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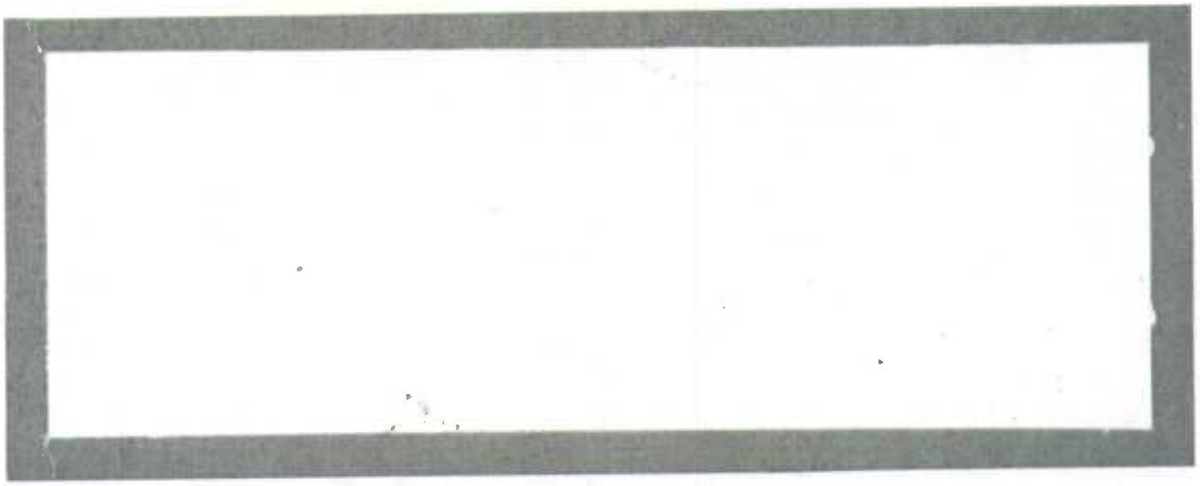

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AN APPLICATION OF THE RESULTS OF THE CLUSTER ANALYSIS OF DAILY LIVING

by

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July, 1985

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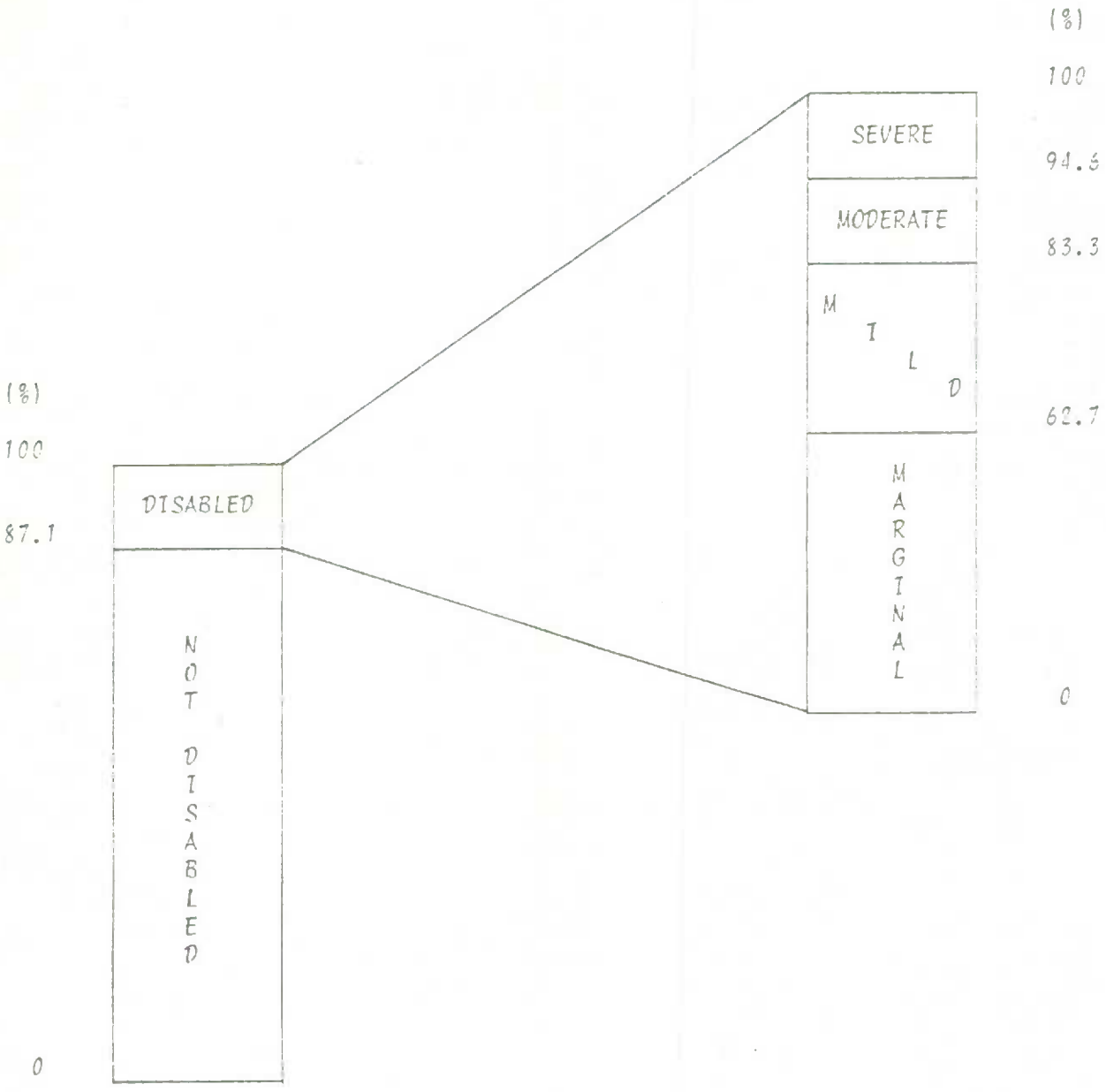
AN APPLICATION OF THE RESULTS

OF THE CLUSTER ANALYSIS

OF ACTIVITIES OF DAILY LIVING



G. Lazarus
July, 1985
(rev. July 19)

Abstract

"A Cluster Analysis of Activities of Daily Living from the Canadian Health and Disability Survey", documents the Techniques used in grouping disabled individuals according to similar screening section item profiles. This paper demonstrates how clustering can be used in the development and evaluation of severity indices.

Résumé

Une méthode de regroupement des individus souffrant d'incapacités selon la similarité des réponses données à un questionnaire de sélection est documentée dans le rapport "A Cluster Analysis of Activities of Daily Living from the Canadian Health and Disability Survey". Le présent rapport montre comment le regroupement en grappes peut être utilisé dans le développement et l'évaluation d'une mesure de gravité de l'incapacité.

1. INTRODUCTION

The first paper in the series, "A Cluster Analysis of Activities of Daily Living from the Canadian Health and Disability Survey", documents the techniques used in grouping disabled individuals according to similar screening section item profiles. The second paper, "Characteristics of Potentially Disabled Individuals Based on the Cluster Analysis of Activities of Daily Living", describes the individuals in the clusters according to information available from the Labour Force Survey household record docket and the CHDS itself, and establishes the terms of reference for the evaluation of any composite disability index.

This paper shows how clustering can be used in the development and evaluation of severity indices. The second section outlines the steps involved. Section 3 then introduces a composite disability index in order to illustrate the measures introduced in section 2. Clearly, there is no absolute and definitive measure of severity. Section 4 details the benefits of the clustering procedures. The main point is that the clustering is a convenient instrument for evaluating the effectiveness of measures of severity of disability. Section 5 provides some closing remarks.

2. A METHODOLOGY FOR THE DEVELOPMENT AND EVALUATION OF DISABILITY INDICES

This section outlines the steps involved in the development and evaluation of a disability index.

2.1 Some Criteria for Selecting an Index

This section presents a list of some of the conditions which a disability index should satisfy:

i) It should summarize as much information contained in the screening and follow-up sections of the questionnaire as possible;

ii) It should be consistent with information contained in the sections of the questionnaire not explicitly involved in the development of the index;

iii) It should by exhaustive, i.e. it should be able to rank every screened-in individual;

iv) It should allow for the broad range of activities covered;

v) It should allow for the differential in severity among activities of daily living;

vi) It should allow for sampling error across data sets, yet be sensitive to real changes in the population of interest;

vii) It should be straightforward to interpret;

viii) It should yield a severity distribution for the population of interest which is "reasonable".

2.2 Some Procedures for the Evaluation of an Index

The evaluation of an index focuses on its ability to satisfy the above criteria. To a large extent evaluation procedures are dictated by the criteria:

i) Which areas of the questionnaire are explicitly represented in the index?

ii) Does the index rank individuals in a manner that is consistent with information in the questionnaire which is not explicitly covered in the index?

iii) Does the index rank all screened-in individuals?

iv) Does the index recognize the wide range of activities covered as well as the differential in severity among ADL's?

v) Can the index be made to rank individuals consistently across data sets?

vi) Does the index provide us with a realistic severity distribution? Is it realistic to identify 15% of the non-institutionalized adult population as severely disabled? 10%? 5%?

It is important to consider a potential index with respect to the above criteria. An index, based on the first principal component (overall measure of strength) of a principal components analysis using screening section information and completely unable items, was presented in the first paper. We reject the PRIN1 index as a serious contender because it is not at all simple to explain its derivation to non-statistical users. For evaluation purposes, the PRIN1 scale can be compared with the average number of activities of daily living or E(NADL) scale, the degree of disability and the degree of dependence, as well as other variables from the follow-up section of the questionnaire. Having completed the evaluation on October unweighted data, the procedure could be repeated on October-June data and January test 3 data (where applicable) as well. While we do not want to do a detailed evaluation of PRIN1, it is worth noting that the current scale of 29 levels is too fine.

The E(NADL) scale is reasonably simple to explain, but its ordering of clusters by severity does not allow for the differential in severity of the ADL's to the extent that the PRIN1 scale allows for it. It might be useful to incorporate E(NADL) into our disability index if this weakness can be corrected without introducing further problems.

The degree of disability, which is based on the number of "completely unables", (NCMPLTLY), also does not use the differential in severity of the ADL's, effectively (or explicitly). Furthermore, the degree of disability is unable to rank individuals who are mentally handicapped alone or who are limited only in the kind or amount of activity they can do at home, at work or going to school because of a long-term physical condition or health problem as effectively as other screened-in respondents due to constraints imposed by the questionnaire. Still, it may be useful as a measure for evaluating disability indices, and a disability index itself may benefit from the explicit use of E(NCMPLTLY).

The degree of dependence is itself another potential index. The version of it described in section 2 of the second paper differs from that described in "Highlights from the Canadian Health and Disability Survey 1983-1984". Our version is more complex and more difficult to describe to individual users. Furthermore, it does not rank everybody. Still, it provides useful information and as such should be considered as a tool for evaluating disability indices.

2.3 The "Hits" Concept

The "hits" concept was proposed as an index which would be simple to interpret as well as capable of using the differential in severity of the ADL's. As a first step, E(NADL) and E(NCMPLTLY) were calculated for each cluster. The basis for the index was the ratio of E(NCMPLTLY) to the E(NADL).

$$I^{(1)} = \frac{E(NCMPLTLY)}{E(NADL)} * 100\% \qquad (1)$$

The percentage of troubles which became "completely unables" was the indicator of severity--the higher the value of the index, the greater the severity. The index recognizes the differential in severity of the ADL's in as much as troubles which are more severe result in more "completely unables" and a higher index value.

While the index given by (1) was able to satisfy some of the concerns raised earlier, it was rejected because it failed to rank clusters properly in all situations. Consider the following potential situation.

CLUSTER	E(NADL)	E(NCMPLTLY)
i	6	3
j	2	1

Two clusters with identical or similar index values may not be worthy of similar severity ranking. Given the above data, clusters i and j would rate 50% according to the "hits" index. Given the variation in E(NADL) and E(NCMPLTLY), it would appear to be illogical to rank the two clusters as equivalent on a severity scale. Hence $I^{(1)}$ was rejected.

3. A COMPOSITE DISABILITY INDEX

This section introduces a composite disability index. It is "composite" in the sense that it incorporates information from the screening section of the questionnaire as well as from the "completely unable" items, and also in the sense that it scales severity regardless of trouble orientation. This basic composite disability index (CDI) is introduced in section 3.1. The remainder of the section considers refinements of the CDI.

3.1 Basis for a CDI

This index is presented in a basic form and its relative merits are discussed.

$$CDI(c) = \frac{[E(NADL) * E(NCMPLTLY)]}{E(NADL) + 17} * 100 \qquad (2)$$

$$CDI(I) = \frac{[NADL * NCMPLTLY]}{NADL + 17} * 100 \qquad (3)$$

3.1.1 Discussion

The derivation of this CDI(c) follows from information acquired in previous efforts. The CDI(c) is obtained for each of the 29 clusters. Hence, E(NADL) and E(NCMPLTLY) are calculated for each cluster. The numerator of the CDI is the square root of the product of E(NADL) and E(NCMPLTLY). The average number of ADL's is derived from a potential maximum of 17 while the average number of "completely unables" is from a potential maximum of E(NADL) for each cluster. Hence the denominator: E(NADL) + 17.

The product of E(NADL) and E(NCMPLTLY) reflects the differential of severity in ADL's and the CDI(c) ranks individuals in a manner we would expect. For example:

Cluster	E(NADL)	E(NCMPLTLY)	CDI(c)(%)
i_1	2	1	7.4
i_2	6	3	18.4
j_1	9	4	23.1
j_2	6	6	26.1

The first example, using the data which led to the rejection of the hits concept, compares clusters i_1 and i_2. The CDI(c) finds the cluster with the higher E(NADL) and higher E(NCMPLTLY) to be more severe. The second example shows the need for the denominator and its role in reflecting the relative severity of the ADL's. The CDI(c) numerator is the same for clusters j_1 and j_2, however the CDI(c) recognizes the greater severity of the ADL's for j_2 where all six troubles are completely unables and cluster j_2 individuals are found to be

more severely disabled than cluster j_1 individuals. The issue of significant differences is considered in section 3.2.

The square root of the numerator is taken so that the numerator is in activities rather than activities squared. The CDI(c) is therefore unitless and, when the ratio is multiplied by 100, can be expressed as a percentage with higher percentages representing greater severity of disability.

The CDI(I) is constructed in a manner similar to that of CDI(c) except that it is applicable to individual respondents rather than clusters. The CDI(c) provides us with an average measure of severity for the cluster. The variation in CDI(I) represents the variation in severity of individuals in that cluster.

Equations (2) and (3) suggest that there are two directions which warrant further study. The first involves finding a ranking of the clusters according to CDI(c) which is consistent for the available data sets (October-June and January weighted) and then making some adjustments to obtain a severity scale with three to five levels. This method ignores the inherent variation in the CDI's of individuals within clusters. Hence it is possible that an individual in a cluster with a relatively low CDI(c) has a much higher CDI(I) than an individual in a cluster with a relatively high CDI(c). If we are prepared to live with this problem then it follows that knowledge of the cluster to which an individual belongs leads immediately to knowledge concerning severity of disability.

The other direction is to fix the number of levels of severity according to a pre-determined severity distribution. For example, it may be realistic to believe that 5% of the disabled non-institutionalized population is severely disabled, 10% is moderately disabled, 20% is mildly disabled and the remainder is marginal. Having established this parameter, it is straightforward to establish the CDI(I)'s for all individuals which are consistent with the distribution although these values may change from data set to data set.

Section 3.2 develops a severity scale based on CDI(c) while section 3.3 develops a severity scale based on CDI(I).

3.2 Development of a Scale of Severity Using CDI(c)

Table 3.1 presents the values of the CDI for the clusters according to October unweighted data, October-June weighted data and January test 3 weighted data. The ranking of the clusters according to the CDI(c) values is shown in Figures 3.1 (A), (B), (C) and (D). Since it is the disabled population that concerns us, we concentrate on the two weighted data sets.

Discussion about the variance associated with the CDI(c) for each cluster is appropriate here. There are two sources of variation in the CDI(c) which are of particular concern: differences between clusters in the same data set and differences between data sets for the same cluster. While the magnitudes of these differences were not estimated, the recognition of the existence of variations was used to reduce the number of levels of severity. A switch in the ranking of two clusters from one data set to the next was interpreted to signify that the two clusters did not differ significantly in severity. Figures 3.1 (A), (B), (C) and (D) illustrate the situation.

Two examples from the weighted data sets will serve to illustrate the idea.

Clusters 1 and 9 are ranked second and third on October-June weighted data but are reversed according to January weighted data. The two clusters can be grouped together in terms of level of severity. Clusters 2, 10 and 12 are in positions four, five and six (though not in this order). According to October-June data, cluster 12 is more severe than 10. The reverse holds for each comparison according to January weighted data. Therefore, the three clusters are interpreted to be equal in severity of disability, though they are lower in severity than clusters 1 and 9.

The result of this procedure is illustrated in Figure 3.2. The twenty-nine levels of severity have been reduced to twelve. Figure 3.3 presents a schematic version of the ordering of clusters according to level of severity. The rectangles exhibit the cluster number in the upper right corner and the ADL's for which every cluster individual had trouble (or mental handicap or activity limitation). The asterisk in the rectangle for cluster 29 indicates that these individuals were screened in on one of A11, A13, A18, A20, A23 or A24. The explicit "does not have trouble" situations are not included in the diagram.

The twelve level scale of severity is still too fine, however, before we look further into pooling of levels, it is worthwhile to evaluate the step which reduced 29 levels to twelve.

This step in the evaluation involved the comparison of clusters within levels of severity (Figure 3.1) and the comparison across levels of severity according to instruments which are known to be useful for this purpose. The degree of disability and degree of dependence are appropriate measures. Furthermore, a follow-up code or guide will be used. This code detects any individual who was "blind" (C10), "deaf" (C20), unable to speak and be understood by other people (C31c), housebound (F02) or who used any of the mobility aids given explicitly (C42A -- C42G). The distributions of these items were presented in the second paper of this series.

The adjusted chi-squared tests described in the second paper were utilized here. The chi-squared test statistic based on weighted

October data (excluding section B non-respondents) was adjusted for the ratio of the appropirate sample total to population total. Again, these tests were seen to be approximate, and given the magnitude of the counts involved, a very small level of significance (.0001) was required for rejection of the hypothesis of no distributional difference between clusters (or levels as apropriate).

Tables 3.2 and 3.3 present the smallest levels of significance (if any) for within level and between level comparisons respectively. Tests on degree of disability which involved clusters 24 and 26 (except with each other) should be interpreted with care as these two clusters contained all the individuals whose degree of disability is "unknown". The incidence of degree of dependence "unknown" affects tests where the unknown representation was much larger or much smaller than the overall average (though these extreme incidences may themselves be useful information). Clusters 4, 13, 16, 17, 18 and 25 show low incidences while clusters 1, 5, 9, 10, 11, 24 and 29 show high incidences.

Generally, the results in tables 3.2 and 3.3 are as expected. The within level comparisons yield relatively few significances while the between level comparisons yield very few non-significances. The procedure which resulted in a reduction of severity levels from twenty-nine to twelve appears to have produced satisfactory results.

The glut of significances in table 3.3 is cause for concern. Twelve levels of severity remain too fine a scale. This table provides some signals as to the next step in a pooling procedure. For example, levels 4 and 5 can be lumped together. Also, notice the unusual results for tests between level 8 and subsequent levels with respect to the follow-up "guide". So table 3.3 presents signals for further pooling of levels. In particular, it appears that levels 4 and 5, and levels 8 through 12 could be affected.

It may have been clear from tables 3.2 and 3.3 that there were no within level comparisons for level 7 and very few between level comparisons involving level 7. This level ended up with seven clusters because of ordering differences between the October-June and January test 3 weighted data sets. The between level comparisons show level 7 to be acceptably distinct, and the composition of the level (7 clusters) was satisfactory.

The final stage in the development of a scale of severity of disability involved the reduction in the number of levels to an acceptable number which satisfied distributional properties. The information in table 3.3 was used, where possible.

Table 3.4 presents the severity of disability for each cluster. Table 3.5 illustrates the distribution of individuals according to severity of disability with respect to the screened-in population and the overall adult population using October-June and January Test 3 weighted data sets.

From table 3.5, we find that slightly better than one half of one percent of the non-institutionalized adult population of Canada to be severely disabled.

Tables 3.6(A), 3.6(B) and 3.6(C) illustrate the results of the severity scale according to our established measures degree of disability, degree of dependence and the follow-up "guide". Table 3.6(D) presents the age group distribution by level of severity. Note that these tables use October weighted data (for screened-in individuals) and exclude section B non-respondents. The severity scale finds about 4.3% of the screened-in population to be severely disabled while the degree of disability finds in the neighbourhood of 14% to be severely disabled.

3.3 Development of a Severity Scale Using CDI(I)

This section develops a scale of severity of disability using CDI(I) as a basis.

In this case, the basic index was obtained for every screened-in individual (it is zero for everyone else) because our interest pertained to the distribution of disabled individuals according to the CDI(I). The final cut-off levels for the resulting severity scale were based on the desire to obtain a scale with three to five levels, and to obtain a distribution of severity which resembled a "pyramid" with the most severely disabled at the peak and the least disabled at the broad base.

The distribution of the values of the CDI(I) was studied and three cut-off values were arbitrarily selected in order to obtain a scale with four levels. The result found five of eight screened-in non-institutionalized adults to be marginally disabled (on October weighted data excluding section B non-respondents). Table 3.7 presents the distribution for the overall screened in population as well as on a cluster basis. It is interesting to note the differences between the cluster distributions and the overall distribution.

For example, seven of every eight individuals who are in cluster 24 are marginally disabled. Also, there are no severely disabled individuals in clusters 20, 24, 25, 26, 27, 28 and 29, and very few in clusters 6, 7, 16, 22 and 23.

Table 3.8 presents a breakdown of the levels of severity by cluster. Note that while cluster 8 contains less than 2% of all screened-in individuals, it contains 24% of all severely disabled individuals. Cluster 15 contains more than its share of moderately disabled individuals.

The tables 3.7 and 3.8 present both sides of a likelihood function. Knowledge of the cluster to which a respondent belongs improves our ability to determine his/her severity of disability.

Table 3.9 presents the distribution of individuals according to severity of disability for October-June weighted CHDS data and January Test 3 weighted data. The distributions based on October-June data are also illustrated on the Figure 3.4. The "pyramid" effect is evident from the diagram and the tables. This particular scale of severity finds between 130,000 (October-June) and 145,000 (January test 3) non-institutionalized Canadian adults to be severely disabled.

4. WHY CLUSTER?

This section summarizes the benefits of clustering.

The clusters contain individuals with similar trouble profiles, that is, with identical responses to a select number of specified ADL's, activity limitation item and mental handicap item and similar responses elsewhere. Having established that the ADL's pertain to specific trouble orientations, the clusters can then be identified (using E(NADL) by orientation) according to one or more trouble orientations. Individuals can then be identified according to the cluster to which they belong (first paper).

The clusters were studied according to the sex, age and labour force characteristics of the individuals in them. It was learned that the distributions of individuals within clusters were reasonably stable between the October-June weighted CHDS data and the January test 3 weighted data (second paper).

Finally, it has been shown that the clusters were useful in helping to identify the severity of disability among screened-in individuals.

5. CLOSING REMARKS

This paper illustrated the steps used in the development and evaluation of disability indeces. These steps are listed below.

1. Determine criteria for selection of index.

2. Develop index.

3. Does index satisfy criteria? If not, can we live with the weaknesses of the index?

4. Determine procedures and develop measures for the evaluation of the index. Is the index consistent with the data throughout the CHDS?

5. Examine the performance of the index with respect to the quality measures developed earlier. Does the index perform satisfactorily?

6. Utilize other available and applicable data sets where possible. Iterate steps 4 and 5 where appropriate.

APPENDIX

FIGURE 3.1(A): CDI(c) for October-June CHDS and January Test 3

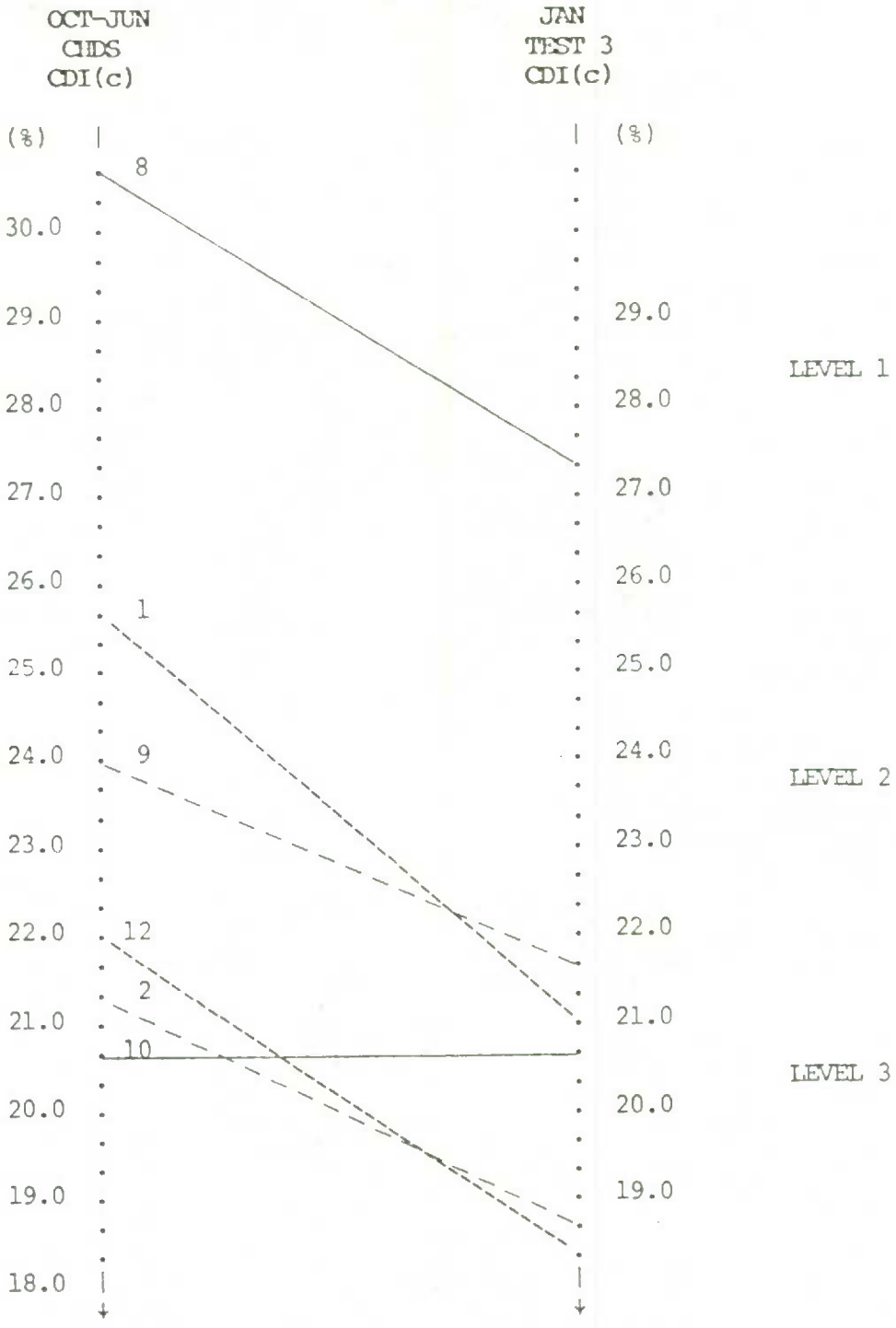


FIGURE 3.1(B)

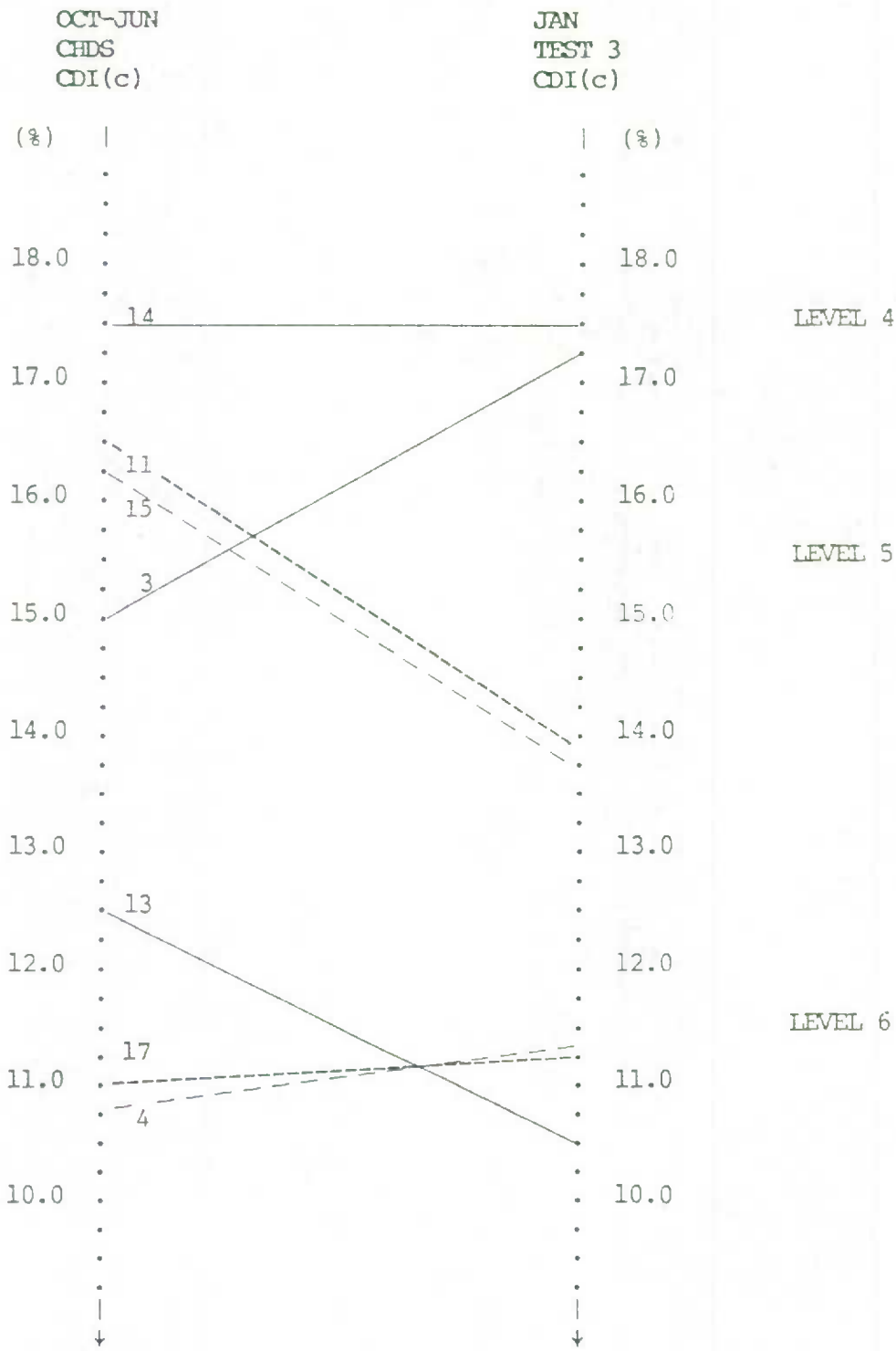

OCT-JUN
CHDS
CDI(c)
JAN
TEST 3
CDI(c)
(%)
(%)
18.0
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
14
11
15
3
13
17
4
LEVEL 4
LEVEL 5
LEVEL 6

FIGURE 3.1(C)

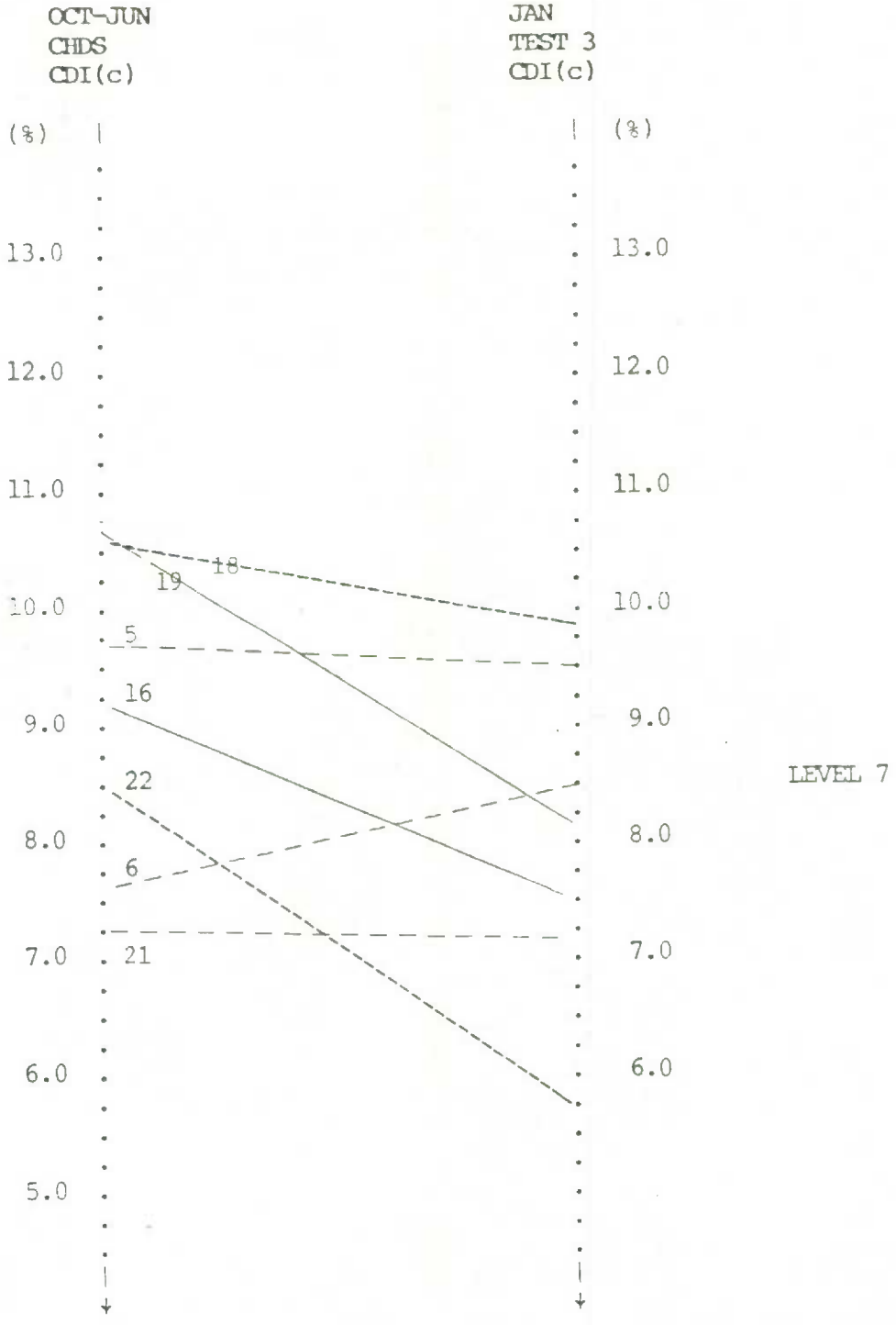

OCT-JUN
CHDS
CDI(c)
JAN
TEST 3
CDI(c)
(%)
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
18
19
5
16
22
6
21
LEVEL 7

FIGURE 3.1(D)

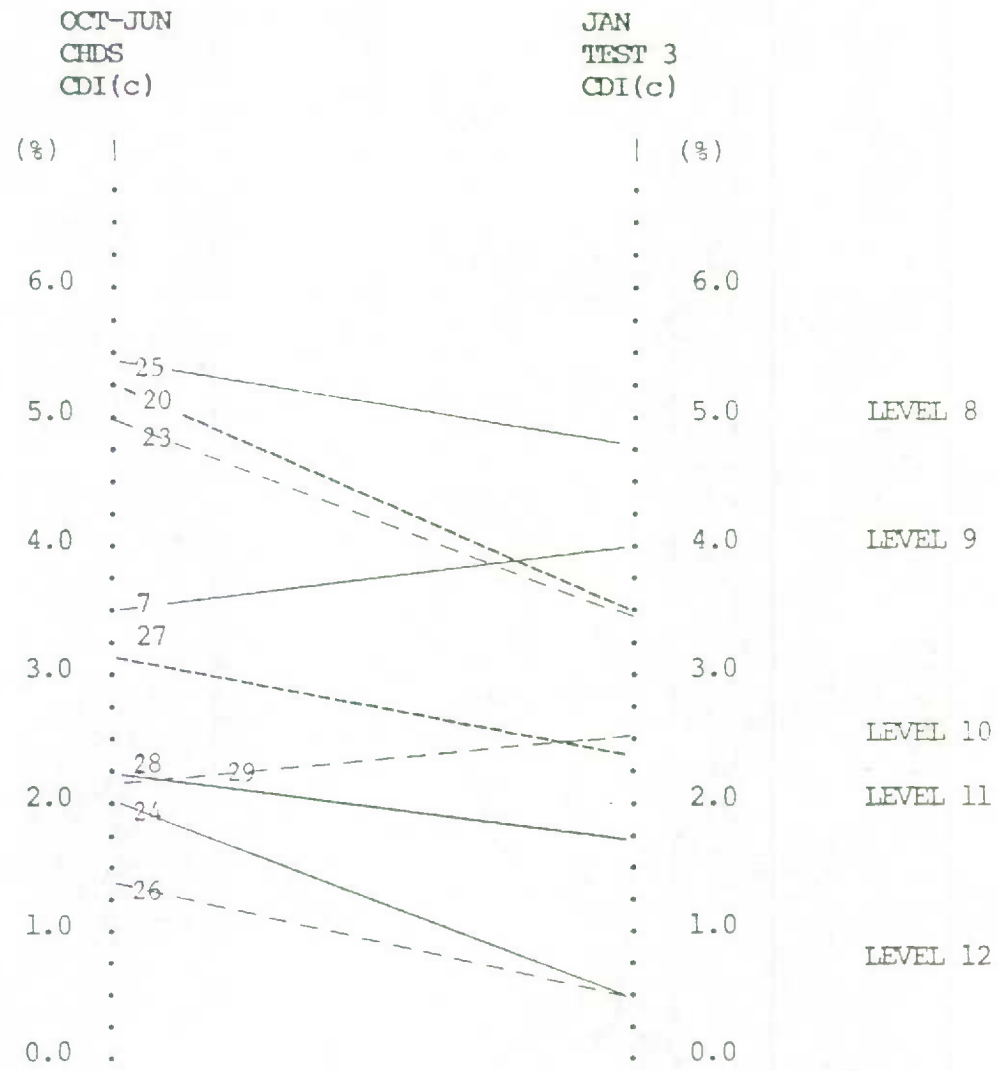

OCT-JUN
CHDS
CDI(c)
JAN
TEST 3
CDI(c)
(%)
(%)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
25
20
23
7
27
28
29
24
26
LEVEL 8
LEVEL 9
LEVEL 10
LEVEL 11
LEVEL 12

TABLE 3.1: Composite Disability Index

Cluster	ID	OCT Unweighted	OCT-JUN Weighted	JAN Test 3 Weighted
			(%)	
2	HVMA1	18.4	21.5	18.8
5	HVN1	9.0	9.7	9.5
1	HMA1	22.7	25.6	20.9
3	HMA2	14.5	15.1	17.2
4	HM1	10.1	10.8	11.4
6	HA1	7.2	7.6	8.5
7	HN1	3.8	3.4	4.1
9	VMA1	21.8	23.9	22.6
12	VMA2	19.0	21.9	18.2
13	VM1	12.2	12.4	10.6
21	VN1	6.9	7.3	7.2
17	SMA1	12.4	11.0	11.3
24	SN1	1.1	2.0	0.6
8	MA1	28.2	30.5	27.3
10	MA2	17.9	20.7	20.6
14	MA3	17.2	17.5	17.4
11	MA4	15.4	16.5	13.8
15	MA5	14.7	16.2	13.6
18	M1	10.4	10.6	9.9
16	M2	9.1	9.2	7.6
19	M3	10.3	10.7	8.1
20	M4	5.2	5.2	3.6
22	A1	8.3	8.5	5.7
23	N1	4.8	5.0	3.6
25	N2	5.3	5.4	4.8
27	N3	3.0	3.2	2.4
28	N4	1.9	2.1	1.8
29	N5	2.2	2.2	2.5
26	N6	1.1	1.4	0.6

FIGURE 3.2: Ordering of Clusters According to Level of Severity

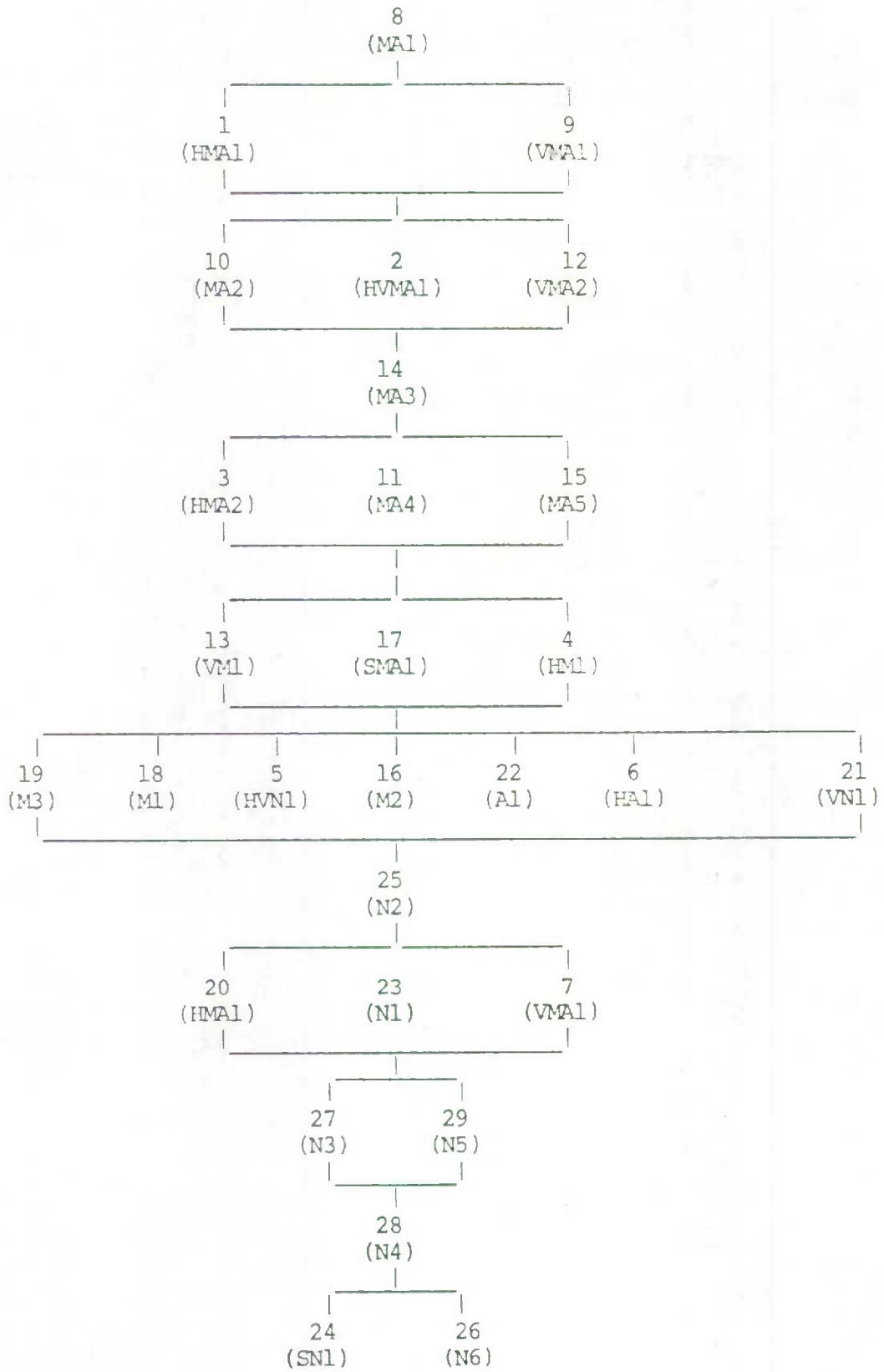


FIGURE 3.3: Schematic Diagram of Ordering of Clusters

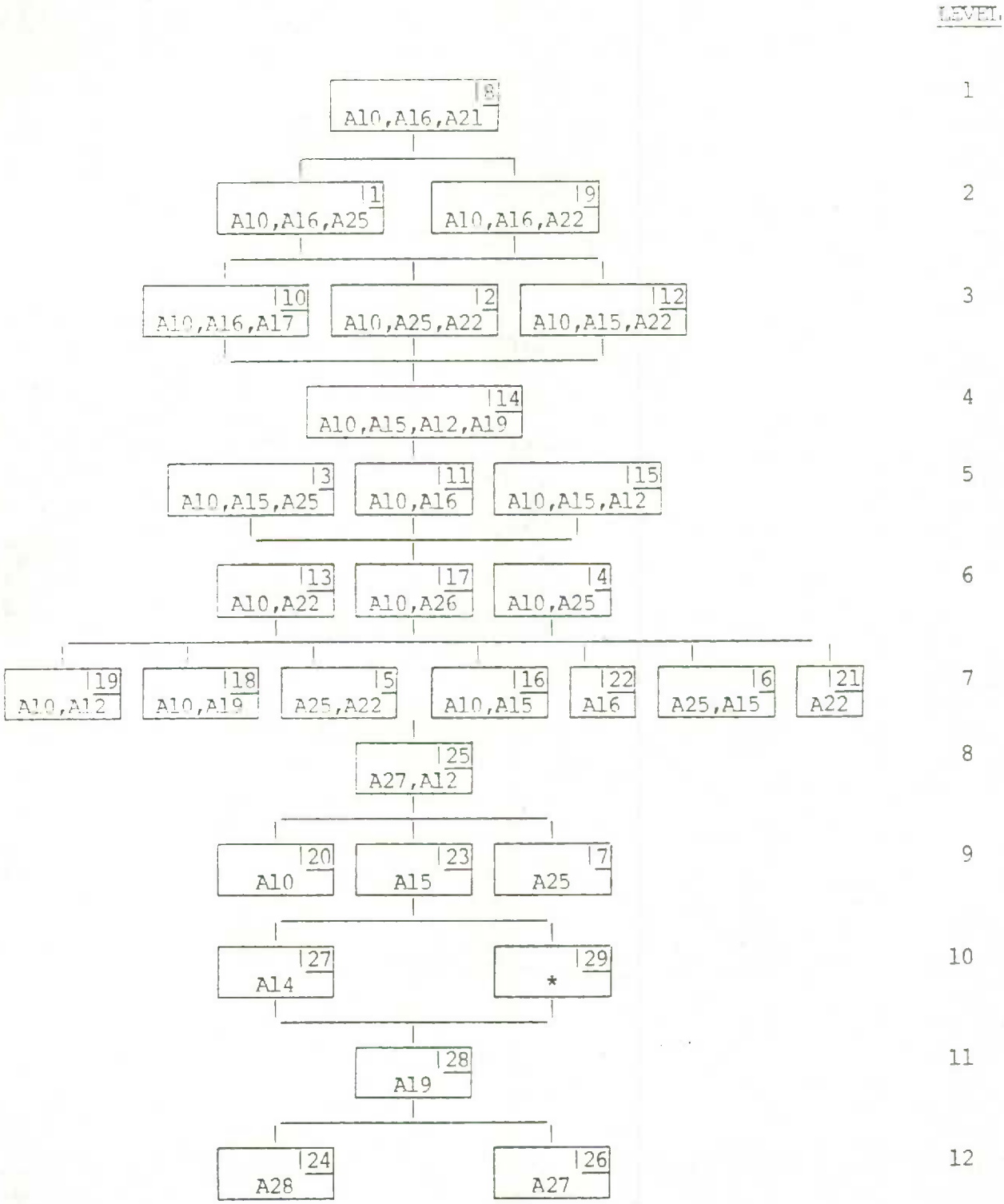


TABLE 3.2: Within Level Comparisons

Comparison of Cluster	with Cluster	Degree of Disability	Degree of Dependence	Follow-up Guide
1	9	NS	.05	NS
10	2	NS	NS	NS
10	12	NS	NS	NS
2	12	NS	NS	NS
3	11	NS	.01	.05
3	15	.01	.05	NS
11	15	NS	.05	NS
13	17	NS	.05	NS
13	4	.01	.0001	NS
17	4	NS	.0001	NS
20	23	.0001	.01	.0001
20	7	.0001	.0001	NS
23	7	.01	.0001	.0001
27	29	.01	NS	NS
24	26	NS	.0001	.05

TABLE 3.3: Between Level Comparisons

Comparison of Level	with Level	Degree of Disability	Degree of Dependence	Follow-up Guide
1	2	.01	.0001	NS
1	3	.0001	.0001	.01
1	4	.0001	.0001	.0001
1	5	.0001	.0001	.0001
2	3	.05	.0001	.0001
2	4	.0001	.0001	.0001
3	4	.0001	.05	.05
3	5	.0001	.0001	.0001
3	6	.0001	.0001	.0001
4	5	NS	NS	NS
4	6	.0001	.0001	NS
5	6	.0001	.0001	.01
5	7	.0001	.0001	.0001
6	7	.0001	.01	.0001
6	8	.0001	.0001	.0001
8	9	.001	.0001	.0001
8	10	.0001	.0001	NS
8	11	.0001	.0001	.001
8	12	.0001	.0001	NS
9	10	.0001	.0001	.0001
9	11	.0001	.0001	.0001
9	12	.0001	.0001	.0001
10	11	.05	.01	.01
10	12	.0001	.0001	.05
11	12	.0001	.0001	.0001

TABLE 3.4: Final CDI: Cluster Composition

Level	Cluster Composition	Indication of Severity
1	1 8 9	Severe
2	2 10 12	Moderately Severe
3	14 3 11 15 13 17 4	Moderate
4	5 6 16 18 19 21 22	Some
5	7 20 23 24 25 26 27 28 29	Marginal

TABLE 3.5: Distribution of Individuals According to Severity of Disability [CDI(c)]

OCT-JUN WEIGHTED (%)		SEVERITY OF DISABILITY	JAN-Test 3 WEIGHTED (%)	
Screened-in Population	Population		Screened-in Population	Population
4.5	0.6	Severe	3.8	0.8
4.5	0.6	Moderately Severe	3.6	0.7
15.2	1.9	Moderate	12.2	2.4
19.6	2.5	Some	17.8	3.5
56.2	7.3	Marginal	62.6	12.7
100.0	12.9	Total	100.0	20.1

TABLE 3.6(A): Table of CDI by Degree of Disability

CDI FREQUENCY ROW PCT COL PCT	DEGREE OF DISABILITY				
	Some	Moderate	Severe	Unknown	Total
Severe	9,592 10.46 0.82	18,637 20.33 3.74	63,455 69.21 21.38	0 0.00 0.00	91,684 4.32
Moderately Severe	19,887 20.58 1.71	20,046 20.74 4.03	56,712 58.68 19.11	0 0.00 0.00	96,645 4.55
Moderate	102,782 31.86 8.84	108,316 33.58 21.75	111,484 34.56 37.56	0 0.00 0.00	322,582 15.20
Some	227,902 54.02 19.59	142,776 33.84 28.67	51,182 12.13 17.24	0 0.00 0.00	421,859 19.88
Marginal	803,042 67.54 69.04	208,203 17.51 41.81	13,995 1.18 4.71	163,750 13.77 100.00	1,188,991 56.04
Total	1,163,205 54.82	497,978 23.47	296,827 13.99	163,750 7.72	2,121,761 100.00

TABLE 3.6(B): Table of CDI by Degree of Dependence

CDI FREQUENCY ROW PCT COL PCT	DEGREE OF DEPENDENCE							
	INDEP	PART-DEP	C-DEPEND	A-DEPEND	B-D-DEP	E-F-DEP	UNKNOWN	TOTAL
Severe	3,901 4.26 0.53	5,781 6.31 1.65	7,554 8.24 2.08	7,630 8.32 4.24	28,525 31.11 8.65	36,386 39.69 37.95	1,907 2.08 3.07	91,684 4.32
Moderately Severe	7,532 7.79 1.02	8,985 9.30 2.57	14,060 14.55 3.87	11,884 12.30 6.60	40,679 42.09 12.34	11,252 11.64 11.74	2,253 2.33 3.62	96,645 4.55
Moderate	39,869 12.36 5.38	39,313 12.19 11.24	67,653 20.97 18.61	48,068 14.90 26.69	102,701 31.84 31.15	17,469 5.42 18.22	7,522 2.33 12.10	322,595 15.20
Some	112,706 26.71 15.22	79,375 18.81 22.69	82,724 19.61 22.75	45,194 10.71 25.10	75,975 18.01 23.04	13,505 3.20 14.08	12,404 2.94 19.95	421,882 19.88
Marginal	576,557 48.49 77.85	216,340 18.19 61.85	191,632 16.12 52.70	67,292 5.66 37.37	81,817 6.88 24.82	17,272 1.45 18.01	38,101 3.20 61.27	1,189,012 56.04
TOTAL	**740,564 34.90**	**349,794 16.49**	**363,624 17.14**	**180,069 8.49**	**329,697 15.54**	**95,883 4.52**	**62,188 2.93**	**2,121,818 100.00**

TABLE 3.6(C): Table of CDI by Follow-up Guide

CDI FREQUENCY ROW PCT COL PCT	Follow-up Guide		
	OUT	IN	TOTAL
Severe	19,461 21.23 1.35	72,222 78.77 10.56	91,683 4.32
Moderately Severe	34,239 35.43 2.38	62,406 64.57 9.12	96,645 4.56
Moderate	155,177 48.11 10.79	167,394 51.89 24.47	322.571 15.20
Some	282,615 66.99 19.66	139,236 33.01 20.36	421,851 19.88
Marginal	946,195 79.58 65.81	242,776 20.42 35.49	1,188,971 56.04
Total	1,437,686 67.76	684,035 32.24	2,121,721 100.00

TABLE 3.6(D): Table of CDI by Age Group

CDI FREQUENCY ROW PCT COL PCT	AGE GROUP						
	15-24	25-34	35-44	45-54	55-64	65+	Total
Severe	4,239 4.62 3.02	4,419 4.82 2.24	3,791 4.13 1.68	6,676 7.28 2.41	18,415 20.08 3.74	54,143 59.05 6.86	91,684 4.32
Moderately Severe	2,355 2.44 1.68	2,035 2.11 1.03	7,134 7.38 3.15	13,432 13.90 4.85	19,132 19.80 3.89	52,557 54.38 6.66	96,645 4.55
Moderate	7,891 2.45 5.61	13,011 4.03 6.60	21,624 6.70 9.56	37,361 11.58 13.50	82,658 25.62 16.79	160,037 49.61 20.28	322,582 15.20
Some	17,945 4.25 12.77	27,338 6.48 13.88	38,354 9.09 16.96	55,685 13.20 20.13	101,585 24.08 20.63	180,965 42.90 22.94	421,872 19.88
Marginal	108,137 9.09 76.93	150,216 12.63 76.24	155,247 13.06 68.65	163,524 13.75 59.10	270,571 22.76 54.95	341,318 28.71 43.26	1,189,012 56.04
Total	140,567 6.62	197,020 9.29	226,150 10.66	276,679 13.04	492,360 23.20	789,020 37.19	2,121,795 100.00

TABLE 3.7: Cluster Characteristics

DATA: October Weighted (Excludes Section B non-response)

Clusters		Characteristics: Marginally Disabled	Mildly Disabled	Moderately Disabled	Severely Disabled	Total
HV	2	21.2	11.7	41.3	25.8	100.0
	5	49.2	34.6	15.0	1.2	100.0
H	1	12.0	13.8	33.7	40.5	100.0
	3	34.0	19.4	37.7	8.9	100.0
	4	44.9	32.7	21.3	1.1	100.0
	6	66.6	22.9	10.2	0.3	100.0
	7	80.3	19.2	0.4	0.1	100.0
V	9	12.8	3.9	29.4	53.9	100.0
	12	14.5	11.5	31.8	42.2	100.0
	13	39.7	27.7	29.2	3.5	100.0
	21	57.2	36.9	4.9	1.1	100.0
S	17	58.1	16.6	16.6	8.7	100.0
	24	87.5	12.5	0.0	0.0	100.0
MA	8	8.3	6.8	19.2	65.6	100.0
	10	25.1	9.1	37.4	28.4	100.0
	14	25.4	15.8	39.7	19.1	100.0
	11	29.2	13.4	48.8	8.6	100.0
	15	25.3	21.7	43.0	10.0	100.0
M	18	45.6	33.2	20.4	0.8	100.0
	16	54.8	31.8	13.1	0.3	100.0
	19	45.1	36.6	17.7	0.6	100.0
	20	68.3	30.8	0.9	0.0	100.0
A	22	63.5	22.4	13.6	0.6	100.0
N	23	76.9	19.2	3.9	0.1	100.0
	25	66.9	31.2	1.9	0.0	100.0
	27	78.5	21.5	0.0	0.0	100.0
	28	92.0	8.0	0.0	0.0	100.0
	29	88.2	11.8	0.0	0.0	100.0
	26	91.5	8.4	0.1	0.0	100.0
Total		62.5	20.7	11.6	5.2	100.0

TABLE 3.8: Cluster Characteristics

DATA: October Weighted (Excludes Section B non-response)

Clusters		Characteristics				
		Distribution of Total Disabled	Distribution of Marginally Disabled	Distribution of Mildly Disabled	Distribution Moderately Disabled	Distribution of Severely Disabled
HV	2	1.40	0.5	0.8	4.9	6.8
	5	1.61	1.3	2.7	2.1	0.4
H	1	2.04	0.4	1.3	5.9	15.6
	3	2.91	1.6	2.7	9.4	4.9
	4	2.38	1.7	3.7	4.3	0.5
	6	2.16	2.3	2.4	1.9	0.1
	7	13.72	17.4	12.6	0.5	0.1
V	9	0.41	0.1	0.1	1.0	4.1
	12	1.45	0.3	0.8	3.9	11.6
	13	1.26	0.8	1.7	3.1	0.8
	21	4.94	4.5	8.7	2.0	1.0
S	17	0.17	0.2	0.1	0.2	0.3
	24	1.03	1.4	0.6	0.0	0.0
MA	8	1.93	0.3	0.6	3.2	24.0
	10	1.76	0.7	0.8	5.6	9.5
	14	1.60	0.6	1.2	5.4	5.8
	11	1.25	0.6	0.8	5.2	2.0
	15	5.81	2.3	6.0	21.3	11.0
M	18	1.43	1.0	2.3	2.5	0.2
	16	3.30	2.9	5.0	3.7	0.2
	19	4.82	3.4	8.4	7.3	0.6
	20	6.68	7.2	9.9	0.5	0.0
A	22	1.86	1.9	2.0	2.2	0.2
N	23	9.70	11.8	8.9	3.2	0.1
	25	2.88	3.0	4.3	0.5	0.0
	27	3.12	3.9	3.2	0.0	0.0
	28	1.69	2.5	0.6	0.0	0.0
	29	4.08	5.7	2.3	0.0	0.0
	26	13.80	20.0	5.5	0.1	0.0
Total		100.0	100.0	100.0	100.0	100.0

TABLE 3.9: Distribution of Individuals According to Severity of Disability (CDI(I))

OCT-JUN WEIGHTED (%)		SEVERITY OF DISABILITY	JAN-Test 3 WEIGHTED (%)	
Screened-in Population	Population		Screened-in Population	Population
5.4	0.7	Severe	3.8	0.8
11.3	1.4	Moderate	7.9	1.6
20.6	2.7	Mild	15.1	3.0
62.7	8.1	Marginal	73.2	14.7
100.0	**12.9**	**Total**	100.0	20.1