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March 5, 1986

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**Via Federal Express**

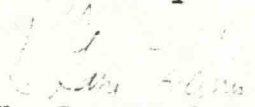
Chris Hansen  
National Staff Counsel  
American Civil Liberties Union  
132 West 43rd Street  
New York, NY 10036

Re: Brown v. Board of Education, et al.  
U.S.D.C. Kansas, No. T-316

Dear Chris:

Enclosed please find a copy of the expert opinion report prepared by Hickman-Maslin Research entitled "Analysis of Central Survey's Poll on Topeka Schools". While our expert, Harrison Hickman, is available for the taking of his deposition at the present time, based upon a recent conversation I had with Dan Biles, I understand that you and Dan have discussed the possibility of combining a trip to Baltimore for the taking of Dr. Crain's deposition with a trip to Washington to take the deposition of Harrison Hickman. This certainly would save a great deal of travel expense to the parties. I am generally in favor of this approach, if the scheduling can be worked out. Of course, we will want to analyze and review in advance Dr. Crain's Hartford study as well as any other articles which he is relying upon for his expert opinion.

Yours very truly,

  
K. Gary Sebelius  
of Eidson, Lewis, Porter & Haynes

KGS:tf

cc: Dan Biles (w/Enclosure)  
Carl Gallagher (w/Enclosure)

ANALYSIS OF CENTRAL SURVEY'S POLL  
ON TOPEKA SCHOOLS

Brown v. Topeka Board of Education USDC Case No. T-316

R. Harrison Hickman  
Partner, Hickman-Maslin Research

March 1986

Public  
Opinion  
Research

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## EXECUTIVE SUMMARY

Central Survey's poll of the views of Topeka residents toward the public school system has two critical problems: 1) methodological deficiencies in the sample design and the administration of the survey seriously undermine the quality of the data collected by the survey; and, 2) problems in the questionnaire design and the interpretation of the results indicate that Central Survey's findings are not nearly as clear as their report claims. Either set of problems is sufficient to challenge the conclusions presented in Central Survey's report.

The methodological problems with the sample design and survey design are numerous and serious:

- o By selecting a sample of respondents from a telephone directory, the survey excluded persons without telephones, those with unlisted numbers and persons with newly listed numbers.
- o The screening questions designed to exclude persons working for District 501 were so broad that they may have excluded persons who should have been included.
- o Central Surveys made no systematic attempt to exclude respondents who did not even live within District 501's boundaries.

The procedures used in the administration of the survey also greatly reduce the confidence that can be placed in the data collected:

- o The poll was conducted over a short period of time during the late summer, a time in which it is difficult to contact respondents.
- o Central Surveys employed no systematic procedures for callbacks so the sample underrepresented persons less likely to be at home.



- o The sample was not adjusted for household size so persons living in large households had a lower probability of being included in the sample than persons from small households.
- o The respondents were not randomly chosen from within each household so persons more likely to answer the phone are overrepresented.
- o Central Surveys failed to use quotas to adjust the sample in an attempt to account for the deficiencies in the survey administration.
- o Central Surveys did conduct a pretest of the survey, but they included the results of the pretest with the rest of the sample even though the pretest had different questions and the respondents were selected without using any callbacks.

The problems with the sampling design and survey administration are serious because in most cases there are no means to evaluate the extent of, or even correct for, the problems resulting from the failure to use standard survey procedures. Instead, the only conclusion is that the survey results obtained cannot be presumed to be a representative sample of Topeka residents, or even Topeka residents with children in school.

Apart from the deficiencies in collecting data, there are crucial problems which derive from the design of the questionnaire and the interpretation of the results:

- o Since Central Surveys did not test the meaning of the key words used in the questionnaire, such as "racially balanced", it is difficult to interpret the meaning the respondents assigned to the words.
- o The survey did not include several questions that would have aided the analysis of the poll's results: questions about schools that were "racially balanced" or about which school the respondents' children attended.
- o The ordering of the list of schools may have inflated the perception that some schools were "mainly white" and others "black or minority."

- o The report consistently suggests that the results refer to a population broader than the persons who had an opportunity to be included in the sample.
- o The report bases its conclusions on differences that are within the range of sampling error. Throughout the discussion of the results no statistical tests are conducted to measure the significance of the findings.
- o The central finding of the survey--that schools perceived as "mainly white" are rated as better than those viewed as "black or minority"--is not supported by any statistical analysis. Instead, when the proper statistical tests are conducted, the relationship between perceptions of racial balance and school quality at the level of the individual respondent appears very questionable.

Although the numerous and serious problems with the sampling design and survey administration seriously challenge the quality of the data collected by the interviews, even accepting the survey results does not mean Central Survey's conclusions are warranted.



## INTRODUCTION

This report assesses the methodology and analysis of the survey of Topeka residents which was conducted by Central Surveys for the plaintiffs. In preparing this report, I utilized the depositions taken of the Central Survey's officials, the materials entered as deposition exhibits, copies of the original call sheets and a data file of the survey responses produced by copy of the computer cards furnished by the plaintiffs.

This report centers around four crucial areas of any survey: 1) sample design; 2) survey administration; 3) questionnaire design; and, 4) interpretation of the results. In each area, I will detail their procedures and the possible implications of those methods on the results. Where their procedures deviate from normal survey methods, they will be noted. In general, there are two points to be made about this survey: 1) Problems that would arise even if the best and most expensive survey methods had been used. In other words, what are the limitations of any survey in attempting to measure the public's attitudes towards the quality and racial balance of schools; and, 2) Problems that occurred because of the specific methods employed by Central Surveys.

In most cases, knowledge of survey methodology enables one to identify problems, but not to quantify their effect on the results. Throughout this assessment, I will argue that certain procedures have prevented Central Surveys from obtaining a truly random sample and answers to clearly unbiased questions.

However, there is no means to judge the impact these problems had on the overall results. Instead, the procedures used by Central Surveys seriously undermine the validity of their findings. Consequently, we know very little more about the public's perception of Topeka schools than before the poll was conducted.



## SAMPLE DESIGN

The basic principle of survey research is that if a random sample can be drawn of a certain group of people (termed the "universe"), by interviewing a subsample of them, the opinions of the entire group can be determined within certain mathematical bounds. The survey can only measure the opinions of those people who had an opportunity to be selected to be interviewed; it cannot be used to describe the attitudes of those people outside the universe without nonscientific, subjective extrapolation and interpretation.

**Use of Telephone Interviewing.** Central Surveys limited the universe to be studied to a very specific segment of the people living in the Topeka area. First, by using telephone interviewing they excluded any person who does not have a telephone. Nationally approximately ten percent of the population do not have telephones. Those people who lack telephones are poorer, younger, less educated and more likely to be black.<sup>1</sup>

According to the 1980 Census, 1,804 of the 50,309 households

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<sup>1</sup> Robert M. Groves and Robert L. Kahn, Surveys By Telephones. (New York: Academic Press, 1979), pp. 91-97; Owen T. Thornberry, Jr., and James T. Massey, "Coverage and Response in Random Digit Dialed National Surveys," Proceedings of the Section on Survey Research Methods, American Statistical Association, August 15-18, 1983, pp. 654-659; Donald S. Tull and Gerald Albaun, "Bias in Random Digit Dialed Surveys," Public Opinion Quarterly, 41 (1977): 389-395.

(4%) within the Topeka city limits lack telephones.<sup>2</sup> The households in Topeka without telephones are disproportionately black. While only 3.1% of white households lack telephones, 10.7% of black households do not have telephones.

One means of dealing with this undersample of poorer respondents would be to adjust the sample by weighting according to demographic variables to reflect the lack of interviews with this group of people. However, Central Surveys did not use any weighting. Even weighting the sample would require the assumption that people without telephones have similar attitudes as those who share their demographic and socioeconomic characteristics but do have telephones. There would be no basis to assume that this is the case with attitudes toward the Topeka school system.

There are two other standard methods to avoid excluding persons without a telephone, both of which Central Surveys did not employ. The first is to conduct in-person interviews rather than use telephone interviewing. Although more expensive than telephone interviewing, in-person interviews are used when full coverage of the population is needed, such as in the census. In addition, Central Surveys could have supplemented its telephone interviews with in-person interviews with people without telephones. This dual sample method would have been less costly

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<sup>2</sup> U.S. Department of Commerce, Bureau of the Census. Census Tracks: Topeka, Kansas. PHC80-2-353. (Washington: Government Printing Office, June 1983). p. H-13.



than in-person interviews with all respondents yet still assured that the views of persons without telephones were represented in the sample.

**Use of Telephone Directories.** Another limitation of Central Survey's sampling procedures is that they selected telephone numbers from a phone book. This excludes persons with new phone numbers and persons with unlisted phone numbers. Nationwide about 20 percent of residential phone numbers are unlisted and the figure is nearly twice that in some urban areas.<sup>3</sup> According to estimates prepared by Southwestern Bell, 7,010 of the 58,503 residential lines (12%) within Topeka Central Zone A are unlisted.<sup>4</sup> However, this figure does not include phones that are not listed because they are new phone numbers since the publication of the last directory.

Persons without listed telephones numbers tend to differ in a variety of ways from persons with listed numbers. They are usually younger, households with many children, have lower incomes and less education, and are more likely to be women.<sup>5</sup> As with the lack of coverage of persons without telephones, Central

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<sup>3</sup> Groves and Kahn, p. 20.

<sup>4</sup> Letter from Ruth Sears, Attorney, Southwestern Bell Telephone, January 20, 1986.

<sup>5</sup> James A. Brunner and G. Allen Brunner, "Are Voluntary Unlisted Telephone Subscribers Really Different?" Journal of Marketing Research, Volume 8 (February 1971), pp. 121-124; Gerald J. Glasser and Gale D. Metzger, "National Estimates of Nonlisted Telephone Households and Their Characteristics," Journal of Marketing Research, Volume 12 (August 1975), pp. 359-361.

Survey's procedures prevent us from knowing the opinions of those without listed telephone numbers.

Two other problems occur when numbers from telephone directories are used to select a sample. First, persons who have moved and received new telephone numbers since the publication of the phone directory are excluded from the sample. Second, households with multiple listings have a larger probability of being interviewed. Although officials of Central Surveys stated that they did not call "teenager" lines, separate phone numbers listed under a husband and wife's name would result in that household have twice the chance of being selected for the sample than a household with only a single listing.

There are commonly used survey procedures that correct the problems of using a telephone directory to select a sample. Random-digit dialing (RDD) takes known telephone exchanges and randomly assigns numbers to the last four numbers to form a telephone number. Although such a sample includes many non-working and business numbers, it ensures that every person with a telephone has an opportunity to be included in the sample even if their number is unlisted or if it is a new number not contained in the latest phone directory.

By excluding persons without telephones and persons without listed telephone numbers, Central Survey's sample design excluded at least 16 percent of the households of the Topeka area from the survey. (The combined total of households without telephones and those with voluntary unlisted numbers, but not including those



with new listed numbers not in the directory.) Those with newly listed or changed numbers that were excluded cannot be quantified. Besides subjective judgment, there is no means to base conclusions about the opinions of this portion of Topeka residents because none were included in the sample.

**Use of Screening Questions.** The sample design limits the universe even further by the use of a screening question. At the beginning of the interview, the person answering the phone was asked: "Do you or any member of your family work in the educational field?" If the respondent answered affirmatively, the person was not interviewed. The purpose of the screening question was to exclude persons employed by the Topeka school system and their family members.

The vagueness of the screening question provides no indication of which persons were excluded from the sample. Central Surveys did not attempt to ascertain in the pretest or during the actual interviews what types of respondents were answering the question affirmatively.<sup>6</sup> Conceivably, respondents who worked, or a family member was employed by, private schools in the area, Washburn University, or any private company that dealt with education, could have answered that they worked in the "educational field." In addition, persons with parents, brothers, sisters, cousins, son and daughters who taught in areas outside of Topeka could have answered that "a member of their

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<sup>6</sup> The necessity of using pretesting to determine the actual meaning of questions is discussed later in this memorandum.

family worked in the educational field."

The important factor is the uncertainty; the procedures employed by Central Surveys resulted in a poll of a universe of persons with unknown characteristics. No one can predict which persons were excluded by the initial screening question because Central Surveys collected no other information about these people. If the sole reason for the screening question was to prevent persons employed by the Topeka public schools, and their immediate family members, from being included in the survey, the question was too broad to achieve such a limited purpose.

Three other screening questions were asked to narrow the sample to persons with recent experience with the Topeka school system. If the respondent answered affirmatively to one of the three following questions then they were included in the sample:

- 1) "Do you have any children in school anywhere from kindergarten through Grade 12?"
- 2) "Do you have any children who completed high school in Topeka within the past 5 years or so?"
- 3) "Did you complete your own schooling in the Topeka school system within the past 5 years?"

Once again the screening question was not closely tailored to its stated purpose. While persons with children in private and parochial schools in the Topeka area were included in the survey, persons with children who dropped out of Topeka public schools, and dropouts themselves (those not "completing" school), were excluded. Also divorced parents with children living in other cities would pass the screen by answering Question 1



affirmatively.

The extremely narrow definition of who should be included in the sample is best demonstrated by the difficulty Central Surveys had in contacting qualified respondents. To complete 400 interviews, Central Surveys telephoned 1,158 persons who were not able to pass the screening questions. Thus only 26 percent of the persons actually contacted satisfied the requirements to be interviewed.

**Sample Definition.** A crucial problem with the screening procedures was the failure to exclude persons not living within the Topeka School District 501 boundaries. Although Central Surveys did not use telephone exchanges that were entirely outside of the district lines, when interviews occurred among persons with exchanges that overlapped the district's boundaries, Central Surveys did not ask the respondents whether they resided in the district. If the respondent volunteered that they lived outside of the district, then the interview was terminated.

During the interviewing Central Surveys concluded that one exchange (354) contained primarily persons who lived outside of District 501 so they discontinued calling the exchange. However, there is no indication that Central Surveys excluded already completed interviews in the exchange that they did not believe were with residents of District 501. Even if the vast majority of persons with exchange 354 lived outside the district, to ensure a random sample of all residents of the district Central Surveys would have had to continue calling to exchange 354 and

then exclude those respondents who did not live in the district.

The answers to the survey questions suggest that there were probably a number of respondents included in the sample who did not live in the district. One indirect indication of this is the fact that in a large number of the open-ended questions, a significant percentage (typically ranging from 5% to 14%) mention schools not in District 501. This would suggest that many of these respondents do not live within the district.

For example, Question 14 asks which high school would the respondent recommend to friends moving to Topeka. Fourteen percent (14%) selected schools outside of the district and another 3% recommended a parochial high school. This suggests that a significant percentage of the respondents had children attending schools outside the district or in parochial schools.

Respondents living outside of District 501 could have easily been excluded by standard screening procedures. The representatives of Central Services testified that they did not utilize a screening device to omit persons not living in the school district because they did not believe that the respondents would know in which school district they lived. However, since the survey purportedly only included persons who currently have or recently had children in the school district or who recently completed school in the district, it is very likely that the respondents would know if they lived within the district's boundaries.

Even without depending on the respondent to answer whether



they lived in District 501, a common survey procedure could have determined if the person should be included in the sample. Respondents could have been asked for the crossing streets nearest their house and then placed inside or outside the district. Alternatively, respondents could have been asked whether they lived north or south, east or west of the major streets which form the district's borders.

The design of the sample determines the universe about which conclusions can be made from the survey. The sampling procedures used by Central Surveys resulted in a very specific universe. The survey results certainly do not represent the views of all Topeka residents, or even Topeka residents with recent experience with the public school system. Instead, the survey represents the views of persons in Topeka, both within and outside the school district, who have telephones, listed phone numbers, no relatives in the "education field" and who currently or recently have children in school or attended school themselves.

The limited population from which the sample was drawn has two implications: 1) the results cannot be generalized to all Topeka residents, or even those with school children; 2) the unique sample design means that there are no means to judge the representativeness of the survey respondents. No demographic or socioeconomic data exist against which to compare the characteristics of the sample.

## SURVEY ADMINISTRATION

Central Survey's methods of administering the poll also deviated in several ways from standard survey methodology undermining further the reliability of the survey's findings. There are seven major questions about Central Survey's procedures in administering the survey: 1) the timing of the poll; 2) use of callbacks; 3) controls for household size; 4) random selection of respondents within households; 5) use of quotas; 6) instructions given to interviewers; and, 7) use of the pretest interviews.

**Timing of the Poll.** The survey was conducted over six days from August 27th through September 1, 1984. Thus the interviewing was during the week preceding Labor Day, including Friday and Saturday of Labor Day weekend. Since it is the last major weekend of summer it is a difficult period during which to find a representative sample of the universe at home.<sup>7</sup> In addition, as the last week of vacation before school started (school started on Tuesday September 4th), parents of school children are more likely to be away from home.

The limited length of the interviewing period (six days) and its timing means that many people were probably not at home and

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<sup>7</sup> An extensive study of more than 70,000 phone calls conducted by Bell Canada found that August was tied with September as the third worst month to reach respondents at home. Only in October and December were response rates lower. Gideon Vigderhous, "Scheduling Telephone Interviews: A Study of Seasonal Patterns," Public Opinion Quarterly, 45 (Summer 1981): pp. 250-259.



consequently prevented from being included in the sample. If the people away during the period of the interviewing differ from those at home in characteristics (age, income, education, etc.) that are related to attitudes toward the schools, then the sample is not representative.

**Callbacks.** Some types of people are more likely than others to be at home to be interviewed. While housewives and elderly persons spend more time at home, younger persons and working men are much more difficult to reach by telephone. If a survey firm continues dialing different numbers until they reach someone at home, their sample will overrepresent women and older people. Instead, callbacks should be used to the same set of numbers over a period of days until the respondent is reached at the number.

Central Surveys did use some callbacks; however, it does not appear that they used any systematic means of callbacks. While they tried many telephone numbers 2 or 3 times, they continued to add telephone numbers in an effort to complete all the interviews over the short time frame. A very high percentage of all completed interviews (77%) were with persons reached on the first attempt. A study of telephone interviewing conducted by the Survey Research Center of the University of Michigan with extensive and systematic callback routine found that 24% of interviews were completed on the first call.<sup>8</sup> Clearly, the sample overrepresented people likely to be at home because a very

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<sup>8</sup> Groves and Kahn, p. 56.

small percentage of the interviews were with people who were not at home on the first call.

Table 1 displays the total numbers of calls to each telephone number in the sample and its final outcome. For instance, 298 (or 77%) of the completed interviews were conducted with persons who answered on the first call, 65 (17%) were completed on the second call, 16 (4%) on the third, 6 (2%) on the fourth call and 2 (.5%) on the fifth try. In total, 76% of all the telephone numbers were only tried once and less than 10% of the numbers were attempted more than two times. "

The problems deriving from Central Survey's failure to use systematic and rigorous callback procedures are evident in Table 1. Extremely large numbers of telephone numbers were only tried once and then abandoned; 310 numbers with no answer were never called more than once. Fifty phones with busy signals were not called back; 45 households without an adult at home were not contacted again; and even in 5 cases Central Surveys set up appointments to conduct interviews but never called the household. Lacking proper callback procedures, the sample clearly favored persons who are frequently at home.



TABLE 1. NUMBER AND DISTRIBUTION OF CALLBACKS<sup>9</sup>

	Total Number of Calls					Total
	1	2	3	4	5	
Completed Interviews	298 (77%)	65 (17%)	16 (4%)	6 (2%)	2 (.5%)	387
Not Qualified	905 (80%)	169 (15%)	44 (4%)	15 (1%)	0 (0%)	1133
No Answer	310 (62%)	93 (19%)	51 (10%)	33 (7%)	12 (2%)	499
Refused	86 (80%)	15 (14%)	6 (6%)	0	1 (1%)	108
Busy	26 (52%)	12 (24%)	7 (14%)	2 (4%)	3 (6%)	50
Not At Home	38 (84%)	6 (13%)	1 (2%)	0	0	45
Not Working/# Changed	146 (95%)	6 (4%)	2 (1%)	0	0	154
Appointments	3 (60%)	0	1 (20%)	1 (20%)	0	5
TOTAL	1812 (76%)	366 (16%)	128 (5%)	57 (2%)	18 (1%)	2381

Without employing a systematic means of callbacks, the sample of respondents in the Topeka poll contained a disproportionate number of women and other types of people more likely to be at home. There can be no assurance that the opinions of those more likely to be at home match those of persons difficult to reach over the telephone.

<sup>9</sup> The total number of completed interviews listed in the table (387) is less than the total number of 400 because not all of the call sheets furnished by the plaintiff were legible.

The response rate for the Central Survey's poll is approximately 35%. This rate is well below the accepted response rate for telephone surveys of about 70%.<sup>10</sup> This suggests that Central Survey's procedures, particularly the lack of callbacks, deviated from standard accepted survey procedures.

**Adjusting for Household Size.** The central assumption of surveys is that every person in the population studied has an exactly equal chance of being selected to be interviewed. Properly conducted telephone surveys result in each household with a telephone having an equal opportunity of being chosen. However, persons and households are two distinct units of analysis; since some households have more adults than others, persons living in large households have a smaller chance of being included in the poll while persons in smaller households have a greater likelihood.

A standard procedure to compensate for varying household size is to ask how many adults are living in the household and then weight the respondents accordingly. Interviews with persons living in smaller households are given less weight and interviews with persons residing in larger households are given more weight. Central Surveys did not include any question about household size

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<sup>10</sup> The response rate is calculated by dividing the number of completed interviews by the number of households attempted with working numbers. In this case, 387 is divided by 1094 (387 + 499 + 108 + 50 + 45 + 5). Households that were not qualified (1133) or numbers that had changed or were not working (154) were not included in the denominator. Groves' and Kahn's review of telephone surveys concludes that 70% is the normal response rate. Groves and Kahn, pp. 63-76.



and consequently could not adjust the responses to account for household size. There are no methods to evaluate the impact of the failure to adjust by household size on the results of the poll, but it does mean that the survey was not a random sample of Topeka residents. At best, considering the problems discussed earlier, the survey was a random sample of households with telephones and listed phone numbers.

#### Random Selection of the Respondent Within the Household.

Some members of a household are more likely to answer the phone than others; particularly because they are more often at home, women and older persons have higher probabilities of answering the phone than men and younger persons. To insure a random sample, the survey procedures must account for the disparate probability of answering phones.

There are several accepted procedures for drawing random samples from within a household, but none were employed by Central Surveys. One method is to alternate between asking to interview the oldest male, the youngest male, the oldest female and the youngest female. If that person is not at home then an appointment can be made to callback the person selected to be interviewed. A more exact process is to ask the person answering the phone to list the adults living in the household and then use a random procedure to choose the respondent.

Without controls to insure a random sample within the household, those interviewed are likely to be disproportionately women and older. Excluding persons without children currently or

recently in school probably aided in reducing the oversample of older respondents. However, there is a serious oversample of women in the survey; 64 percent of the respondents are women while only 36 percent are men. In contrast, the figures for the Topeka adult population is about 54% female and 46% male.

The survey results could accurately reflect the views of all Topekans if women shared the same opinions as men and if those people frequently at home had the same attitudes as persons difficult to reach. However, the results of the survey suggest that women and men do not always share the same views toward the schools; instead, in many cases, there are answers that diverge by statistically significant margins.

**Use of Quotas.** One common approach to attempt to compensate for problems caused by not randomly selecting respondents is to establish quotas so that the interviewed sample will match the general population on the basis of certain key demographic characteristics. For instance, Central Surveys could have set a quota that would have required half of the interviews to be with men and half with women.

In their testimony, the Central Survey officials indicated that they often used sex quotas in instances in which they believed the opinions of men and women would differ. It was their judgment that on attitudes about schools, the opinions of the two sexes would be similar. However, this was not a contention that they investigated with the pretest or consulted other research to determine.



During their testimony Central Survey officials stated that the opinions of men and women were similar in the poll and consequently there was no reason to use a quota or weight the results. Although in no case do the views of the majority of women respondents contradict those of the majority of the men interviewed, there are differences on crucial questions.

Table 2 shows that men are less likely than women to believe that some Topeka schools are white and some are black. For 11 of the 13 schools asked about, men were more inclined than women to say that the school was racially balanced. Men were also less probable to call the school "white" or "black." In one of the other cases (McCarter Elementary) an equal percentage of men and women said the school was racially balanced. In the other case (Whitson Elementary) more women than men said it was "racially balanced," but also a larger percentage of women labelled it as a "white" school.

Although many of the differences in Table 2 do not exceed range of statistical significance, the figures do indicate that if the survey had included an equal number of men and women (instead of 64% women), the results would have shown a smaller percentage of Topekans believed that the schools were "white" and "black" and not "racially balanced."

TABLE 2. VIEWS OF MEN AND WOMEN

	MEN	WOMEN
Q10. Are there any schools in Topeka that you think of as black or minority?		
YES.....	59	65
NO.....	38	30
DK.....	3	5
Q18. Are there any schools in Topeka that you think of as white schools?		
YES.....	54	64
NO.....	44	32
DK.....	2	3

Q19. Do you think of (SCHOOL) as mainly a white school, a black or minority school, or a racially balanced school? (Percentages of those who say they don't know or are not familiar with the school are not included in the table.)

	MEN			WOMEN		
	White	Black	Balanced	White	Black	Balanced
<b>HIGH SCHOOLS</b>						
Topeka West	58%	0%	23%	60%	1%	16%
Highland Park	0	28	47	0	30	41
<b>MIDDLE SCHOOLS</b>						
French	38	0	13	35	2	7
Eisenhower	6	7	28	2	11	23
Landon	33	1	14	34	0	9
<b>ELEMENTARY SCHOOLS</b>						
Belvoir	1	12	6	1	17	4
Crestview	16	3	13	18	0	12
Gage	15	0	24	20	0	19
Highland Pk North	2	12	18	2	13	16
Lafayette	1	11	15	1	20	9
McCarter	17	0	10	20	0	10
Whitson	19	1	8	25	0	10
Quinton Heights	9	2	31	6	6	30

There are other demographic characteristics which possibly could have been used to adjust the sample to match the general



population. For instance, in the survey 69% of the respondents live west of Topeka Avenue. Since there are clear differences in opinions depending on where the respondent lives, the sample should closely match the known characteristics of the population. Unfortunately, the unique definition of the sample (persons with current or recent experience with the school system, but with no family members involved in the "educational field") means that it is nearly impossible to locate data with which to compare the sample.

**Instructions to the Interviewers.** A final problem with the administration of the survey was that the interviewers were told explicitly the results that were desired.<sup>11</sup> The instructions identified the ACLU as Central Survey's client and then described the conclusions the ACLU wished to find.

Standard practice in survey research is to not inform interviewers of the purpose of the survey because they might, consciously or subconsciously, read the questions in a manner that elicit the desired responses.

**Use of the Pretest Interviews.** Before commencing with the entire poll, Central Surveys conducted a pretest of 36 interviews to evaluate the questionnaire. The pretest included 3 questions about which schools (high school, middle and elementary) have the

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<sup>11</sup> The instructions to the interviewers clearly define the clients' purpose: "The American Civil Liberties Union contends that Topeka never did comply with the Supreme Court order to integrate its schools. We want to find out whether or not the general public in Topeka feel this is the case." (Exhibit 9)

poorest teachers which were deleted from the final questionnaire. The 36 interviews from the pretest were then included in the final sample of respondents, comprising 9% of the total sample.

The use of the pretest interviews raises two questions. First, it is difficult to gauge whether the three questions had an effect on the responses to the other items in the survey. The Central Survey officials claim that the responses of the 36 are similar to those of the rest of the sample who were administered the final questionnaire. However, the added emphasis on poor schools in the pretest questionnaire may have elicited more negative responses for the rest of the items.

The other issue concerning the pretest interviews is whether their inclusion contaminates the randomness of the survey. None of the pretest interviews were based on callbacks, all were interviews with persons who answered the phone on the first call. Thus this portion of the sample is clearly biased toward persons who are more likely to be at home.



## QUESTIONNAIRE DESIGN

Although Central Surveys attempted to produce an objective survey to measure Topekans' views of the District 501 schools, several elements of the questionnaire design may have influenced the results obtained. The potential problems with the questionnaire can be divided into two categories: 1) those resulting from questions that were included in the survey; and, 2) those originating from items which were missing from the questionnaire.

A crucial difficulty in writing any survey items is that responses are often extremely sensitive to minor changes in question wording. Although a question may not appear to be biased or slanted, another similarly objective version of the question could produce dramatically different results. Thus each question must be examined closely to understand its precise meaning to the respondents.

**Questions Included in the Survey.** The wording of several of the key questions in the survey suffer from two basic problems: 1) they present a one-sided argument; and, 2) their meaning is vague and untested. The three most important questions are listed below:

Question 17. Are there any schools in Topeka that you think of as black or minority schools?

Question 18. Are there any schools in Topeka that you think of as white schools?

Question 19. Do you think (name of school) as mainly a white school, a black or minority school, or a racially balanced school?

Both Question 17 and Question 18 fail to provide the other side of the argument; for instance, the following phrase could have been added: "or does the racial composition of the schools match that of Topeka as a whole." Without an alternative, respondents, especially those of lower socioeconomic status, are more likely to agree to the statement.<sup>12</sup>

By not including an opposing statement, the wording of Questions 17 and 18 probably inflated the number of respondents saying that there were "white" and "black" schools. The interpretation of the results is also hampered because there is no indication of what the respondents believed the terms "white" or "black" school meant. The pretest did not attempt to discover their meaning or compare this question format with another way of asking the question.

The same problems apply to Question 19. Although the term "racially balanced" provides an alternative to "white" and "black" schools, the phrase may imply extremely dissimilar things to different respondents. The interviewers were to inform respondents who inquired that "racially balanced" was designed to mean "representative of the population ratio." However, respondents could have easily interpreted "racially balanced" to

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<sup>12</sup> George F. Bishop, Robert W. Oldenick, and Alfred Tuchfarber, "Effects of Presenting One Versus Two Sides of an Issue in Survey Questions," Public Opinion Quarterly, Volume 46 (1982), pp. 69-85. Schuman and Presser find that substantive counterarguments can add 4 to 13 percentage points to that response. Howard Schuman and Stanley Presser, Questions and Answers in Attitude Surveys. (New York: Academic Press, 1981), chapter 7.



mean the school contained 50% white students and 50% black students.

Since the pretest did not examine the respondents' definition of this term, nor test other questions that could have been used to measure the public's view of the racial composition of schools, we cannot state with any certainty what the results mean. There is evidence from the survey that the respondents may have misunderstood Central Survey's concept of "racially balanced" and instead interpreted it to mean a 50-50 mix of white and black students. Sixty-two percent of the respondents identified Quinton Heights (55% minority enrollment) as "racially balanced" and a plurality described Highland Park North as "racially balanced" (62% minority enrollment).

Experiments with question wording demonstrate that even commonly used words are often misunderstood by survey respondents or interpreted in contrasting ways by different respondents.<sup>13</sup> In order to understand how respondents interpret the key terms used in a survey, one recommended procedure is to ask respondents at the end of the pretest interview to explain their opinions of the meaning of the question wording.<sup>14</sup> The crucial words used in

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<sup>13</sup> William A. Belson, The Design and Understanding of Survey Questions. (Aldershot, Hants., England: Glower, 1981).

<sup>14</sup> Belson, pp. 390-395; Seymour Sudman and Norman M. Bradburn, Asking Questions. (San Francisco: Jossey-Bass, 1982), p. 49; Panel on Survey Measurement of Subjective Phenomena, Committee on National Statistics, Assembly of Behavioral and Social Sciences, National Research Council, Surveys of Subjective Phenomena: Summary Report. eds. Charles F. Turner and Elizabeth Martin. (Washington: National Academy Press, 1981), pp. 34-37;

this survey, such as "black school", "white school" and "racially balanced", are more vague and unusual than many of the words that experimenters have discovered that respondents have trouble in interpreting.<sup>15</sup>

Questions Not Included in the Survey. There are several items missing from the survey that handicap efforts to analyze the results. First, only schools with very high percentage of white students or a disproportionate number of black students are included in the survey. Most notably missing from the closed-ended questions is Topeka High School. Including a school that was "racially balanced" by the Central Survey's definition would have provided a useful test of whether the respondents were interpreting the term in the manner that the survey writers assumed. It would have also clarified the "relationship" between racial composition and educational quality by establishing a midpoint between the two types of schools.

The exclusion of racially balanced schools combined with the particular ordering of the schools listed in Question 19 may have prompted respondents to answer that the schools were "white" or

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Anitra Rustemeyer Strett and Wray Smith, "Investigating Respondents' Interpretations of Survey Questions." in, American Statistical Association, Proceedings of the Section on Survey Research Methods, August 15-18, 1983, pp. 675-679.

<sup>15</sup> For instance, Benton finds that only 14 of 53 respondents in an experiment understood correctly the word "proportion." (pp. 243-245) The words "racially balanced" which were to be explained to inquiring respondents as "representative of population ratio" would seem to be of the same degree of difficulty as the word "proportion."



"black." Most surveys rotate the order of reading long lists so as to reduce any influence positioning may have on the results. Although Central Surveys rotated the list of schools in Question 13, in Question 19 they maintained the same order for all the interviews.<sup>16</sup> The order of reading the schools' names juxtaposed primarily "white" schools next to ones with larger black student populations.

The order emphasized the differences in the minority enrollment in the different schools by placing the most "white" schools adjacent to the most "black" schools with no balanced schools in between. Also by starting with the school most likely to be perceived as a "white" school, Topeka West High School, the question may exaggerate the differences between the schools.

Question 19. Do you think (name of school) as mainly a white school, a black or minority school, or a racially balanced school?

	% Minority Enrollment
a. Topeka West High School	7%
b. Highland Park High School	40
c. French Middle School	6
d. Eisenhower Middle School	42
e. Landon Middle School	6
f. Belvoir Middle School	60
g. Crestview Elementary	5
h. Gage Elementary	8
i. Highland Park North Elementary	62
j. Lafayette Elementary	56
k. McCarter Elementary	7
l. Whitson Elementary	9
m. Quinton Heights	55

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<sup>16</sup> A simple rotation procedure would not have solved the ordering problems in Question 19 because all the items would have to be scrambled so the alternating pattern would be broken.

Another series of questions missing from the final questionnaire are the three items contained in the pretest about which high school, middle school and elementary school has the poorest teachers. The question was deleted because Central Survey officials felt that respondents were "reluctant" to name a school with bad teachers.

Although fewer persons answered this open-ended question than some of the multiple choice items, one quarter of the respondents (9 of 36 pretested) were able to choose the high school and elementary school with the worst teachers. What was clear from the pretest, however, was that the answers to the question may not have substantiated the ACLU's contentions that "black" schools had lower quality of education.

Among the responses of the small pretest sample, there does not appear to be a relationship between a school being perceived as "black" and having poor teachers. Four persons named racially-balanced Topeka High School as having the worst teachers, 3 selected "white" Topeka West High School and only 1 picked "black" Highland Park High School. Only one of the five middle schools selected as having the worst teachers was classified as a "black" school.

Although fewer persons are willing to name a school as having the least qualified teachers, there is no reason to presume it is not an accurate measure of the public's perception of the school's educational quality. Because the question appeared to provoke different attitudes than some of the other



items in the questionnaire, it should have been retained in the survey.

One other important question that would have aided in the analysis is missing from the survey. Respondents are not asked which schools their own children attend (or for recent graduates, which schools they attended). This information is necessary to determine whether respondents select their own children's schools as the best ones, or whether they are truly comparing the educational quality of the various schools in Topeka.

When responses are separated by the one variable that provides an indication of the respondent's residence--whether the person lives east or west of Topeka Avenue--location seems to be an important predictor of views toward the different schools.

## INTERPRETATION OF THE RESULTS

Poll results allow researchers to draw conclusions about the universe studied within certain mathematical bounds determined by the precise design of the survey. For instance, when a major television network conducts a poll of 1,500 persons nationwide who are likely to vote in the Presidential election, they can predict within a certain range of error the views of the entire nation even though they did not interview 99.9% of the voters. However, when interpreting the data, researchers must always be aware of the universe which can be discussed and the mathematical precision of the sample or subsample. Throughout their report, Central Surveys fails to account for these two crucial factors.

The earlier sections of this memorandum have detailed the very specific nature of the sample used by Central Surveys. It is a poll of persons in Topeka, but not necessarily within the school district, who have a telephone, a listed phone number, were home from August 27th through September 1, 1984, answered the phone themselves, had children currently or recently in the school (anywhere, not just Topeka) or had themselves recently completed school in Topeka, and who had no members of their family working in the "educational field." This is a very limited universe that is very different from that of Topeka residents or even Topeka residents with recent experience with the school system.

Despite the very narrowly defined universe, Central Surveys throughout their report refers to the opinions as those of "most



Topekans" (p. 1), "residents of Topeka" (p. 1), "some Topeka residents" (p. 28), "great many Topekans" (p. 32), "most residents of Topeka" (p. 33), and "Topekans" (p. 34). The language conveys the impression that all persons in Topeka had a chance to be included in the sample. Since the sample definition was much more limited, the conclusions can only be made about the subset of Topeka residents who could have qualified to be interviewed.

The language in the report is often misleading when it discusses the opinions of subgroups of the entire sample. The report refers to percentages based on a subsample of respondents as if they reflected the views of all 400 respondents. The problem is most apparent in the discussion of the results of Question 19 (pp. 31-32).

The report refers to "sizable majorities" and "majorities" when it is discussing only about the views of persons familiar with the particular school. For instance, the report asserts that majorities describe Belvoir Elementary and Lafayette Elementary as "black" schools. Yet, only 61 respondents said that Belvoir was "black" (15% of the entire sample) and only 66 labelled Lafayette as "black" (16%). The language of the report implies that the perception of these schools as "black" is widespread throughout Topeka, when in fact it is limited to a small proportion of all Topekans who were qualified to be included in the sample.

In writing the report, the officials of Central Surveys

never mention whether any of the differences they cite are large enough to be statistically significant. Since a survey only interviews a small proportion of those whose attitudes are being studied, the results are within a range of error which can be determined mathematically. The larger the sample size and the higher the consensus on the question, the lower the margin of error. For example, for questions that are evenly split (50% to 50%) and are asked of all 400 respondents, the sampling error in this survey was plus or minus 5 percent at a 95 percent confidence level. That means that in 95 cases out of 100, the responses to the poll should be with plus or minus five percentage points of those that would have been obtained from interviewing the entire population.

Reports of survey results should indicate the sampling errors for the responses to the different questions. The United States Bureau of the Census which establishes standards for federal government surveys recommends that tables and charts account for sampling errors.<sup>17</sup> Instead of using point estimates, the Census Bureau suggests that the results be presented in terms of ranges.

Apart from the note in the Introduction about the 5% sampling error for the entire sample of 400 interviews, nowhere in the Central Survey's report do they discuss sampling errors.

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<sup>17</sup> United States Bureau of the Census, Standards for Discussion and Presentation of Errors in Data, Technical Paper No. 32 (Washington: Government Printing Office, 1974), p. 3.



In his deposition Charlie Williams indicated that he did not conduct any statistical tests while analyzing the data in preparation to write the report. He suggested that he merely inspected the numbers to ensure that they were larger than the margin of error.

**Example 1****Statement:**

"Highland Park High, which is never said to be a 'white school' by survey respondents, consistently ranks third behind Topeka West and Topeka High."  
(p. 3)

"Topeka West is consistently rated the most favorably and Highland Park the least favorably."  
(p. 41)

**Evidence:** Question 2a. Which schools are better?

Topeka High	7%
Highland Park High	5%

Question 2c. Which schools are poorest?

Topeka High	9%
Highland Park High	9%

Question 3. Best qualified/most experienced teachers?

Topeka High	11%
Highland Park High	5%

Question 6. Most modern facilities?

Topeka High	8%
Highland Park High	6%

Question 7. Poorest facilities?

Topeka High	18%
Highland Park High	22%

Question 11. Best job preparing students?

Topeka High	13%
Highland Park High	5%

Despite the repeated statement that Highland Park High School consistently ranks third behind Topeka West and Topeka High School, there is very little evidence to suggest that Topeka High is rated better than Highland Park High School. Of the six questions comparing the schools' quality, only in one case (Question 11) does the difference exceed sampling error.

### Example 2

**Statement:** "The middle schools that tend to be rated most favorably on these questions are French and Landon, while Chase and Eisenhower are usually ranked at the bottom of the middle schools."

**Evidence:** Q2a. Better schools?

French	3%
Landon	2%
Chase/Eisenhower	1%

Q2c. Poorest schools?

(None mentioned)

"Q4. Best teachers?

French	10%
Landon	9%
Chase	4%
Eisenhower	3%

Q8. Most modern facilities?

French	18%
Chase	11%
Landon	7%
Eisenhower	3%

Q9. Poorest facilities?

Eisenhower	7%
Chase	2%
French	*
Landon	*



As with Example 1, the statement about the quality of the middle schools cannot be supported by the survey results once sampling error is examined. The differences between the ratings of the schools are small enough that they could have resulted from sampling error.

Example 3 Revision of Table from Page 33

	Q13. Rate Excellent or Good	Q19. Mainly White
Topeka West High School	87% (83-91)	72% (67-77)
French Middle School	83% (78-88)	68% (62-74)
Landon Middle School	78% (72-84)	68% (62-74)
McCarter Elementary	76% (69-83)	54% (46-62)
Whitson Elementary	76% (69-83)	58% (50-66)
Gage Elementary	72% (65-79)	42% (35-49)
Crestview Elementary	71% (64-78)	47% (39-55)
Quinton Heights Elementary	62% (55-69)	14% (9-19)
Eisenhower Middle School	60% (53-67)	7% (3-11)
Highland Park High School	57% (51-63)	-
Highland Park North Elem.	45% (37-53)	5% (1-9)
Lafayette Elementary	34% (26-42)	2% (0-10)
Belvoir Elementary	33% (24-42)	4% (0-13)

Using ranges instead of point estimates blurs some of the findings presented in Central Survey's report. For instance, when the above table is presented only with point estimates, the report claims that it shows a close relationship between the public's evaluation of the quality of a school and whether it is perceived as a "white" or "black" school. However, when the results are displayed in terms of their ranges within sampling error (shown in the parantheses), the relationship is much less clear.

Other conclusions reached in the report also lack support from the proper statistical analysis. For instance, the crucial table on page 4 of the report displays the percentage of respondents who rate each school as excellent or good and the percentage who call the school "white." The report uses the data contained in this table to conclude that a relationship exists between the public perception of the racial composition of the school and their evaluation of its quality: "white" schools are rated higher and "black" schools are rated lower. However, Mr. Williams testified that he performed no statistical tests to confirm this central hypothesis.

Although examining the aggregate figures may suggest a relationship between the two, the results of advanced statistical analysis of the data at an individual level does not tend to support the conclusion. It is very clear how examining the aggregate levels could mislead someone to conclude that a statistical relationship existed between perceptions of the racial balance of the school and the evaluations of the school's quality.

One common statistical technique to measure the relationship between two variables is to compute the correlation between the two variables. If two things are perfectly related--that is, when one increases, the other increases, when one declines, the other declines--then the correlation coefficient is 1. If two things are totally unrelated--that is, when one increases, the other declines, when one decreases, the other increases--then the



correlation coefficient is -1. However, if two variables move in totally unrelated and inconsistent directions, or randomly, then the correlation coefficient is 0. The degree to which two variables are related is then measured on a scale of -1 to 1 with 0 measuring no relationship.

The table on page four of Central Survey's report shows the total percentage of persons who rate a school as "excellent" or "good" along with the percentage who believe the school is "mainly white" and the actual minority enrollment in the school. The numbers in the table appear to show a relationship between perceived school quality and minority enrollment: that schools which more people think of as "mainly white" and those with lower actual minority enrollment are more likely to be evaluated as "excellent" or "good."

Computing the this correlation coefficient (the Pearson correlation coefficient) between the variables tends to support this hypothesis. The correlation in the aggregate between the school quality ratings and the percentage who say the school is "mainly white" is .899. Similarly, the correlation between the school quality ratings in the aggregate and the actual minority enrollment percentage is -.899.

The central problem with this type of analysis is that it focuses on the aggregate level, not on individuals. The figures on the table on page 4 of Central Survey's report show that schools that more people think are "mainly white" are rated by more people as "excellent" or "good"; they do not constitute any

evidence that the individuals who believe the schools are "mainly white" are the same individuals who rate the schools as "excellent" or "good."

An example from voting in presidential elections may help clarify this distinction between aggregate and individual level analysis. If George Wallace's share of the presidential vote in 1968 in each county across the country was compared to the percentage of the precinct's population that was black, examining the aggregate figures would lead one to conclude that Wallace did well among black voters because his vote was highest in counties with large black populations. However, if the data were examined on an individual basis, it would be clear that only whites voted for Wallace.

The crucial test of the results of the Topeka survey is whether persons who perceive a school as "mainly white" rate the school higher and persons who believe a school is "black or minority" rate the school lower. The only way to answer this question is to examine the statistical relationship on a individual level.

The correlation coefficients presented in Table 3 question Central Survey's conclusion that the perception of a school's racial balance affects evaluations of the school's quality. When examined at the individual level, perceptions of the racial balance are not only weakly related to assessments of the quality of the schools, in some instances the relationship is in the opposite direction.



If Central Survey's conclusion were correct, the correlation coefficients in the first column of Table 3 would all be close to one and positive; people who think the school is "mainly white" would be much more likely to rate that school as "excellent" or "good." If people who believed a school was "black or minority" were more likely to rate a school as "only fair" or "poor" then the coefficients in column 2 of Table 3 should approach -1. However, in most cases the coefficients are very small, and in several instances the relationship is in the opposite direction of Central Survey's conclusions.

TABLE 3 CORRELATIONS BETWEEN SCHOOL RATINGS AND OTHER FACTORS

School	School Perceived as:		Respondent is:		
	Mainly White	Black or Minority	Male	West Topeka Ave.	White
Topeka West High	.008	-.089	-.025	.126	.074
Highland Park High	-	-.122	-.014	-.197	-.032
French Middle	.061	.063	.067	.033	.026
Eisenhower Middle	.126	-.173	-.002	-.125	-.017
Landon Middle	.157	.053	-.036	.083	.287
Belvoir	-.032	.101	.081	.038	.271
Crestview	.078	-.079	-.033	-.013	.163
Gage	.109	.048	-.054	.069	.014
Highland Park North	.121	-.164	.000	-.009	.004
Lafayette	-.002	-.119	-.042	-.069	.079
McCarter	.090	-	-.122	-.039	.129
Whitson	.233	-.031	-.194	.136	.158
Quinton Heights	.194	-.140	-.012	-.098	.020

Table 3 also tests the correlation between rating the school as "excellent" or "good" and the respondent's sex, residence (East or West of Topeka Avenue) and race. As the figures in the

table demonstrate these factors are often more closely related to the ratings of the schools than are the respondent's perception of the school's racial balance. For instance, which side of the city the respondent lives in appears to be more related to their views on the quality of the two high schools than is their perception of whether the school is "mainly white" or "black or minority." Simply put, persons living west of Topeka Avenue rate Topeka West higher and they also rate Highland Park High School lower. In other cases, the respondent's sex or race are more related to their assessment of the particular school than is their classification of the school as "mainly white" or "black or minority."

By not performing statistical tests on the individual level, Central Surveys mistakenly assumed that the relationship in the aggregate figures that was displayed in their table on page 4 of their report must have existed among the individual respondents. However, the analysis contained in Table 3 clearly suggests that among individuals, a perception of whether a school is "mainly white" or "black or minority" is a poor, and often contradictory, predictor of whether that same person will believe that the school is "excellent", "good", "only fair" or "poor." A person's sex, race and residence are often more important predictors of a person's evaluation of a school. The low correlations in Table 3 clearly demonstrate that explaining a person's evaluation of a school is much more complicated than merely knowing their views on the racial composition of the school.



## CONCLUSION

Central Survey's poll of Topeka residents about the public schools does not prove without question that persons who perceive the schools as "mainly white" rate schools more favorably or that those who view a school as "black or minority" evaluate the school more negatively. Instead, to accept that critical conclusion of the survey, along with all the other claims made in Central Survey's report, one must assume:

- o that the views of persons without telephones (poorer and more likely to be black) match those of persons with telephones;
- o that the opinions of persons with unlisted phone numbers, or those who have just moved, (both more likely to be younger persons) parallel those of persons with listed telephone numbers;
- o that the opinions of persons living outside District 501's boundaries resemble those of the residents of the District;
- o that the persons who are less likely to be at home (men and younger persons) have similar opinions as those people who are almost always at home;
- o that persons living in large households believe the same things that persons living in smaller households;
- o that the answers of the respondents given the pretest were not affected by the inclusion of questions that were not part of the final questionnaire;
- o that persons more likely to answer a phone in a household have the same views as the other members of the household;
- o that women have exactly the same opinions as men even though the results of the survey suggest otherwise;
- o that persons away from home during the week before Labor Day weekend share the same attitudes as those who were at home;
- o that persons who have family members who work in the "educational field", but do not work for the Topeka public schools, evaluate the schools the same way as persons with no family member involved in the "educational field";

o that the respondents understood that "racially balanced" means 75% white students and 25% black or minority students;

o that the respondents would have had the same views if they were also asked about schools such as Topeka High which have "racially balanced" school populations;

o that respondents would have given the same answers even if the order of the schools listed did not accentuate the differences in the minority enrollments; and,

o that interviewers did not consciously, or unconsciously, elicit answers in accordance to the interests of Central Survey's client.

Not only must all of these assumptions be presumed to be accurate, but Central Surveys' conclusions must be accepted without support from any statistical analysis or tests.