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ABSTRACT

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University of Minnesota

RESEARCH REPORT #9

PRESCHOOL SCREENING REFERRAL RATES IN MINNESOTA SCHOOL DISTRICTS ACROSS TWO YEARS

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EARLY CHILDHOOD ASSESSMENT PROJECT

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Abstract

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Preschool Screening Referral Rates in Minnesota School Districts Across Two Years

Robert A. Bursaw and James E. Ysseldyke

The identification of potentially exceptional children at an early age has become an increasingly important goal in the effort to improve educational opportunities for the handicapped. As a result, state-mandated preschool screening programs have spread across the country. Basically, screening involves brief, and relatively inexpensive assessment of large numbers of children in a number of areas, including physical health, vision, and hearing. It also typically includes evaluation of the child's development of speech and language, social/emotional, motor, and cognitive skills. Underlying this focus on preschool screening is the belief that remediation of handicapping conditions can be enhanced by early identification and subsequent placement in special education programs (Abbott & Crane, 1977). Minnesota was a leader in this area by being the first state, in 1977, to offer a free, comprehensive screening program for all pre-kindergarten age children (Lombard, 1980). At present, some form of preschool screening for children under age five is mandated by 42 states (U.S. Department of Education, 1985; see Gracey, Azzara, & Reinherz, 1984).

The rationale behind wide-spread screening efforts has not been universally accepted, however. Critics describe mass screening as a "menace" (Bergman, 1977), and liken it to the sorting of acceptable from unacceptable oranges (Divoky, 1977). Keogh and Kopp (1978), cautioned against an inordinate emphasis on classification in making

decisions. In addition, concern about over-reliance on technically questionable assessment tools that often are used in the screening process has been noted (Ysseldyke, Thurlow, O'Sullivan, & Bursaw, 1985).

Although most states mandate screening programs for preschool children, most of them only propose rough guidelines for the programs. Actual practices and procedures are not specified by law, and are often left to the discretion of individual school districts (Gracey, Azzara, & Reinherz, 1984). Not surprisingly, screening practices vary widely among the states.

On the other hand, in a survey of 511 Minnesota screening programs, Ysseldyke et al. (1985) concluded that the personnel, tools, procedures, and criteria used in the screening process were actually more similar than different. The similarity among Minnesota school district screening processes also was noted by Lombard (1983).

Referral Rates

Preschool screening referral rates, the percentage of screened children who are referred for further evaluation on the basis of the screening results, have been mentioned sparsely in early childhood literature. Thurlow, Ysseldyke, and O'Sullivan (1985) noted that there exists "little information on the extent of or results of preschool screening" (p. 2). Limited referral rate data are available for specific instruments and some locations.

In a study using the Comprehensive Identification Process, which assesses developmental areas as well as vision and hearing, Zehrbach

(1975) found that 28.5% of the children failed screening or had to be re-evaluated. In a 1977 article, Asbed, Schipper, Varga, and Marlow reported a referral rate of 48% when screening was done for physical and developmental problems in Maryland. Anderson, Griffin, and Hunt (1978) reported that 11% of a sample of 790 children in Quincy, Massachusetts were classified as either a high or moderate risk for later problems in school. In this study, the Hainsworth screening instrument, a brief test of learning efficiency, was used as well as vision and hearing checks, and a comprehensive physical exam. These authors noted that their findings were consistent with a national survey (Wolman, 1972) concerning the percentage of at-risk children in the population. More recently, Lichtenstein and Ireton (1984) stated that the base rate for developmental and educational problems is typically 5 to 10% of the preschool population. They further suggested that a reasonably efficient referral rate, in terms of minimizing over- and under-referral errors, might be set at 1 1/3 to 2 1/2 times the base rate. Use of the more liberal extremes of these ranges would result in a referral rate of approximately 25%.

It is difficult to compare these four reports of screening referral rates found in the literature. There is variation in the types of problems included, with some of the reported rates comprised of developmental and physical problem referrals while others are comprised of only developmental referrals. There is also the question of the definition of terms such as "at-risk" and "problem," as well as the various criteria used to make referral decisions. Even with this

in mind, there does appear to be considerable variation in the proportion of children who are identified by various screening programs. Similarly, wide variation was found among referral rates for Minnesota school districts for the 1982-83 school year (Thurlow et al., 1985). This variability in Minnesota referral rates also was reported for the 1979-80 school year (Lombard, 1983).

While there have been some reports of preschool screening referral rates in the literature, there are no data on the stability (or change) of these rates for a given program or area. Certainly there are factors operating within each screening program that will result in some fluctuation in referral rates from year to year including, of course, actual changes in an area's population of exceptional children. Concern about extremely high and low screening referral rates, and their possible implications for thousands of young children has been documented (Ysseldyke, Thurlow, Weiss, Lehr, & Bursaw, 1985). The consistency with which a given district operates its screening program has implications for many preschoolers. Knowledge about the extent to which district referral rates are stable over time, as well as the magnitude and direction of changes in those rates, should shed some light on the dynamics and policies at work in various screening programs. This issue takes on greater importance when one considers the fact that preschool screening programs in each state make potentially critical decisions about many thousands of children annually.

Several questions about preschool screening referral rates were addressed here. First, referral rates for a sample of Minnesota

school districts from the 1979-80 and 1982-83 school years were compared. We examined the referral rates of each district to find the amount of change that occurred from the first to the second year sampled. As part of our analysis, three groups of districts were identified whose rates increased or decreased considerably, or stayed the same. The referral rates from the entire sample were analyzed to ascertain the continuity, in terms of the districts' relative standing, that existed between the two school years. In other words, did districts with high referral rates in 1979-80 also have high rates in 1982-83?

Another issue studied was the extent to which eight variables differentiated the three groups. We compared the districts on three district variables and four socioeconomic variables. Finally, the extent to which screening practices differentiated the three groups of districts was examined.

Method

Subjects

The subjects for this study were school districts selected from among Minnesota's 432 school districts. Preschool screening data were available for the 1979-80 school year (Lombard, 1983), and for the 1982-83 school year (Thurlow et al., 1985). The data consisted of the numbers of children screened in virtually all Minnesota school districts, and also the number of those children who were referred for further diagnostic assessment. All of the data included in this study represented referrals for developmental problems (motor, speech and

language, social/emotional, and cognitive development). Referrals for vision, hearing, or physical health problems were not included. The original 1979-80 data represented 420 districts; 402 districts were included in the original 1982-83 data. Districts were eliminated from inclusion in the current study when data from only one year were available. In addition, to reduce the spurious influence of districts screening very few children, only districts that screened at least 25 children in each of the two years were included. The final sample for this study consisted of 219 school districts.

Procedure

Two referral rates were computed for each district, one for each school year. The referral rates were computed by dividing the number of children referred for further assessment of suspected developmental problems by the total number of children screened. These proportions were then multiplied by 100, resulting in percentages. The two referral rates for each district were then paired for statistical analysis.

Those districts with referral rates that showed considerable change from 1979-80 to 1982-83, as well as districts with rates that remained the same were identified. For each district, the 1979-80 referral rate was subtracted from the 1982-83 rate, resulting in a percentage difference that was either positive (indicating an increase over 1979-80), negative (indicating a decrease from the 1979-80 rate), or zero (the rates were the same for both years). The districts were rank-ordered in terms of rate difference to determine the districts

with the greatest increases and decreases. From this, three groups of rate difference districts were identified. The first group included the 10 districts with the greatest rate increases. The second included the 10 districts with the greatest rate decreases. Finally, the third group consisted of districts with referral rates that were the same for both years.

The three groups of districts were compared on the basis of three variables from the School District Profiles (Minnesota Department of Education, 1981, 1984b), which are statistical summaries of the state's school districts. The comparison variables were average daily membership (total K-12 enrollment of the district), student-staff ratio, and the minority student percentage of total enrollment. In addition to these variables, the districts also were compared on the basis of four variables from the 1980 census (Bureau of the Census, 1982) representing socioeconomic status (SES): mean home value, mean level of education, percentage of district population below the poverty level, and median income of the district residents. Group means were calculated for each of these seven variables.

The actual screening practices of the districts in the three rate difference groups also were analyzed. Information on screening practices was gathered from a survey sent to screening programs throughout Minnesota during the 1984-85 school year (see Ysseldyke, Thurlow, O'Sullivan, & Bursaw, 1985). Surveys were available for 9 of the 10 districts in the "increase" group, 8 of the 10 in the "decrease" group, and 12 of the 14 in the "same" group. "Unavailable"

surveys were ones that were not completed and returned by school districts. In this analysis, responding districts were compared on the basis of the screening tools they reported using, the professionals they cited as performing screening, and the criteria used to decide failure or the need for further assessment. Each of these variables was examined for the areas of speech and language, motor, social/emotional, and cognitive development.

Results

Preschool screening results from the 1979-80 school year (Year 1) showed that a total of 53,048 Minnesota children were eligible for screening services (Minnesota Department of Education, 1984). Of this number, 41,635 (78%) were screened by the state's 432 school districts. During the 1982-83 school year (Year 2), 46,986 of the 58,202 eligible children were screened, representing 81% of the total.

Referral Rate Changes

The mean number of children screened in the 219 school districts and the mean referral rates for each of the two school years are presented in Table 1. The districts screened an average of 139.2 children in Year 1 and 157.7 in Year 2. This reflects the higher total number of children screened in 1982-83. The numbers of children screened by the 219 districts in Year 1 correlated very highly with the numbers for Year 2 ($r = .94$, $p < .001$). The highest number of children screened in Year 1 was 1930, and 1814 in Year 2. The same district did not screen the highest number of children in both years.

Table 1

Mean Numbers of Children Screened and Preschool Referral Rates for 219 Minnesota School Districts in 1979-80 and 1982-83

		Number Screened[a]		Percent Referred		
School Year	Total Screened	$\bar{X}$	High	Low	$\bar{X}$	High
1979-80	30,488	139.2	1930	0	12.281	58.537
1982-83	34,542	157.7	1814	0	12.300	40.789

[a]All districts screened at least 25 children

For the 219 districts, the mean referral rate for 1979-80 was virtually identical to the mean rate for 1982-83. The average rate was 12.28% (SD = 10.17) for Year 1, and 12.30% (SD = 10.02) for Year 2. The range of referral rates for both years was quite large. Several districts had rates of 0% in each year. The highest rate for Year 1 was 58.37%. The highest rate for Year 2 was in a district that referred 40.79% of the children it screened.

It should be noted that the majority of districts (157) had referral rates for the two years that were within 10 percentage points, plus or minus, of each other. Yet, the referral rates from Year 1 correlated only moderately (Pearson $r = .27$, $p < .001$) with the rates from Year 2. A slightly greater degree of relationship was found when the two years' referral rates were correlated on the basis of their rank-orders (Spearman $r = .33$, $p < .001$). The fact that these correlatinos are significant is somewhat misleading. Figure 1 shows a scatterplot of the referral rates from Year 1 and Year 2. As can be seen in the figure, there is clearly a lack of a pervasive relationship between years.

The relationship between the numbers of children screened by the districts in this sample and their referral rates was examined for each year by calculating Pearson correlation coefficients. There was no relationship found between the two variables for either year (Year 1: $r = -.01$; Year 2: $r = .03$).

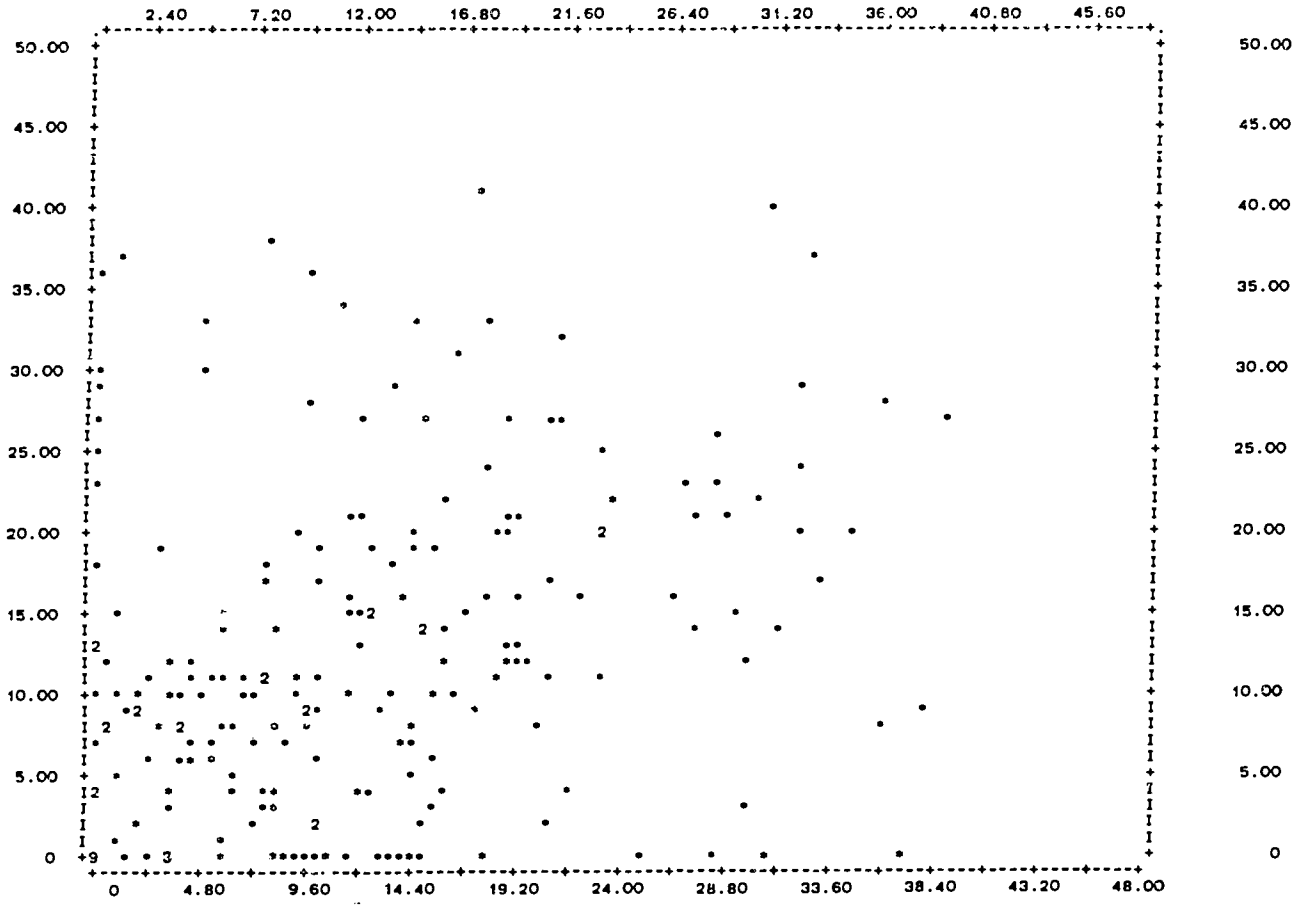

Figure 1. Scatterplot of preschool screening referral rates of 219 school districts from the 1979-80 and 1982-83 school years.

The frequency of districts whose referral rates increased, decreased, or stayed the same from Year 1 to Year 2 is shown in Table 2. There were 14 districts with the same referral rates across the two years. As can be seen in the table, the remaining districts were evenly split with 103 having higher rates in Year 2 and 102 having higher rates in Year 1. As a further indication of the evenness of the split, the mean difference between Year 1 and Year 2 referral rates for the 219 districts was a negligible +.02%.

Data from the 10 districts with the largest referral rate increases are shown in Table 3. The largest increase was 36.117%; the mean increase for the 10 districts was 29.257%. The mean number of children screened in these districts in Year 1 and Year 2 was 79.4 and 85.4, respectively. Five of the districts had rates of 0% in 1979-80.

The 10 districts with referral rates that decreased the most from Year 1 to Year 2 are listed in Table 4. The percentage change of these districts ranged from -29.944% to -58.537%. Six of these districts referred 0% of the children screened in Year 2, including the district with the largest decrease. As the table shows, the mean number of children screened in this group for Year 1 was 58.3 and 62.9 for Year 2.

The 14 districts with referral rates that were the same for both years are shown in Table 5. While the mean number of children screened by these districts was over 80, 12 of them did not refer any children in either year. The remaining two districts had referral rates less than 4%.

Table 2

Frequency of School Districts Whose Preschool Screening Referral Rates Increased, Descreased, or Stayed The Same From 1979-80 to 1982-83

Same	Increased	Decreased	Total
14	103	102	219

Table 3

Ten Districts Showing the Greatest Increases in Referral Rates From 1979-80 to 1982-83

	1979-80		1982-83		
District	Number Screened	Referral Rate	Number Screened	Referral Rate	% Increase
I_1	102	.980	124	37.097	36.117
I_2	28	0.0	28	35.714	35.714
I_3	39	7.692	46	37.783	30.091
I_4	30	0.0	37	29.730	29.730
I_5	120	0.0	130	29.231	29.231
I_6	42	4.762	57	33.333	28.571
I_7	217	0.0	259	27.027	27.027
I_8	31	9.677	28	35.714	26.037
I_9	86	4.651	60	30.000	25.349
I_{10}	99	0.0	85	24.706	24.706
$\bar{X}$	79.4	2.776	85.4	32.034	29.257

Table 4

Ten Districts Showing the Greatest Decreases in Referral Rates From 1979-80 to 1982-83

	1979-80		1982-83		
District	Number Screened	Referral Rate	Number Screened	Referral Rate	% Decrease
D_1	41	58.537	67	0.0	58.537
D_2	27	37.037	35	0.0	37.037
D_3	26	30.769	65	0.0	30.769
D_4	58	37.931	65	9.231	28.700
D_5	67	28.358	95	0.0	28.358
D_6	86	36.047	51	7.843	28.204
D_7	77	29.870	34	2.941	26.929
D_8	28	25.000	32	0.0	25.000
D_9	44	20.455	42	2.380	18.075
D_{10}	129	17.829	143	0.0	17.829
$\bar{X}$	58.3	32.183	62.9	2.240	29.944

Table 5

Fourteen Districts Whose Referral Rates
Remained the Same From 1979-80 to 1982-83

	1979-80	1982-83	
District	Number Screened	Number Screened	Referral Rate
S_1	76	84	0.0
S_2	36	29	0.0
S_3	39	53	0.0
S_4	31	26	0.0
S_5	28	36	0.0
S_6	32	38	0.0
S_7	199	183	0.0
S_8	107	109	0.0
S_9	181	192	0.0
S_{10}	41	37	0.0
S_{11}	227	339	0.0
S_{12}	79	51	0.0
S_{13}	32	32	3.125
S_{14}	28	28	3.571
$\bar{X}$	81.1	88.4	.478

The possibility that the number of children screened by the three rate difference groups differed significantly was examined. Sixteen t tests were performed between the means for each group, between each group and the state mean for each year, and between the two years means within each group. None of the t tests was significant at the p = .01 level.

The approximate geographic location of the districts in each of the three groups is shown in Figure 2. Two-thirds of the districts were located in the southern half of the state. No district was located in the northeastern quadrant. Most of the districts in the three groups were relatively small, rural districts. Only two of the 34 districts were suburban, and none was urban. There did not appear to be any distinct pattern in the geographic configuration of the districts except for a cluster of four increase districts in the southwestern corner of the state.

District Variables Related To Change

Three school district variables were examined for the three rate difference groups. The means of these statistics for the three groups, as well as the state medians for these variables for Years 1 and 2 are shown in Table 6. The student-staff ratios for groups and across both years ranged from 13.98 to 15.01, with the state median being 14.50 for both years. Minority percentages for the three groups ranged from 1.30% (state median) to 2.31% (decrease group). All group means were larger than the state median for both Year 1 and Year 2, although not significantly so. The only trend apparent in the table

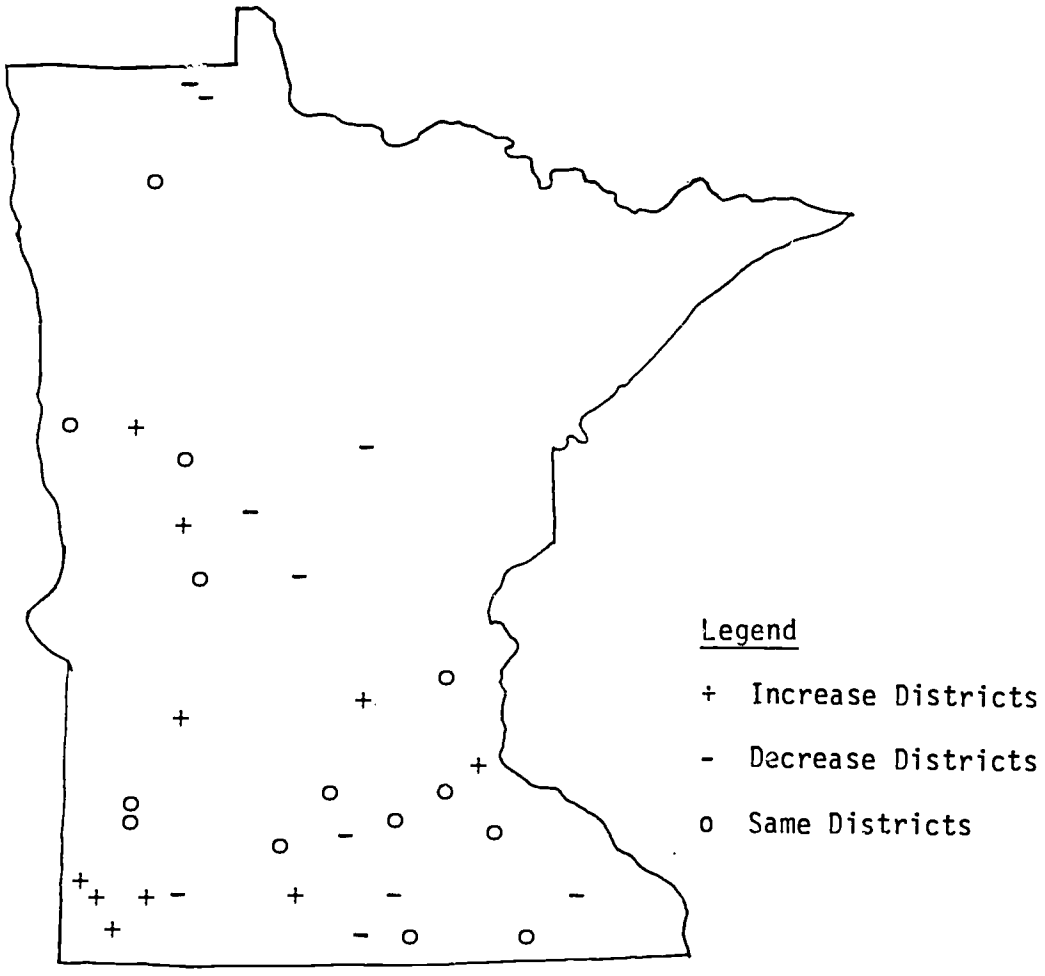

Figure 2. Geographic location of three groups of referral rate difference districts.

Table 6

Means and State Medians of Three District Variables for Three Referral Rate Difference Groups for Two School Years*

	Student-Staff Ratio		K-12 Enrollment		Percent Minority	
	1979-80	1982-83	1979-80	1982-83	1979-80	1982-83
Increase Group N=10	14.27	14.34	1171.9	1054.2	1.35	1.68
Decrease Group N=10	13.98	15.01	977.7	903.1	2.31	2.16
Same Group N=14	14.41	14.29	1451.0	1300.8	1.40	1.59
State Medians N=432	14.50	14.50	730.0	653.0	1.30	1.40

*Sources: School District Profiles: 1979-80 and 1982-83 (Minnesota Department of Education, July, 1981; August, 1984)

is that the average daily membership went down from Year 1 to Year 2 for all three groups and the state as a whole.

Differences between the group means as well as differences within each group from Year 1 to Year 2 were tested for significance by performing multiple t tests. The means for the three rate difference groups were compared to state medians since the latter were believed to be less influenced by the relatively small number of large districts. None of the 48 t tests between pairs of means was significant at the p = .01 level of significance. This level of significance was used to counteract the effect of performing multiple t tests.

SES Variables Related to Change

Four 1980 census statistics reflecting socioeconomic status were studied in comparisons between the three rate difference groups and the whole state. The means of these variables for the three groups are listed in Table 7. As can be seen in the table, the median home values for the three groups ranged from $36,500 to $40,200, with the average for the entire state falling within that range. The percentage of residents below the poverty level ranged from 10.39% for the same rate group to 12.15% for the decrease group. Similarly, the median income was highest in the same rate group and lowest for the decrease group. Finally, the median education level of district residents over 18 years of age was relatively consistent across groups. All four groups, the state included, averaged between 12.32 and 12.40 years of education. As before, t tests were performed to determine whether differences between the various group means were

Table 7

Means of Four SES Characteristics for Three Groups of Referral Rate Difference Districts from the 1980 Minnesota Census

Group	Median Home Value ($1000's)	Percent Below Poverty	Median Income	Years of Education*
Increase Group N=10	36.5	11.37	14,113	12.32
Decrease Group N=10	36.8	12.15	13,569	12.35
Same Group N=14	40.2	10.39	15,363	12.36
State Medians N=432	37.6	10.74	15,105	12.40

*Median for residents over 18 years of age

significant. Twenty-four t tests were performed on these data, none of which reached significance at the p = . 01 level.

Screening Practices Related to Change

Screening practices were extremely consistent across all groups. The DIAL (Developmental Indicators for the Assessment of Learning) was the tool most frequently cited in each of the four screening areas and for each group of districts. The only exception to this was social/emotional screening in the increase group, where observation was the procedure most frequently used. In this instance, the DIAL was the second most often cited tool.

Special educators were the professionals most frequently mentioned for motor, social/emotional, and cognitive screening in each group. The increase group cited volunteers nearly as often as special educators in these areas, and this group reported using volunteers more than the same or decrease rate groups. Speech and langauge screening was done most often by speech clinicians in each group.

The decision criteria reported by the respondents were similarly consistent across groups and reflected the overwhelming preference for the DIAL as the screening instrument. Criteria reflecting normative decision rules were mentioned most frequently by each group, and for each screening area. Several respondents reported the DIAL's cutoff scores as the criteria they used to make screening decisions. Second to normative criteria were the more subjective "clinical judgment" decision criteria. For all of the respondents in all three groups, clinical judgment was mentioned 1/3 as many times as normative criteria.

The results gleaned from the 29 surveys from this sample were very similar to the results for the entire sample of 511 surveys completed by screening programs from throughout the state (see Ysseldyke, Thurlow, O'Sullivan, & Bursaw, 1985).

Discussion

Preschool screening in Minnesota is reaching higher percentages of eligible children every year. As a result, the likelihood that a handicapped child will not be evaluated is continually declining. Minnesota school districts also are screening approximately the same numbers of children from year to year, relatively speaking.

One of the most striking findings of this study is that the 1979-80 average referral rate was virtually identical to the average rate for 1982-83. The state as a whole appears to be remarkably consistent in terms of the percentages of children who are referred after screening. This seems to be the case even though there is wide variation among the referral rates of individual districts, and an increase in the total number of children screened. However, the wide variation among individual districts has important implications. Conceivably, the probability of a child being referred after screening may be quite different depending on the district in which he or she is screened.

One question raised is the extent to which districts are over- or under-referring children from their screening programs. Wide variation in referral rates would logically result in a corresponding range of "hit rates," which has important implications for a given

program's screening efficiency. This issue takes on greater importance when one considers districts in which very few or no children were referred, even though hundreds were screened. Are significant numbers of potentially exceptional children being missed in these districts? Conversely, are children being referred needlessly in those districts that have high referral rates? Studies designed to follow up on children who were referred from screening, as well as children who were not referred, would help to answer these questions.

The significant correlation between Year 1 and Year 2 referral rates suggests that at least some districts are consistent from year to year in the proportion of children that they refer. This could be due to similar screening practices, personnel, and policies at work across years. Another explanation might be that each district's referral rate reflects the local base rate for developmental problems of preschool children. In reality, both of these factors probably contribute to the consistency to some extent.

The fact that the correlation is only moderate suggests that there remains a significant number of districts that are not consistent in terms of the proportion of children they refer. These districts, one of which went from referring over half of the children it screened in Year 1 to referring no children in Year 2, seem to have fluctuated more than would have been expected from normal variation in their respective base rates. Lending support to this notion is the fact that the three rate difference groups are fairly intermixed

around the state, except for the cluster of four increase districts in the southwestern corner of the state. The extent to which these four districts might have other factors in common was not examined as part of this study.

No significant differences existed between the groups for any of the variables examined. Overall, 88 t tests were performed, and none of them was significant. This means that there were no differnces between groups in the same year, or between the two years within each group. Therefore, neither SES measures, district variables, nor screening practices provided a clue as to why these districts should have such disparate referral rates from one year to another. This leads to the question of just what accounts for the considerable change from Year 1 to Year 2 in these districts, as opposed to districts that remained more consistent.

One possible explanation for the referral rate changes is that there were significant changes in the district personnel, practices, or policies which, in turn, affected their preschool screening outcomes. Factors such as administrator attitudes toward screening and the relative leniency of decision criteria have been discussed as contributing to varied screening outcomes (Ysseldyke & O'Sullivan, 1985). Similarly, the significant use of subjective clinical judgment as a decision criterion could result in referral rate fluctuation between programs as well as over time. Further study will be necessary to uncover the dynamics at work in these districts, dynamics that may be idiosyncratic and district-specific. By addressing this

question, we would be better able to isolate, and hopefully control, variables that result in such variation.

The results of the current study are similar to those of the Ysseldyke and O'Sullivan (1985) study, which failed to find any simple relationship between screening outcomes (specifically, referral rates), and global demographic and educational variables. (It should be noted here that the data studied by those authors were from 398 Minnesota districts in 1982-83, the pool of districts from which the subjects for the current study were selected.) Ysseldyke and O'Sullivan discussed and rejected some alternative explanations for their findings. These included the possibilities that better predictors existed that were not examined, that some districts screened disproportionately high numbers of underprivileged children, and that recording errors may have contaminated the screening data (see Ysseldyke & O'Sullivan, 1985 for a full discussion). It appears that the same thing can be said concerning the current study. The relationship between referral rates and the variables that contribute to their variation is not a simple one.

Minnesota school districts, on the whole, appear to be very consistent when it comes to preschool screening referral rates. However, only when we examine the results of individual districts does the wide variation in terms of this screening outcome become apparent. When it comes to evaluating preschool screening referral rates, we must do more than look at the whole picture. We must look at the picture's parts, which in this case, are individual districts with individual children.

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