DESIGN EFFECTS IN A COMPLEX MULTISTAGE SAMPLE: THE SURVEY OF LOW INCOME AGED AND DISABLED (SLIAD)

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This paper presents the results of an empirical examination of design effects of attributes and proportions estimated from a complex sample survey. The investigation was carried out as part of an effort to simplify the computation and presentation of measures of sampling variability for the numerous statistics that can be derived. The SLIAD data set contains well over 2,000 variables. In addition, statistics such as proportions, averages, aggregates, differences and many others can also be estimated. Even with the most up-to-date computers it would be too costly and cumbersome to compute and present sampling errors for each statistic of interest, especially when survey results are presented as cross-tabulations that are both lengthy and numerous.

One approach to estimating sampling errors for a survey of SLIAD's magnitude is to compute sampling errors for subsets of characteristics and to use the results to generalize, where possible, to the larger set.[1],[2] In this case, variances, specifically rel-variances, were computed directly for a subset of attributes using a random group - collapsed stratum method. A regression curve was fitted to the estimates and rel-variances having a similar relationship. Sampling errors for other characteristics were then estimated from the generalized variance model. SLIAD because of its complex design required nine separate models. From each model look up tables of standard errors of attributes and proportions were generated by computer.

Another approach is to use what Kish calls "design effects" [3]. Design effects measure the relationship between the variance based on the actual complex sample and the variance based on a simple random sample of the same size. If design effects could be generalized for similar statistics and subclasses, standard errors could be estimated much more easily by the relationship:

$$\text{standard error} = (\text{design effect})^{1/2} \times (\text{simple random sampling variance})^{1/2}$$

Variances for simple random sample estimates are readily available as a byproduct from most statistical software packages or they are easily added to a computer tabling routine.

Unlike other studies of design effects (at least those that have come to the attention of the authors [4]-[7]), this study looks at design effects for quantities with simple estimates and known and easily expressible variance equations. The idea here is to use design effetts as a relatively easy way for providing analysts with an easy method of obtaining estimates of sampling variability for a myriad of data cells.

Although the present research does not attempt to generalize the design effects, the results are nevertheless inciteful.

The Survey

SLIAD is a two year panel survey conducted by the Social Security Administration to assess the impact of the Supplemental Security Income (SSI) program on its target population [8]. Interviews were conducted with about 18,000 persons in the fall of 1973 just prior to the implementation of SSI and again in late 1974 after SSI had been in operation about a year.

The study population is represented by 4 national samples of noninstitutionalized adults. Two are samples of aged and disabled persons who received welfare payments in 1973 under the State operated old-age assistance, aid to the blind and aid to the permanently and totally disabled programs. The other two represent low income aged and disabled persons in the general population at that time. The results in this report are from the two welfare recipient samples.

Sample Design

The aged and disabled welfare samples were selected under a stratified multi-stage cluster design [9]. The samples provide national estimates, and separate estimates for 5 States--California, Georgia, Mississippi, New York and Texas--and the balance of the U.S.

The welfare population was grouped into primary sampling units (PSU's) similar to those used by the Bureau of the Census for the Current Population Survey [10]. The U.S. was divided into 6 global strata--the 5 States and the balance of the U.S. Within each global stratum the PSU's were restratified to form strata about equal in total welfare population. Each stratum contained one or more first stage units consisting of CPS PSU's from a common CPS stratum. Restratification for the balance of the U.S. component was by welfare population and average benefit payment within four geographical regions. Overall 212 strata were formed. 55 of these contained one PSU termed self-representing (SR) and the rest of the strata contained more than one. PSU's in these strata are referred to as non-selfrepresenting (NSR).

There were three stages of selection within each of 12 self-weighting component samples. The first state was the selection of a cluster of CPS PSU's from a common CPS stratum with probability proportionate to size of the welfare population. The second stage was the selection of the CPS PSU with probability proportionate to Census population. The final stage was the selection of individual recipients using a systematic sampling plan within each of the two aid categories.

Variance Estimation

The computations for estimating variances and developing the generalized model were carried out using the software package "Processor for the Analysis of Statistical Surveys" (PASS) [11] developed at SSA. The combined random group--collapsed stratum method for estimating variances is as follows:

Random Group Method

This method was utilized for estimating the variances of attributes for the SR PSU's. The sample cases in these PSU's were assigned a random number from 1-8 using a random number generator to establish a new random start for each county in each PSU. The aged and disabled cases were treated separately. Then

$$\text{Var }(x_i)SR = \sum_{h=1}^{L} \frac{K}{K-1} \sum_{g=1}^{K} (x_{ghi} - \bar{x}_{hi})^2$$

where X_{ghi} is the inflation estimate of the i^{th} characteristic for the g^{th} random group in the h^{th} stratum (PSU);

K is the number of random groups, K = 8;

L is the number of self-representing strata, L = 55;

and $$x_{i,SR} = \sum_{h=1}^{L} \sum_{g=1}^{K} x_{ghi}$$

$$\bar{x}_{hi} = \frac{1}{K} \sum_{g=1}^{K} x_{ghi}$$

Collapsed Stratum Method

Variances for the NSR part of the samples were estimated by this method. Each of the strata from which the NSR PSU's were selected was assigned to a super stratum SS_h such that each super stratum contained two or three strata. No SS_h contained strata from more than one global stratum. For the 5 States the strata forming each SS_h were nearly equal in size of total welfare population. The strata in the balance of the U.S. samples were combined on the basis of geographic proximity.

Each PSU in a super stratum was assigned a proportional weight equal to the ratio of the total welfare population of the PSU's stratum to total welfare population of the super stratum. Then

$$\text{Var }(x_i)NSR = \sum_{h=1}^{L} \frac{G}{G-1} \sum_{g=1}^{G} (x_{ghi} - P_{gh}\, x_{hi})^2$$

where $$x_{hi} = \sum_{g=1}^{G} x_{ghi}$$

$$x_{i,NSR} = \sum_{h=1}^{L} x_{hi}$$

and

x_{ghi} is the inflated estimate for the i^{th} characteristic in the g^{th} PSU in the h^{th} super stratum;

G_h = the number of PSU's in the h^{th} super stratum;
G = 2 sometimes 3

L = number of super strata

P_{gh} = proportional weight for the g^{th} stratum in the h^{th} super stratum;

$$= \frac{\text{welfare population in } g^{th} \text{ stratum}}{\text{sum of welfare population for all strata in } h^{th} \text{ super stratum}}$$

Combined Estimate

For an attribute,

$$x_i = x_{i,SR} + x_{i,NSR}$$

$$\text{Var }(x_i) = \text{Var }(x_{i,SR} + x_{i,NSR})$$

$$= \text{Var }(x_{i,SR}) + \text{Var }(x_{i,NSR})$$

then rel-variance $$v^2(x_i) = \frac{\text{Var }(x_i)}{x_i^2}$$

$$= \frac{\text{Var }(x_{i,SR} + x_{i,NSR})}{(x_{i,SR} + x_{i,NSR})^2}$$

For a proportion, $\frac{x_i}{y_i}$, an approximation was used,

$$\text{Var}\left(\frac{x_i}{y_i}\right) = \left(\frac{x_i}{y_i}\right)^2 (V^2(x_i) - V^2(y_i))$$

The generalized variance estimating model is of the form[12],

$$V^2(x_i) = a + \frac{b}{x} + \frac{c}{\sqrt{x}}$$

The 9 subgroups requiring separate models were:

Total U.S. aged and disabled
California aged and disabled
Georgia aged and disabled
Mississippi aged
Mississippi disabled ($V^2 = a + \frac{b}{x}$)
New York aged and disabled
Texas aged
Texas disabled
Other U.S. aged and disabled

Methodology

The design effect is defined as the ratio:

$$\frac{\text{Variance of complex sample estimate}}{\text{variance of simple random sample estimate}}$$

The square root of the design effect is referred to as the design factor.

Design effects were considered for six variables separately for each of the 12 samples (Cal., Ga., Miss., N.Y., Texas, other U.S. by aged and disabled). The six variables were age, race, education, marital status, urban/rural, nuclear family annual income, and poverty ratio.

For each statistic, x, we computed the

(1) simple random sample variance =
$\text{Var}(x)_{SRS} = ((1-f)N) \frac{(P(1-P))}{n-1}$ where
f is the sampling rate, P is the proportion of the people in the sample component having the characteristic, n is the sample size and N is the population total for each sample

(2) random group - collapsed stratum variance=
$\text{Var}(x)_{RG-CS}$ (see section on variance estimation)

(3) Design effect =
$$\text{Deff} = \frac{\text{Var}(x)_{RG-CS}}{\text{Var}(x)_{SRS}}$$

(4) Design factor = $\sqrt{\text{Deff}}$

Some Observations

Attributes

Among the aged and disabled samples (tables 1 and 2), the design factors, vary considerably. The vast majority are greater than 1 and in a few instances are as high as 4 or 5. For certain characteristics these design factors are consistently high across all samples. For example, among the aged components the design factors for race-white are the highest ranging from 1.5 to 5.3. While among the disabled components, some of the highest design factors are also for race-white, this is not consistently true for all disabled components.

In California 96 percent of the aged and disabled sample cases are located in 30 self-representing PSU's and 4 percent are located in nonself representing PSU's. Here the design factors are generally the lowest and the most stable. They range from .8 to 1.5 for the aged sample and .8 to 1.3 for the disabled. In both instances many of the characteristics have design factors equal to 1. If we use the SRS estimate of the variance we would tend to over estimate the variance in only a few instances. Averaging $\sqrt{\text{Deff}}$ offers little improvement over the SRS estimate especially for the aged sample. For the disabled using the average which is 1.04 offers some payoff.

In Georgia 17 percent of the aged and 23 percent of the disabled sample cases are located in 2 self-representing PSU's. The balance of the cases are located in 18 nonself representing PSU's. The design factors are slightly higher than those for California and are less stable. Unlike California, the design factors for Georgia disabled are on the average less than those for the aged. This difference, however is only slight. Most notable is the variation among variables and across components. The design factors for "large cities" were about the same 3.1 and 3.3 for the two components but were the highest of all the characteristics for both components.

The distribution of sample cases for Mississippi is almost the complete reverse of that in California. Seven percent of the aged and 8 percent of the disabled are in 1 self-representing PSU. 14 nonself representing PSU's contain the balance. Again there is considerable variation in the design factors; however, the range of the design factors is about the same for both components. The design factors for race-white and black, and rural and small town behave similarly for both components and are among the highest of the characteristics.

The New York samples come from the least number of PSU's. 78% aged and 83% disabled come from 4 self-representing PSU's and the remainder from 7 nonself representing PSU's. The design factors for the aged sample are all 1.5 or less. The lowest .5 is for large cities. Except for rural with a design factor of 2.2 and white with deff = 1.7; the design factors for the disabled sample are less than 1.5. The lowest factor .3 for large cities in the disabled sample is the lowest of all characteristics for all samples.

The Texas samples consist of cases selected mostly from nonself representing PSU's. 77% of the aged and 71% of the disabled were selected from 21 nonself representing PSU's and 23% of the aged and 29% of the disabled come from 4 self-representing PSU's. The design factors for both samples are generally high, the highest 5.5 and 4.0 are for the same characteristics; aged white and disabled white. The two next highest design factors are also for the same characteristics aged and disabled small town and aged and disabled nuclear family poverty ratio of less than 75%. This pattern does not hold for the other characteristics; however in most instances the design factors for aged characteristics are usually higher than those for the disabled.

The final samples to be considered represent the balance of the U.S. Here 20% of the aged cases and 31% of the disabled cases are in 14 self-representing PSU's and the balance are in 95 nonself PSU's. The design factors for these samples are by far the highest. Like Texas, "white", small town and "less than 75% nuclear family poverty ratio" have consistent design factors across the two samples. Although the factor for disabled large cities is high, 2.1, it is not as high as that of aged large cities, 3.7. Generally the design factors for the disabled sample are lower than those for the aged sample and have less variation.

Proportions

The design factors for proportions (tables 3 and 4) are considerably less than those for attributes and are far more stable. Among the aged sample components the design factors are 1.5 or less while some disabled characteristics have factors as high as 1.7 and 1.8. The highest design factors are found in the two balance of the U.S. samples.

The California aged sample had consistently low design factors ranging from .7 to 1.0. Here SRS variance estimates would tend to overestimate the variance. However because of their stability, a single design factor equal to the sample average design factor, .9, can be used to adjust the SRS variance estimate. This is true for all the sample components except the California disabled. Here the SRS estimate, without an adjustment, is quite satisfactory.

Among the other sample components the design factors for aged characteristics were lower than those for the disabled for Georgia, Texas and the balance of the U.S. What is most noticeable is the lack of variation in the design factors within the sample components. Particularly the Mississippi and New York disabled components which are the only two among the disabled with design factors less than that of the aged components. Here the design factors are identical for all characteristics.

Conclusions

Some of the interesting results from a sample design standpoint can be found by comparing the design effects for the state samples. The sample for California contains only 2 nonself representing strata - which means little clustering effect and the design effects are about 1.0. This also suggests that the stratification was not effective. The sample for Texas in contrast, comprised mostly nonself representing strata - which would result in clustering effects. The design effects for Texas are consistently higher than 1.0 which verifies the clustering effect.

Another interesting result is the comparison of design effects for proportions vs. attributes. Proportions are theoretically more reliable than attributes and this is supported by these results. In addition, the design effects for proportions are less variable which may be an effect of the approximations used to obtain the SLIAD variances - this should be the subject of further investigation.

The results obtained for proportions offer some hope that generalizing design effects is an obtainable objective. On the basis of these results we are encouraged to extend the investigation to other characteristics. Many more characteristics would have to be considered before concrete conclusions could be drawn. However, because of the stability of the design factors for the characteristics we have considered, it appears that a simple average design factor might work well for proportions. For SLIAD these results are promising, most of the descriptive reports consist primarily of proportions. No conclusions can be drawn from the results for attributes. What is apparent is that because of the variation in the design factors additional research is needed. We should, through further investigation, determine the reasons for the variation and consider other techniques, besides the simple average, for constructing a single design factor for each of the samples.

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TABLE 1: Design Factors for Selected Characteristics by Aged Sample Component - Total Persons

Characteristics	California			Georgia			Mississippi			New York			Texas			Balance of U.S.			United States		
	Est (000)	SE (000)	√DEFF	Est (000)	SE (000)	√DEFF	Est (000)	SE (000)	√DEFF	Est (000)	SE (000)	√DEFF	Est (000)	SE (000)	√DEFF	Est (000)	SE (000)	√DEFF	Est (000)	SE (000)	√DEFF
Age																					
65-74	132	4.6	1.0	44	2.1	1.4	43	2.7	1.8	53	1.9	1.0	82	7.7	2.4	509	31	2.8	864	33	2.9
75-84	94	4.4	1.0	29	2.9	1.9	25	2.2	1.6	32	2.2	1.2	65	8.2	2.6	340	24	2.2	586	26	2.4
85+	32	3.1	1.1	9	1.0	1.1	9	.9	1.0	13	1.1	1.0	26	3.2	1.4	128	8	1.2	216	10	1.4
White	216	4.8	1.5	48	4.8	3.1	28	4.6	3.2	66	2.7	1.5	125	16.1	5.5	722	52	5.3	1205	56	5.5
Black	34	2.8	1.0	33	4.0	2.5	49	4.0	2.8	26	1.0	.7	47	8.1	2.8	249	22	2.3	439	25	2.5
Other	8	1.7	1.1	.2	.2	1.0	-	-	-	6	1.4	1.5	.8	.4	1.1	7	2	1.1	22	3	1.2
0-4 ed.	63	3.9	1.0	37	2.2	1.4	33	2.4	1.7	32	1.1	.7	76	8.9	2.8	351	23	2.1	593	25	2.3
5-8	100	4.6	1.1	35	2.5	1.6	32	2.8	1.5	41	1.7	1.1	66	9.4	3.0	455	31	2.6	729	32	2.9
9-11	38	3.2	1.0	6	1.3	1.6	9	1.3	1.4	11	1.7	1.3	17	3	1.6	107	12	1.7	199	13	1.8
12+	55	3.7	1.0	2	.5	1.0	2	.4	.8	9	.8	.7	10	1.9	1.3	58	7	1.4	137	8	1.4
Married	69	4.2	1.1	27	1.8	1.2	31	1.7	1.2	12	1.6	1.2	51	5.7	2.0	263	23	2.4	453	25	2.4
Widowed	133	4.1	.9	44	2.3	1.5	35	1.7	1.2	63	1.8	1.0	90	8.6	2.7	520	32	2.9	884	34	3.0
Separated	12	1.7	.9	3	.6	1.0	4	.5	.8	7	1.3	1.5	7	1.5	1.2	48	7	1.4	83	7	1.5
Divorced	27	2.7	1.0	3	.7	1.3	3	.5	.9	5	.9	1.2	17	2.6	1.4	63	6	1.1	118	7	1.2
Never married	17	2.4	1.1	5	.8	1.2	4	.9	1.3	10	.9	.8	8	2.2	1.7	84	7	1.2	128	8	1.4
Rural	14	1.8	.9	32	4.6	2.9	41	5.6	3.6	3	.9	1.4	30	4.9	2.0	259	27	2.7	379	28	3.0
Small town	122	5.1	1.1	40	2.7	1.7	34	3.2	2.2	27	1.7	1.0	105	15.3	4.8	481	36	3.2	808	40	3.5
Large cities	123	3.8	.9	10	3.5	3.3	3	.5	1.0	68	.8	.5	38	7.2	2.1	234	36	3.7	476	37	3.6
Ann Inc NF <1000	.9	.6	1.2	8	1.2	1.3	20	2.0	1.6	2	.6	1.0	12	1.9	1.2	58	10	1.9	101	11	2.0
1000-1499	4	1.1	1.1	31	2.4	1.6	13	1.5	1.3	11	1.1	.9	73	8.8	2.8	285	16	1.9	416	22	2.2
1500-1999	10	1.8	1.1	10	1.0	1.0	16	1.5	1.3	21	2.3	1.5	34	2.9	1.2	264	29	3.0	355	30	3.2
2000-2499	50	3.4	1.0	17	1.4	1.1	6	.7	.9	26	1.3	.8	25	3.9	1.8	124	12	1.7	248	14	1.7
2500-2999	100	4.5	1.1	4	.4	.7	13	1.7	1.6	13	1.0	.8	11	2.1	1.3	92	11	1.8	233	13	1.6
3000+	70	3.4	.9	5	.6	.8	7	.7	.9	12	1.0	.8	4	1.0	1.1	76	11	1.8	173	12	1.7
Pov Ratio NF <.75	6	1.5	1.1	44	2.1	1.3	41	2.6	1.8	17	1.6	1.1	107	11.9	3.8	450	36	3.2	66	40	8.6
.75-.99	21	2.5	1.0	20	1.5	1.1	16	1.4	1.2	28	2.1	1.2	43	4.1	1.5	260	21	2.2	390	22	2.3
1.00-1.25	89	3.5	.8	6	.8	.9	14	1.4	1.2	24	2.1	1.3	6	1.5	1.3	122	13	1.8	262	14	1.7
1.26+	118	4.6	1.0	4	.6	.9	3	.7	1.2	16	1.4	1.0	3	1.0	1.2	66	9	1.6	210	10	1.4

TABLE 2: Design Factors for Selected Characteristics by Disabled Sample Component - Total Persons

Characteristics	California			Georgia			Mississippi			New York			Texas			Balance of U.S.			United States		
	Est (000)	SE (000)	√DEFF	Est (000)	SE (000)	√DEFF	Est (000)	SE (000)	√DEFF	Est (000)	SE (000)	√DEFF	Est (000)	SE (000)	√DEFF	Est (000)	SE (000)	√DEFF	Est (000)	SE (000)	√DEFF
Age																					
18-29	27	2.0	.9	6	.5	.9	4	.3	.8	18	2.3	1.2	9	.5	1.3	80	5.7	1.3	140	6.5	1.4
30-49	49	2.5	.9	9	.8	1.2	6	.7	1.5	42	2.1	.8	8	.8	1.8	182	13.5	2.2	296	14.0	2.2
50-64	101	3.1	1.0	23	1.6	2.0	18	.9	1.7	82	3.8	1.3	16	1.2	2.3	365	16.8	2.7	606	19.6	2.7
65-74	20	2.1	1.1	3	.5	1.4	2	.3	1.2	8	1.4	1.1	1	.2	1.1	67	8.1	2.0	101	6.5	2.1
75-84	4	.9	1.0	-	-	-	-	-	-	-	-	-	-	-	-	7	2.2	1.6	12	2.4	1.7
85+	1	.5	1.0	-	-	-	-	-	-	-	-	-	-	-	-	3	.9	1.1	5	1.2	1.3
White	151	3.1	1.1	23	1.9	2.5	9	1.9	3.6	83	5.0	1.7	21	1.9	4.0	483	34.7	5.2	772	35.4	5.1
Black	46	2.6	1.0	18	1.8	2.3	19	1.8	3.4	60	2.3	.8	11	1.2	2.5	217	14.4	2.2	371	15.1	2.2
Other	5	.9	.9	-	-	-	-	-	-	7	.9	.8	-	-	-	4	1.7	1.7	15	2.1	1.3
0-4 yrs. ed.	34	2.7	1.1	20	.9	1.2	12	.8	1.5	28	3.1	1.3	14	1.2	2.5	213	15.4	2.4	321	16.1	2.5
5-8	59	2.9	1.0	13	.9	1.3	11	.8	1.6	50	3.4	1.2	9	.6	1.4	246	16.2	2.4	388	16.9	2.5
9-11	42	2.6	1.0	6	.6	1.1	5	.6	1.6	39	3.5	1.4	5	.5	1.3	128	8.6	1.6	224	9.7	1.7
12+	66	3.2	1.1	3	.5	1.4	2	.5	1.6	32	2.2	.5	4	.4	1.4	113	8.8	1.7	219	9.6	1.7
Married	53	2.9	1.0	12	1.3	1.9	9	.5	1.1	24	2.8	1.3	9	.8	1.8	151	12.8	2.2	256	13.5	2.3
Widowed	37	3.1	1.2	9	.5	.8	6	.5	1.1	34	2.6	1.1	4	.4	1.2	130	9.4	1.7	220	10.3	1.8
Separated	19	2.1	1.1	4	.7	1.4	4	.5	1.4	25	2.6	1.2	2	.3	1.0	80	5.9	1.3	135	6.8	1.5
Divorced	41	2.7	1.0	3	.3	.8	2	.5	1.7	14	1.0	.6	5	.5	1.5	104	7.2	1.5	170	7.9	1.6
Never married	52	3.1	1.1	13	.8	1.1	8	.7	1.5	53	3.6	1.3	13	1.1	2.3	238	14.9	2.2	377	15.8	2.3
Rural	8	1.3	1.1	15	1.4	1.9	14	1.5	2.9	5	2.2	2.2	5	1.0	2.8	129	15.2	2.6	175	15.7	3.0
Small town	94	2.7	.8	19	1.9	2.5	14	1.7	3.1	36	3.4	1.4	17	1.9	3.8	328	28.0	4.0	507	28.6	4.0
Large cities	99	2.0	1.1	7	1.8	3.1	2	.2	.8	110	.8	.3	9	1.4	3.1	243	14.0	2.1	471	14.4	2.0
Ann Inc NF 1000	2	.5	.9	8	.6	1.0	12	.7	1.4	7	1.1	1.0	6	.5	1.4	121	13.9	2.6	155	1.4	.3
1000-1499	3	1.0	1.2	15	.9	1.2	5	.4	1.1	22	2.4	1.2	13	1.0	2.1	185	15.7	2.5	243	16.0	2.7
1500-1999	20	2.0	1.0	5	.4	.8	4	.3	.7	23	1.7	.8	4	.4	1.4	154	9.9	1.7	211	10.5	1.9
2000-2499	39	2.9	1.2	5	.5	1.0	2	.4	1.2	41	2.8	1.1	3	.3	1.1	84	5.9	1.3	195	7.3	1.4
2500-2999	64	4.0	1.3	1	.3	1.0	2	.4	1.4	18	2.1	1.1	1	.2	1.1	46	3.7	1.1	106	5.2	1.3
3000+	14	1.7	1.1	4	.8	1.7	3	.3	1.1	22	3.0	1.5	1	.3	1.3	57	5.5	1.5	15	7.5	4.5
Pov Ratio NF .75	18	1.8	1.0	28	1.3	1.7	22	1.2	2.5	40	3.0	1.2	24	1.7	3.9	444	32.2	4.7	575	32.6	4.7
.75-.99	57	3.0	1.0	6	.6	1.2	4	.2	.6	55	3.6	1.3	3	.4	1.2	123	7.0	1.3	248	8.5	1.5
1.00-1.25	63	3.5	1.2	2	.3	1.1	2	.3	1.3	22	1.8	.9	-	-	-	51	5.0	1.4	140	6.4	1.4
1.26+	49	3.4	1.2	2	.3	1.1	1	.2	1.2	15	1.9	1.1	-	-	-	29	2.8	1.1	98	4.8	1.2

TABLE 3: Design Factors for Selected Characteristics by Aged Sample Component - Proportions

Characteristics	California			Georgia			Mississippi			New York			Texas			Balance of U.S.			United States		
	Est %	SE	$\sqrt{DEFF}$	Est %	SE	$\sqrt{DEFF}$	Est %	SE	$\sqrt{DEFF}$	Est %	SE	$\sqrt{DEFF}$	Est %	SE	$\sqrt{DEFF}$	Est %	SE	$\sqrt{DEFF}$	Est %	SE	$\sqrt{DEFF}$
Age																					
65-74	51	1.3	.8	54	2.2	1.1	56	2.7	1.5	54	2.2	1.1	48	2.3	1.3	52	1.5	1.4	52	1.0	1.4
75-84	37	1.3	.8	35	2.0	1.1	33	2.5	1.4	33	2.1	1.1	37	2.2	1.3	35	1.4	1.3	35	1.0	1.4
85+	12	.9	.9	11	1.2	1.0	12	1.6	1.3	16	1.8	1.3	15	1.6	1.2	13	.9	1.2	13	.6	1.3
White	84	.9	.7	59	2.1	1.1	36	2.6	1.4	67	2.1	1.1	72	2.1	1.3	74	1.4	1.4	72	.9	1.5
Black	13	1.0	.9	40	2.1	1.1	64	2.7	1.5	27	1.9	1.1	27	2.0	1.2	25	1.3	1.3	26	.9	1.4
Other	3	.5	1.0	.4	.2	.9	-	-	-	6	1.0	1.1	1	.3	1.1	1	.2	1.0	1	.2	1.1
0-4 yrs ed.	25	1.2	.8	46	2.1	1.1	43	2.7	1.4	33	2.1	1.1	44	2.3	1.3	36	1.4	1.3	36	.9	1.4
5-8	39	1.3	.8	43	2.1	1.1	42	2.7	1.4	52	2.5	1.2	38	2.2	1.3	47	1.5	1.4	44	.9	1.4
9-11	15	1.0	.9	7	.9	1.0	12	1.7	1.3	12	1.4	1.1	10	1.3	1.2	11	.8	1.2	12	.5	1.3
12+	21	1.1	.8	3	.6	1.0	3	.9	1.3	10	1.3	1.1	6	1.0	1.2	6	.6	1.1	8	.5	1.2
Married	27	1.2	.8	33	1.9	1.1	39	2.6	1.4	13	1.5	1.1	29	2.1	1.2	27	1.3	1.3	27	.8	1.4
Widowed	52	1.3	.8	54	2.2	1.1	45	2.7	1.4	64	2.1	1.1	52	2.3	1.3	53	1.5	1.4	53	1.0	1.4
Separated	5	.7	.9	4	.7	1.0	6	1.1	1.3	9	1.4	1.3	4	.8	1.1	5	.5	1.1	5	.3	1.2
Divorced	10	.9	.9	3	.7	1.0	4	.9	1.3	5	.9	1.1	10	1.3	1.2	7	.6	1.1	7	.4	1.2
Never married	7	.8	.9	6	.9	1.0	5	1.1	1.3	11	1.4	1.1	5	.9	1.1	9	.7	1.2	8	.4	1.2
Rural	6	.7	.9	39	2.1	1.1	53	2.7	1.4	3	.8	1.1	17	1.7	1.2	27	1.3	1.3	23	.7	1.3
Small town	47	1.3	.8	49	2.1	1.1	44	2.7	1.4	28	1.9	1.1	61	2.3	1.3	49	1.5	1.4	49	1.0	1.4
Large city	48	1.3	.8	12	1.3	1.0	3	.9	1.3	69	2.0	1.1	22	1.8	1.2	24	1.2	1.3	29	.8	1.4
Ann Inc NF < 1000	.4	.2	1.0	10	1.1	1.0	27	2.3	1.4	2	.6	1.1	7	1.1	1.2	6	.6	1.1	6	.4	1.2
1000 - 1499	1	.4	1.0	38	2.0	1.1	17	1.9	1.4	11	1.4	1.1	42	2.3	1.3	29	1.3	1.3	25	.8	1.4
1500 - 1999	4	.6	.9	12	1.3	1.0	21	2.1	1.4	21	1.8	1.1	20	1.8	1.2	27	1.3	1.3	21	.7	1.3
2000 - 2499	19	1.1	.8	20	1.6	1.1	8	1.4	1.3	27	1.9	1.1	15	1.5	1.2	13	.9	1.2	15	.6	1.3
2500 - 2999	39	1.3	.8	5	.8	1.0	16	1.9	1.4	13	1.5	1.1	6	1.0	1.2	10	.8	1.2	14	.6	1.3
3000 +	27	1.2	.8	6	.9	1.0	9	1.4	1.3	12	1.5	1.1	2	.6	1.1	8	.7	1.2	10	.5	1.3
Pov. Ratio <.75	2	.5	1.0	54	2.2	1.1	53	2.7	1.4	17	1.7	1.1	62	2.3	1.3	46	1.5	1.4	4	.3	1.2
.75 - .99	8	.8	.9	24	1.8	1.1	21	2.1	1.4	29	2.0	1.1	25	1.9	1.2	27	1.3	1.3	26	.8	1.3
1.00 - 1.25	35	1.3	.8	8	1.0	1.0	19	2.0	1.4	24	1.9	1.1	4	.9	1.1	13	.9	1.2	17	.7	1.3
1.26+	46	1.3	.8	4	.8	1.0	4	.9	1.3	17	1.7	1.1	1	.5	1.1	7	.6	1.2	14	.6	1.3

TABLE 4: Design Factors for Selected Characteristics by Disabled Sample Component - Proportions

Characteristics	California			Georgia			Mississippi			New York			Texas			Balance of U.S.			Total U.S.		
	Est %	SE	$\sqrt{DEFF}$	Est %	SE	$\sqrt{DEFF}$	Est %	SE	$\sqrt{DEFF}$	Est %	SE	$\sqrt{DEFF}$	Est %	SE	$\sqrt{DEFF}$	Est %	SE	$\sqrt{DEFF}$	Est %	SE	$\sqrt{DEFF}$
Age																					
18-29	13	1.2	1.1	14	1.8	1.4	13	1.5	1.3	12	1.3	.9	16	1.5	1.3	11	1.0	1.5	12	.6	1.6
30-49	24	1.4	1.0	22	2.2	1.4	21	1.8	1.3	28	1.8	.9	28	1.9	1.3	26	1.4	1.6	26	.9	1.7
50-64	50	1.5	1.0	56	2.8	1.5	59	2.2	1.3	55	2.0	.9	53	2.2	1.4	52	1.7	1.7	52	1.1	1.8
65-74	10	1.0	1.1	8	1.4	1.4	6	1.1	1.3	6	.9	.9	5	.8	1.2	10	.9	1.5	9	.5	1.6
75-84	2	.5	1.2	1	.3	1.3	-	-	-	-	-	-	-	-	-	1	.3	1.3	1	.2	1.4
85+	1	.3	1.2	-	-	-	-	-	-	-	-	-	-	-	-	1	.2	1.2	-	-	-
White	75	1.2	.9	56	2.8	1.5	34	2.1	1.3	55	1.8	.9	67	2.1	1.4	69	1.8	1.8	67	1.1	1.8
Black	23	1.4	1.0	44	2.8	1.5	65	2.2	1.3	41	1.7	.9	35	2.1	1.4	31	1.5	1.7	32	1.0	1.7
Other	2	.6	1.2	-	-	-	-	-	-	4	.7	.9	-	-	-	1	.2	1.2	1	.2	1.4
0-4 yrs. ed.	17	1.3	1.1	49	2.8	1.5	39	2.2	1.3	19	1.4	.9	45	2.2	1.4	30	1.5	1.7	30	.9	1.7
5-8	29	1.5	1.0	32	2.6	1.5	34	2.1	1.3	34	1.7	.9	28	1.9	1.3	35	1.6	1.7	34	1.0	1.7
9-11	21	1.3	1.0	13	1.8	1.4	16	1.7	1.3	26	1.6	.9	16	1.5	1.3	18	1.2	1.6	20	.8	1.7
12+	33	1.5	1.0	6	1.2	1.4	8	1.1	1.3	21	1.5	.9	12	1.3	1.3	16	1.1	1.6	19	.8	1.6
Married	26	1.5	1.0	28	2.5	1.5	32	2.1	1.3	16	1.3	.9	22	1.8	1.3	22	1.3	1.6	22	.9	1.7
Widowed	19	1.2	1.0	21	2.2	1.4	21	1.8	1.3	23	1.5	.9	14	1.4	1.3	19	1.2	1.6	19	.8	1.6
Separated	10	1.0	1.1	11	1.6	1.4	12	1.5	1.3	17	1.3	.9	8	1.1	1.3	11	1.0	1.5	12	.6	1.6
Divorced	20	1.3	1.0	8	1.4	1.4	8	1.2	1.3	10	1.1	.9	15	1.5	1.3	15	1.1	1.6	15	.7	1.6
Never married	26	1.5	1.0	33	2.6	1.5	27	2.0	1.3	35	1.7	.9	43	2.1	1.4	34	1.6	1.7	33	1.0	1.7
Rural	4	.7	1.1	36	2.7	1.5	47	2.3	1.3	3	.6	.9	16	1.5	1.3	18	1.2	1.6	15	.7	1.6
Small town	47	1.5	1.0	45	2.8	1.5	46	2.3	1.3	24	1.7	.9	55	2.2	1.4	47	1.7	1.7	45	1.1	1.8
Large cities	49	1.2	.9	18	2.0	1.4	6	1.1	1.3	73	1.8	.9	30	2.0	1.3	35	1.6	1.7	41	1.1	1.7
$1000 NF Ann Inc.	1	.4	1.2	19	2.1	1.4	41	2.2	1.3	5	.7	.9	18	1.6	1.3	17	1.2	1.6	14	.7	1.6
1000 - 1499	2	.5	1.2	36	2.7	1.5	16	1.7	1.3	14	1.3	.9	42	2.1	1.4	26	1.4	1.6	21	.8	1.7
1500 - 1999	10	1.1	1.0	12	1.7	1.4	14	1.6	1.3	16	1.3	.9	13	1.4	1.3	22	1.3	1.6	18	.8	1.6
2000 - 2499	30	1.5	1.0	11	1.6	1.4	8	1.2	1.3	27	1.6	.9	8	1.1	1.3	12	1.0	1.5	17	.8	1.6
2500 - 2999	19	1.3	1.0	3	.9	1.3	8	1.2	1.3	12	1.2	.9	4	.7	1.2	7	.7	1.5	9	.6	1.6
3000 +	32	1.4	1.1	9	1.4	1.4	9	1.3	1.3	15	1.3	.9	5	.8	1.2	8	.8	1.5	1	.2	1.4
.75 NF Pov. Ratio	9	1.0	1.1	68	2.7	1.5	73	2.0	1.3	27	1.6	.9	77	1.9	1.4	63	1.7	1.8	54	1.1	1.8
.75 - .99	29	1.4	1.0	14	1.9	1.4	12	1.5	1.3	37	1.6	.9	9	1.1	1.3	18	1.2	1.6	24	.9	1.7
1.00 - 1.25	32	1.5	1.0	4	1.0	1.3	8	1.1	1.3	14	1.7	.9	2	.5	1.2	7	.8	1.5	13	.7	1.6
1.26+	24	1.4	1.0	4	1.0	1.3	3	.8	1.3	10	1.0	.9	3	.6	1.2	4	.5	1.4	9	.6	1.6