review*.
- Saur, R. E. & Long, G. L. (1981). *Mainstreaming Research at NTID*. Paper presented at the annual meeting of the Council for Exceptional Children, New York.
- Saur, R. E., Layne, C. A. & Hurley, E. A. (1981). *Naturalistic research on mainstreaming at the National Technical Institute for the Deaf*. (Paper Series #43) Rochester, NY: Department of Educational Research and Development, National Technical Institute for the Deaf. (ERIC document Reproduction Service No. Ed 209 910).
- Saur, R. E., McKee, B. G. & Neumann, M. D. (1984). A measure of the classroom environment for hearing-impaired learners: The development and pilot of the learning environment scale. *American Annals of the Deaf*, 129 (4), 355-361.
- Saur, R. E., Popp, M. & Hurley, B. (1983, April). *Looking beyond basic communication needs: The achievement and class participation of mainstreamed hearing-impaired students*. Paper presented at the annual meeting of the American Educational Research Association, Montreal, Canada.
- Sims, D., Gottermeir, L. & Walter, G. (1980). Factors contributing to the development of intelligible speech among prelingually deaf persons. *American Annals of the Deaf*, 125, 274-381.
- Stinson, M. (1981, April). *Students' perceptions of the NTID tutoring services*. In C. Hargis (Chair) Supporting mainstreamed students at the National Technical Institute for the Deaf. Symposium presented at the annual convention of the Council for Exceptional Children, New York.
- Stinson, M., Saur, R. & Panara, J. (1982, June). Opinions of deaf college students about tutoring services: An example of the evaluation of a support service. In M. Stinson (Chair), *Support services that facilitate learning in mainstreamed classes by deaf college students*. Symposium presented at the convention of the A. G. Bell Association Convention, Toronto, Canada.
- Stinson, M. & Ng, P. (1983, April). *Relations between communication skills and comprehension of an interpreted lecture by hearing-impaired students*. Paper to be presented at the meeting of the American Educational Research Association, Montreal, Canada.
- Walberg, H. & Uguroglu, M. (1979). Motivation and educational productivity: Theories, results, and implications. In L. J. Fyans (ed.), *Achievement Motivation: Recent trends in theory and research*. New York: Plenum.
- Welsh, W. & Schroedel, J. (1982). *Predictors of success for deaf graduates of the Rochester Institute of Technology* (Paper Series #46) Rochester, NY: Department of Planning and Evaluation Systems, National Technical Institute for the Deaf.