LEMAS Nonresponse Bias Report

Introduction

We examine two features in this nonresponse bias report. First, we calculate the effect size as a measure of the difference between the respondents and the population. Additionally, we compare non-response weighted and design weighted estimates for a few outcomes to empirically examine the effect of nonresponse weighting.

Effect Size: Comparing Respondents to the Frame

We compare respondents to the frame on two characteristics – agency size (using data on frame) and population served within each agency type. We use the categories of agency sized that were used in strata construction and the population served as documented in the analysis file. **Table 1** shows the Cohen's effect size for the two variables for each agency type. There were no separate agency size strata for state agencies, so that analysis was not conducted.

Table 1: Nonresponse Effect Size[1]

Agency Type	Agency Size Effect Size	Population Served Effect Size
Local Police	0.08	0.08
Sheriff	0.07	0.07
State	N/A	0.03

Generally, an effect size is defined as small if it is less than 0.2. As shown in Table 1, all of the effect sizes are lower than that threshold, meaning that they are all considered small, Thus, we do not have evidence of a statistical difference between the respondents and the frame.

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[1] Detailed calculations are in the attached appendix.

Effect of Nonresponse Bias Weighting

When constructing analysis weights, nonresponse adjustment was used. If this adjustment affects estimates significantly, it can be a sign of nonresponse bias. We compare the estimates for 5 outcomes for estimates under design weights compared to estimates under analysis weights.

Table 2: Comparison of Estimates Using Design and Analysis Weights

Estimate	Weight	Local Police	Sheriff	State
Average FTS	Design	41.2	59.9	1,138.4
	Analysis	38.2	57.9	1,138.4
% Female Chiefs	Design	2.9	1.0	6.8
	Analysis	2.9	0.9	6.8
Average number hours required for training	Design	984.5	895.4	1479.3
	Analysis	968.0	890.5	1479.3
Operating Budget Per Sworn Officer	Design	1,268,334	2,574,389	201,175
	Analysis	1,300,040	2,608,018	201,175
Operating Budget Per Resident	Design	5,038	1,889	43
	Analysis	5,331	1,933	43

There does not appear to be a significant impact on the estimates when using the non-response adjusted analysis weights compared to the design weights. Thus, there is no evidence of significant nonresponse bias.

Table 1. Nonresponse bias effect size for local police departments, LEMAS 2016

Variable	Released Eligible Sample		Respondents		Nonrespondents		Diff in Percent (Resp vs. Nonresp)	Diff in Percent (Resp vs. Overall)	z(i)	Effect size
	NUM	PCT	NUM	PCT	NUM	PCT				
Agency Size										
100+	638	24.4	564	26.4	74	15.5	10.9	2.0	0.002	
50-99.5	132	5.1	108	5.1	24	5.0	0.0	0.0	0.000	
25-49.5	272	10.4	232	10.9	40	8.4	2.5	0.5	0.000	
10-24.5	542	20.7	458	21.4	84	17.6	3.8	0.7	0.000	
5-9.5	500	19.1	402	18.8	98	20.5	-1.7	-0.3	0.000	
2-4.5	392	15.0	284	13.3	108	22.6	-9.3	-1.7	0.002	
1-1.5	137	5.2	88	4.1	49	10.3	-6.2	-1.1	0.002	0.08
Population Served										
1,000,000 or more	14	0.5	14	0.7	0	0.0	0.7	0.1	0.000	
500,000–999,999	30	1.1	30	1.4	0	0.0	1.4	0.3	0.001	
250,000–499,999	55	2.1	50	2.3	5	1.0	1.3	0.2	0.000	
100,000–249,999	205	7.8	183	8.6	22	4.6	4.0	0.7	0.001	
50,000–99,999	291	11.1	251	11.8	40	8.4	3.4	0.6	0.000	
25,000–49,999	204	7.8	174	8.1	30	6.3	1.9	0.3	0.000	
10,000–24,999	321	12.3	275	12.9	46	9.6	3.2	0.6	0.000	
2,500–9,999	676	25.9	559	26.2	117	24.5	1.6	0.3	0.000	
2,499 or fewer	817	31.3	600	28.1	217	45.5	-17.4	-3.2	0.003	0.08

Table 2. Nonresponse bias effect size for sheriff's departments, LEMAS 2016

Variable	Released Eligible Sample		Respondents		Nonrespondents		Diff in Percent (Resp vs. Nonresp)	Diff in Percent (Resp vs. Overall)	z(i)	Effect size
	NUM	PCT	NUM	PCT	NUM	PCT				
Agency Size										
100+	358	44.2	271	45.2	87	41.4	3.7	1.0	0.000	
50-99.5	62	7.7	49	8.2	13	6.2	2.0	0.5	0.000	
25-49.5	99	12.2	79	13.2	20	9.5	3.6	0.9	0.001	
10-24.5	159	19.6	106	17.7	53	25.2	-7.6	-2.0	0.002	
5-9.5	90	11.1	69	11.5	21	10.0	1.5	0.4	0.000	
2-4.5	38	4.7	24	4.0	14	6.7	-2.7	-0.7	0.001	
1-1.5	4	0.5	2	0.3	2	1.0	-0.6	-0.2	0.001	0.07
Population Served										
1,000,000 or more	33	4.1	26	4.3	7	3.3	1.0	0.3	0.000	
500,000–999,999	60	7.4	43	7.2	17	8.1	-0.9	-0.2	0.000	
250,000–499,999	97	12.0	76	12.7	21	10.0	2.7	0.7	0.000	
100,000–249,999	161	19.9	126	21.0	35	16.7	4.3	1.1	0.001	
50,000–99,999	83	10.2	67	11.2	16	7.6	3.5	0.9	0.001	
25,000–49,999	112	13.8	78	13.0	34	16.2	-3.2	-0.8	0.000	
10,000–24,999	136	16.8	99	16.5	37	17.6	-1.1	-0.3	0.000	
2,500–9,999	100	12.3	68	11.3	32	15.2	-3.9	-1.0	0.001	
2,499 or fewer	28	3.5	17	2.8	11	5.2	-2.4	-0.6	0.001	0.07

Table 3. Nonresponse bias effect size for state police agencies, LEMAS 2016

Variable	Released Eligible Sample		Respondents		Nonrespondents		Diff in Percent (Resp vs. Nonresp)	Diff in Percent (Resp vs. Overall)	$z(i)$	Effect size
	NUM	PCT	NUM	PCT	NUM	PCT				
Population Served										
1,000,000 or more	43	87.8	39	88.6	4	80.0	8.6	0.9	0.000	
500,000–999,999	6	12.2	5	11.4	1	20.0	-8.6	-0.9	0.001	
250,000–499,999	0	0.0	0	0.0	0	0.0	0.0	0.0	0.000	
100,000–249,999	0	0.0	0	0.0	0	0.0	0.0	0.0	0.000	
50,000–99,999	0	0.0	0	0.0	0	0.0	0.0	0.0	0.000	
25,000–49,999	0	0.0	0	0.0	0	0.0	0.0	0.0	0.000	
10,000–24,999	0	0.0	0	0.0	0	0.0	0.0	0.0	0.000	
2,500–9,999	0	0.0	0	0.0	0	0.0	0.0	0.0	0.000	
2,499 or fewer	0	0.0	0	0.0	0	0.0	0.0	0.0	0.000	0.03