DMDC

Information and Technology for Better Decision Making

2013 Workplace and Equal Opportunity Survey of Active Duty Members

Nonresponse Bias Analysis Report

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2013 WORKPLACE AND EQUAL OPPORTUNITY SURVEY OF ACTIVE DUTY MEMBERS: NONRESPONSE BIAS ANALYSIS REPORT

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Contributors

Many members of the Defense Manpower Data Center (DMDC) contributed to the analyses and writing of this report assessing the level and direction of potential nonresponse bias in estimates from the *2013 Workplace and Equal Opportunity Survey of Active Duty Members* (*2013 WEOA*). Phil Masui wrote this report and Eric Falk and David McGrath guided the studies, consolidated the individual reports, and served as primary editors.

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Executive Summary

The Defense Manpower Data Center (DMDC) conducted several studies to assess the presence of nonresponse bias (NRB) in estimates from the *2013 Workplace and Equal Opportunity Survey of Active Duty Members* (*2013 WEOA*).

The objective of this research was to assess the extent of nonresponse bias for the estimated rate of Racial/Ethnic Harassment/Discrimination in the active duty military. The level of nonresponse bias can vary for every question on the survey, but DMDC focused on the Racial/Ethnic Harassment/Discrimination rate because this is the central question on the survey. Nonresponse bias occurs when survey respondents are systematically different from the nonrespondents. Nonresponse bias can occur with high or low survey response rates, but the decrease in survey response rates in the past decade has resulted in a greater focus on potential NRB. DMDC investigated the presence of nonresponse bias using several different methods, and this paper summarizes the following methods and results:

1. Analyze response rates from *2013 WEOA* and other related DMDC surveys,
2. Evaluate composition of sample compared with survey respondents,
3. Use late respondents as a proxy for nonrespondents,
4. Analyze item missing data for Racial/Ethnic Harassment/Discrimination questions,
5. Analyze whether past Racial/Ethnic Harassment/Discrimination victims respond to later WEOA surveys at different rates.
6. Analyze mean Armed Forces Qualification Test scores between active duty population and *2013 WEOA* survey respondents.

The six studies provide little evidence of nonresponse bias in estimates of the Racial/Ethnic Harassment/Discrimination rate from the *2013 WEOA*. The largest evidence of nonresponse bias is where study five shows that respondents to the prior WEOA respond to the current WEOA at very high rates, regardless of their demographic characteristics. If these cooperative respondents have different attitudes and opinions than nonrespondents, this provides limited evidence of nonresponse bias.

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2013 WORKPLACE AND EQUAL OPPORTUNITY SURVEY OF ACTIVE DUTY MEMBERS: NONRESPONSE BIAS ANALYSIS REPORT

Introduction and Outline

The Defense Manpower Data Center (DMDC) conducted several studies to assess the presence of nonresponse bias in estimates from the *2013 Workplace and Equal Opportunity Survey of Active Duty Members* (*2013 WEOA*).

The objective of this research was to assess the extent of nonresponse bias (NRB) for the estimated rate of Racial/Ethnic Harassment/Discrimination[1] (henceforth this rate will be referred to as Racial Discrimination) in the active duty military. The purpose of the Racial Discrimination rate was to provide the policy offices and the Department with an overall estimate of active duty members who experienced behaviors aligned with racial/ethnic harassment and/or discrimination. The level of nonresponse bias can vary for every question on the survey, but DMDC focused on the Racial Discrimination rate because this is the central question on the survey. Nonresponse bias occurs when survey respondents are systematically different from the nonrespondents. Statistically, the bias in a respondent mean (e.g., Racial Discrimination rate) is a function of the response rate and the relationship (covariance) between response propensities and the estimated statistics (i.e., Racial Discrimination rate), and takes the following form:

$Bias\ (\bar{y}_r) = \frac{\sigma_{yp}}{\bar{p}} = \left(\frac{\rho_{yp}}{\bar{p}}\right)\sigma_y\sigma_p$, where σ_{yp} = covariance between y and response propensity, ρ

Nonresponse bias can occur with high or low survey response rates, but the decrease in survey response rates in the past decade has resulted in a greater focus on potential NRB. DMDC investigated the presence of nonresponse bias using many different methods, and this paper summarizes the following methods and results:

1. Analyze response rates from *2013 WEOA* and other related DMDC surveys,
2. Evaluate composition of sample compared with survey respondents,
3. Use late respondents as a proxy for nonrespondent,
4. Analyze item missing data for Racial Discrimination questions,
5. Analyze whether past Racial Discrimination victims respond to later WEOA surveys at different rates.

[1]See Appendix A for the relevant survey questions and the creation of this rate.

6. Analyze mean Armed Forces Qualification Test scores between active duty population and WEOA survey respondents.

The first section of this paper is a summary of DMDC's nonresponse bias results. The second section describes the *2013 WEOA* survey. The third section consists of the six individual nonresponse bias studies. The final section contains additional appendix figures including how the Racial Discrimination rate was created.

Summary of Findings

Nonresponse bias (NRB) is difficult to assess. Most authors recommend averaging across several different studies to measure NRB (Montaquila and Olson, 2012). DMDC has taken that approach here and conducted six studies to assess NRB in Racial Discrimination estimates. **Our analyses indicate that the level of NRB in *2013 WEOA* estimates of the Racial Discrimination rate are likely quite small**.

We summarize the results from each study below:

1. **Analyze response rates from *2013 WEOA* and other related DMDC surveys**—Analysis of response rates show that comparisons of WEOA and the Status of Forces Survey of Active Duty Members (SOFS-A) provide potential evidence that topic saliency alters response rates to the WEOA survey, but any increase in NRB over the SOFS-A is likely to be small to modest.

2. **Evaluate composition of sample compared with survey respondents**—The *2013 WEOA* sample composition demographically differs from the active duty population distribution due to intentional sampling strategies that allow DMDC to make precise estimates for small subgroups. The respondent composition differs from the sample distribution in predictable ways due to subgroups (e.g., junior enlisted) responding at different rates. Analyses show that the survey weights effectively eliminate these differences and the distribution of weighted survey respondents closely matches the active duty population.

3. **Use late respondents as a proxy for nonrespondents**—The analysis of late respondents provides no systematic evidence of nonresponse bias in the estimates of the Racial Discrimination rate. Late respondents are disproportionately from low response rate groups and groups that have higher Racial Discrimination rates, and therefore we would expect unweighted rates to be higher for late respondents. After performing a weighted logistic regression, the results show that the timing of the returned survey, using late respondents as a proxy for nonrespondents, is not significant in whether or not a member experienced Racial Discrimination.

4. **Analyze item missing data for Racial Discrimination questions**—The questions that contribute to the Racial Discrimination rate showed no significant number of drop-offs compared to other survey questions. The number of drop-offs for a question is driven more by the length of the question rather than the sensitive nature of the Racial Discrimination questions, an effect DMDC also observed when

assessing NRB in the *2012 WGRA* survey: *2012 Workplace and Gender Relations Survey of Active Duty Members: Nonresponse Bias Analysis Report* (DMDC, 2013d). The analysis of missing data provides no evidence of nonresponse bias.

5. **Analyze whether past Racial Discrimination victims respond to later WEOA surveys at different rates**—Members who reported experiencing Racial Discrimination in an earlier survey appear equally likely to respond to later WEOA surveys. Additionally, the results of a weighted logistic regression show that prior experience is not significant in modelling response propensity. This study provides no evidence of NRB in estimates of Racial Discrimination.

6. **Analyze mean Armed Forces Qualification Test scores between active duty population and 2013 WEOA survey respondents**—DMDC investigated whether respondents to the WEOA had systematically different AFQT scores than nonrespondents after controlling (through weighting) demographic differences between survey respondents and nonrespondents. DMDC concludes that this study provides very little evidence of NRB because the weighted estimates almost exactly match the known population values.

2013 WEOA Survey

The *2013 WEOA* survey sample size was 88,816 active duty members selected from the 1,407,767 active members on the September 2012 Active Duty Master File (ADMF). The frame included Army, Navy, Marine Corps, Air Force, and Coast Guard active duty members who were ranked E1-O6 in September when the survey fielded. DMDC selected a stratified random sample using the following three characteristics to define the stratification dimensions: race/ethnicity,[2] Service, and paygrade.[3] Completed surveys were returned by 18,018 eligible sampled members, resulting in a 23% weighted response rate. These respondents were weighted to the full active population using standard weighting methods. The four-step weighting process included:

1. Assigning a base weight based on the inverse of the probability of selection,

2. Adjusting the base weight by distributing the weights from the cases of unknown eligibility to the cases of known eligibility,

3. Adjusting the weight from step 2 by distributing the weights from incomplete cases to the complete cases,

4. Post-stratifying the step 3 weight to known population totals for race/ethnicity, Service, gender, and paygrade.

[2] Race/ethnicity was stratified as a seven level variable: Hispanic, White, Black, American Indian/Alaskan Native, Asian, Hawaiian/Pacific Islander, Multi Race

[3] Paygrade was stratified as a five level variable: E1-E4, E5-E9, W1-W5, O1-O3, O4-O6

Applying the weights to the respondents, DMDC estimated that overall 10.2% (±1.0[4]) of active duty military members had experienced Racial Discrimination. DMDC further estimated that 6.5% of non-Hispanic whites (±1.5) and 15.9% of minorities (±1.3) in the active duty military had experienced Racial Discrimination. The statistical methodology report (DMDC, 2013b) provides more details regarding the sampling, weighting, and variance estimation and the tabulation volume (DMDC, 2013c) provides details for the estimates of Racial Discrimination rates by additional demographic groups.

[4] The margin of error of this estimate is based on a 95 percent confidence interval

Section I:
Analyze Response Rates From 2013 WEOA and Other Related DMDC Surveys

DMDC always computes response rates by many known administrative variables (e.g., Service and paygrade). Differential response rates can be evidence of potential NRB unless these variables are controlled for during statistical weighting. Table 1 shows that response rates to the WEOA and comparable SOFS-A vary greatly by subgroup; for example, O4-O6s consistently respond at a much higher rate than E1-E4s. Because O4-O6s also report very different Racial Discrimination rates than E1-E4s, NRB levels would be high if DMDC used unweighted estimates. However, DMDC controls for Service, paygrade, gender, race/ethnicity, location, occupation group, age and on/off base, variables that are correlated with response propensity as well as actual survey responses when constructing survey weights. Therefore, analysis of response rates alone does not provide evidence of NRB in weighted *2013 WEOA* estimates. Instead, the focus of this response rate analysis is to assess a different hypothesis. Some critics may hypothesize that minorities, or potentially Racial Discrimination victims, would be more likely to respond to the WEOA because of the subject matter, a hypothesis Groves (2000) refers to as topic saliency. If this were true, minorities should respond at different rates to the WEOA than they do to other active duty surveys that do not focus on racial issues.

To assess this hypothesis, DMDC compared the *2013 WEOA* response rates to the previously fielded WEOA survey and SOFS-A that fielded in close time proximity. The SOFS-A is DMDC's main recurring general topic survey that covers the same active duty population as WEOA. DMDC used the prior WEOA survey (*2009 WEOA*) and the SOFS-A surveys that fielded the closest to the WEOA surveys, which were in 2012 and 2008. Table 1 shows overall response rates (labeled "Total") and response rates for key demographic subgroups.

Table 1 shows that response rates to the WEOA follow patterns consistent with known trends in the SOFS-A. Over time, across all military surveys, active duty response rates have steadily declined. The WEOA shows a more severe decline than the SOFS-A; however, this can be attributed to budget pressures that forced the removal of the WEOA paper survey option after the 2009 cycle.[5]

[5] The *2009 WEOA* surveys had paper and Web response options while the 2013 survey was Web-only.

Table 1.
Comparison of Trends in WEOA and SOFS-A Response Rates (Shown in Percent)

	2008/2009		2012/2013	
Key Surveys	**WEOA[a]**	**SOFS-A[b]**	**WEOA**	**SOFS-A[c]**
Total	33	31	23	26
Race/Ethnicity				
Non-Hispanic White	35	33	24	28
Minority	30	28	22	22
Black	29	27	21	21
Hispanic	28	28	21	22
Asian	36	32	26	28
All Other Races	29	24	21	22
Service				
Army	29	26	17	20
Navy	33	32	25	27
Marine Corps	21	23	20	21
Air Force	42	42	32	37
Coast Guard	55		44	48
Paygrade				
E1-E4	17	16	12	13
E5-E9	41	39	29	33
O1-O3	43	42	33	38
O4-O6	60	60	45	54
Gender				
Male	33	31	23	26
Female	35	34	26	29

[a]The *2009 WEOA* surveys had paper and Web response options while the 2013 survey was Web-only.
[b]The *November 2008 SOFS-A* was used because it was the most recent SOFS-A survey prior to the *2009 WEOA*, which was conducted in February 2009
[c]The *June 2012 SOFS-A* was used because it was the most recent SOFS-A survey prior to the *2013 WEOA*, which was conducted in April 2013

For race/ethnicity, non-Hispanic whites and Asians consistently respond to active duty surveys at higher rates than other minorities. However, comparing the most recent WEOA and SOFS-A surveys reveals that the response rate gap between non-Hispanic whites and minorities is smaller in the *2013 WEOA* survey. For example, response rates for non-Hispanic whites (28%) were six percentage points higher than minorities (22%) in the *June 2012 SOFS-A*, but response rates for non-Hispanic whites were only two percentage points higher in the *2013 WEOA* (24% versus 22%). This may indicate that the subject matter of equal opportunity influences some minorities to respond (topic saliency) or may dissuade some non-Hispanic whites from responding because of lack of topic interest. The decrease in the race/ethnicity gap is a consideration but does not necessarily indicate an increase in NRB because race/ethnicity is a characteristic that is controlled for during survey weighting. Therefore the only way that the smaller race/ethnicity gap could create larger NRB is if the minorities that were influenced to respond had higher (or lower) Racial Discrimination rates than those that did not respond, and

that hypothesis is not testable with these data. However, the presence of this gap could lead to slightly increased risk for NRB in WEOA surveys.

For Service, response rate patterns are consistent between the SOFS-A and WEOA surveys across years. Air Force response rates are highest, followed by Navy, and the lowest response rates belong to Army and Marine Corps. The response rates by Service provide no evidence of additional NRB in the WEOA survey that does not exist in the SOFS-A.

For paygrade, response rate patterns are consistent across all surveys where senior officers (O4-O6) respond at the highest rates and response rates decrease as active members become more junior until dropping off rapidly for the junior enlisted (E1-E4). DMDC's weighting methods correct for bias associated with the differential response probabilities for these known characteristics (e.g., Service, paygrade). The response rates by paygrade provide no evidence of additional NRB in the WEOA survey that does not exist in the SOFS-A.

Summary of Response Rates Analysis From 2013 WEOA and Other Related DMDC Surveys

Comparisons of WEOA and SOFS-A response rates provide evidence that topic saliency does not substantially alter response rates to the WEOA survey, and therefore any increase in NRB, compared to that of a SOFS-A, is likely to be small to modest. However, although WEOA and SOFS-A response rates have similar patterns, the difference between non-Hispanic white and minority response rates (race/ethnicity gap) suggests that topic saliency may increase the level of NRB in the WEOA over the SOFS-A, but because the response rate gap is only slightly smaller for WEOA, the increase in NRB is likely small.

Section II:
Evaluate Composition of Sample Compared With Survey Respondents

DMDC next considered whether, and how, survey nonresponse (unit nonresponse), affects NRB for this survey. In this section DMDC evaluates the composition of the *2013 WEOA*, exploring key military demographic breakdowns by survey subgroups (e.g., population total, sample size, respondents, and weighted respondents). DMDC draws optimized samples to reduce survey burden on members as well as produce high levels of precision for important domain estimates by using known information about the military population and their propensity to respond. It is important to note that DMDC samples are often not proportional to their respective population. Depending on the specific subgroup, DMDC will over or under sample a specific group (e.g., E1-E4 Army) to obtain enough expected responses to make statistically accurate estimates. While the sample and the number of responses might look out of alignment with the population, this is by design. DMDC is able to use its military personnel data to correctly weight the respondents in order to make survey estimates representative of the entire active duty population. The military demographics considered include: Service, paygrade, gender, and race/ethnicity. Table 2 through Table 5 contains both the frequency and percent for the survey population, sample size, and respondents (unweighted and weighted) by demographic category.

Table 2 shows the breakdown by race/ethnicity. Minority members typically have lower response rates because they are composed of more junior enlisted. For the *2013 WEOA*, minorities were significantly oversampled considering they are disproportionately victims of Racial Discrimination. Overall minorities made up 86% of the sample compared to 35% of the overall active duty military population. The final weighted population pulls the respondents back into alignment with race/ethnicity composition in the active duty to ensure final weighted estimates are not over-representing minorities.

Table 2.
Distribution of Population, Sample and Respondents, by Race/Ethnicity

	Population		Sample		Respondents		Weighted Population	
Race/Ethnicity	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Non-Hispanic White	908,984	65	12,718	14	3,153	18	908,984	65
Minority	498,783	35	76,098	86	14,865	83	498,783	35
Black	223,208	16	16,151	18	2,961	16	223,208	16
Hispanic	159,842	11	14,825	17	2,840	16	159,842	11
Asian	49,489	4	11,421	13	2,632	15	49,489	4
All Other Races	66,244	5	33,701	38	6,432	36	66,244	5
Total	**1,407,767**	**100**	**88,816**	**100**	**18,018**	**100**	**1,407,767**	**100**

Table 3 shows the breakdown by Service. Based on historically different response rates and the need to make estimates for each Service, DMDC oversampled the Navy, Marine Corps, and Coast Guard, and under sampled the Air Force and Army (Table 3: columns 3 and 5). For instance, Army makes up 38% of the active duty but only 33% of the *2013 WEOA* sample. There are fairly large differences between the sample size and respondents percentages, especially with the Air Force and Army (Table 3: columns 5 and 7). The Air Force is the highest responding group and made up 14% of the sample, but 21% of the respondents. Army, on the other hand, made up 33% of the sample and only 24% of the respondents. Finally, DMDC uses post-survey weighting procedures (described earlier) to adjust the 24% of Army respondents to make them representative of the Army's 38% of the overall military population. The final weighting procedure aligns respondent proportions back with the military population for Service (Table 3: columns 3 and 9).[6]

Table 3.
Distribution of Population, Sample and Respondents, by Service

	Population		Sample		Respondents		Weighted Population	
Service	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Army	537,215	38	29,581	33	4,357	24	537,215	38
Navy	310,406	22	25,448	29	4,686	26	310,406	22
Air Force	324,789	23	12,212	14	3,793	21	324,789	23
Marine Corps	193,891	14	16,793	19	3,139	17	193,891	14
Coast Guard	41,466	3	4,782	5	2,043	11	41,466	3
Total	**1,407,767**	**100**	**88,816**	**100**	**18,018**	**100**	**1,407,767**	**100**

Table 4 shows the breakdown by paygrade. Junior enlisted members (E1-E4) are known to have the lowest response rates for all military surveys. DMDC oversamples this group to provide enough responses to make precise estimates for this subgroup (56% of the sample versus 44% of the population). The lower response rate for the E1-E4 group is shown by them making up only 33% of the total respondents. Higher responding groups such as high ranking officers (O4-O6) or senior enlisted members (E5-E9) are under sampled. The high response rates among these specific subgroups provide a sufficient number of respondents. The respondents DMDC received for the *2013 WEOA* are consistent with expected rates based on historical trends. Again, the post-stratification adjustment properly aligns the final weighted population (Table 4: column 9) with the population (Table 4: column 3).

[6]During the *2013 WEOA*, DMDC controlled for race, Service, gender, and paygrade during the post-stratification weighting stage.

Table 4.
Distribution of Population, Sample and Respondents, by Paygrade

	Population		Sample		Respondents		Weighted Population	
Paygrade	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
E1-E4	613,841	44	50,029	56	5,910	33	613,893	44
E5-E9	549,786	39	28,606	32	8,221	46	547,720	39
W1-W5	21,116	2	1,016	1	450	3	21,211	2
O1-O3	134,009	10	6,131	7	2,059	11	135,640	10
O4-O6	89,015	6	3,034	3	1,378	8	89,303	6
Total	**1,407,767**	**100**	**88,816**	**100**	**18,018**	**100**	**1,407,767**	**100**

Table 5 shows the survey subgroup breakdown by gender. The respondents DMDC received for the *2013 WEOA* are consistent with expected rates based on historical trends. Females responded to the *2013 WEOA* at slightly higher rates (19% of respondents versus 18% of sample), but in general Table 5 shows that an assessment of gender shows no evidence of NRB.

Table 5.
Distribution of Population, Sample and Respondents, by Gender

	Population		Sample		Respondents		Weighted Population	
Gender	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**	**Frequency**	**Percent**
Male	1,202,059	85	73,159	82	14,570	81	1,202,088	85
Female	205,708	15	15,657	18	3,448	19	205,679	15
Total	**1,407,767**	**100**	**88,816**	**100**	**18,018**	**100**	**1,407,767**	**100**

Summary of Sample Composition Compared With Survey Respondents

The WEOA sample composition demographically differs from the active duty population distribution due to intentional sampling strategies that allow precise estimation for small subgroups (e.g., racial/ethnic groups). The respondent composition differs from the sample distribution in predictable ways due to subgroups (e.g., junior enlisted) responding at different rates. Analyses show that the survey weights effectively eliminate these differences and the distribution of weighted survey respondents closely matches the active duty population. The difference in the composition of the respondents compared with the population distributions is effectively eliminated during survey weighting. This assessment shows a risk of NRB due to differential response rates, but because the differences are on observable characteristics (e.g., Service, paygrade) the weighting eliminates NRB for these estimates, and reduces NRB for statistics (e.g., Racial Discrimination) correlated with these demographics. DMDC concluded that although large differential response rates provide great risk of NRB, the abundant frame data

on military personnel allows complex weighting adjustments to account for a large number of observable characteristics, and therefore this study provides no evidence of NRB in the *2013 WEOA* estimates.

Section III:
Use Late Respondents as a Proxy for Nonrespondents

Survey researchers have observed that if the field period were shortened or fewer contact attempts were used, a subset of survey respondents would have been nonrespondents, and they have hypothesized that these late respondents may be more similar to nonrespondents than the early respondents. This hypothesis is called the "continuum of resistance" model (Lin & Schaeffer, 1995). Although results from studies testing this model have been mixed (Groves & Peytcheva, 2008), analysis of late respondents is still a common practice in NRB studies.

DMDC evaluated the effect of late responders by performing a weighted logistic regression using PROC SURVEYLOGISTIC in SAS. Specifically, DMDC assessed whether a dichotomous predictor variable for early/late response was a significant predictor of Racial Discrimination, after controlling for other covariates. If late respondents report different experiences from early respondents, the early/late predictor variable should be significant, and may provide evidence of NRB if late responders are similar to survey nonrespondents. Note that whether late respondents are similar to nonrespondents on estimates of interest cannot be directly measured, but whether they are similar on observable characteristics using administrative variables can be assessed.

Table 6 shows the number of respondents by week of fielding. To define early and late respondents, DMDC divided the fifteen week field period into two parts, treating respondents from the first twelve weeks as early respondents and the final three weeks as late respondents.[7]

[7] The choice for breaking the field period into early and late respondents is subjective. We chose the final two weeks to coincide with the final survey contact and to ensure there were sufficient numbers of late respondents to make separate estimates with reasonable precision.

Table 6.
Respondents by Week of Fielding

Early/Late Split	Week	Respondents
Early	1	4,806
	2	3,478
	3	1,667
	4	1,361
	5	741
	6	1,009
	7	518
	8	295
	9	1,035
	10	432
	11	763
	12	187
Late	13	948
	14	763
	15	15
Total		**18,018**

Table 7 shows the demographic composition for early respondents, late respondents, and nonrespondents by race/ethnicity, Service, and paygrade, and gender.

Table 7.
Composition of Sample for Early, Late, and Nonrespondents

Key Domains	Early Respondents		Late Respondents		Nonrespondents	
	Number of Respondents	Unweighted Percent of Total Early Respondents[a]	Number of Respondents	Unweighted Percent of Total Late Respondents[a]	Number of Nonrespondents	Unweighted Percent of Total Nonrespondents[a]
Race/Ethnicity						
Non-Hispanic Whites	2,885	18	268	16	9,087	14
Minority	13,407	82	1,458	84	58,123	86
Black	2,628	16	333	19	12,439	19
Hispanic	2,569	16	271	16	11,437	17
Asian	2,382	15	250	14	8,295	12
All Other Races	5,828	36	604	35	25,952	39
Service						
Army	3,828	24	529	31	24,114	36
Navy	4,259	26	427	25	19,812	29
Marine Corps	2,865	18	274	16	12,956	19
Air Force	3,440	21	353	20	7,831	12
Coast Guard	1,900	12	143	8	2,497	4
Paygrade						
E1-E4	5,247	32	663	38	42,264	63
E5-E9	7,459	46	762	44	19,068	28
W1-W5	415	3	35	2	530	1
O1-O3	1,887	12	172	10	3,826	6
O4-O6	1,284	8	94	5	1,522	2
Gender						
Male	13,177	81	1,393	81	55,827	83
Female	3,115	19	333	19	11,383	17
Total	**16,292**	**100**	**1,726**	**100**	**67,210**	**100**

[a]Details may not add to totals because of rounding.

Early and late respondents generally look demographically similar; however, late respondents contain a lower percentage of Coast Guard (8% versus 12%), more Army (31% versus 24%), and more E1-E4 (38% versus 32%). *2013 WEOA* late respondents are more demographically similar to the nonrespondents than the early respondents, but they are still demographically different from the nonrespondents. For instance, late respondents are disproportionately E1-E4 relative to early respondents, but nonrespondents are much more E1-E4 than late respondents (63% compared with 38%). The pattern follows for Service and race/ethnicity, where late respondents are more Army and minority, and then the effect is more pronounced for nonrespondents (e.g., 36% Army for nonrespondents versus 31% for late

respondents, 86% minority for nonrespondents versus 84% for late respondents). For gender, nonrespondents look very similar to both early and late respondents. While the analysis of the demographics shows that late respondents do look "more like" nonrespondents, which provides limited support for the continuum of resistance model, early, late, and nonrespondents are still quite different from one another. Next, we investigate Racial Discrimination propensity through logistic regression using key predictor variables including the early/late response variable.

Respondents and nonrespondents are characterized based on a set of demographic variables. Variables such as member's race/ethnicity, gender, paygrade, and Service can be critical in predicting military experience of Racial Discrimination. The analysis of Racial Discrimination was conducted via logistic regression with the nine independent variables shown in Table 8. The dependent variable of the logistic model is a binary variable representing whether or not the member experienced Racial Discrimination where the variable equals 0 for no experience and 1 for experience. Although variables such as Service and paygrade are important predictors, early/late response is the variable of interest. Most of the variables in the table are self explanatory with the exception of occupation group. The groups for occupation were determined based on historical response rates, where DMDC coded specific occupation groups as low, average, and high response rate groups.

Table 8.
Independent Demographic Variables for Logistic Model Predicting Racial Discrimination

Variable	Categories
Early/Late	Early Responder*
	Late Responder
Race/Ethnicity	Hispanic
	Non-Hispanic White*
	Black
	Asian
	All Other Races
Gender	Male*
	Female
Paygrade	E1-E4*
	E5-E9
	W1-W5
	O1-O3
	O4-O6
Service	Army*
	Navy
	Marine Corps
	Air Force
	Coast Guard
Location	US & US territories*
	Asia & Pacific Islands
	Europe
Age	Under 25 Years Old*
	25-29 Years Old
	30-35 Years Old
	36-44 Years Old
	45+ Years Old
Occupation Group	Low Response Rate Occupations*
	Average Response Rate Occupations
	High Response Rate Occupations
On/Off base	On Base*
	Off Base

*Represents the reference category for each variable.

The purpose of testing the full model was to measure the effect of each variable on Racial Discrimination while controlling for the others (i.e. measuring the effect of one characteristic taking the other characteristics into consideration). To perform statistical modeling using logistic regression, we set one of the categories (levels) of the independent variable to be a reference category, shown with an asterisk (*) in Table 8. DMDC modeled the data using SAS

PROC SURVEYLOGISTIC. All other categories of the variable were compared with the reference category and the model parameters and odds ratios were derived and interpreted accordingly. The odds ratio can be interpreted as the odds that an outcome (in this case experiencing Racial Discrimination) will occur given a non-reference category compared to the odds of that outcome for the reference category..

Table 9 displays the output statistics from the weighted full logistic model. Column 1 shows the independent variables and their categories. The second through fifth columns consist of the parameter estimates, the standard errors of the estimate, the Wald tests, and the degrees of freedom associated with the variables and categories, respectively. Wald's test and the corresponding p-values for Air Force, Hispanic, Black, and Asian are significant, suggesting that these levels of variables exhibit significant power for predicting Racial Discrimination experience. Minority groups are expected to report more Harassment/Discrimination, and the odds ratios show that minorities experience 2 to 3 times the rate of non-Hispanic whites (reference group).

Table 9.
Logistic Model Predicting Racial Discrimination with Nine Independent Variables

Independent Variable	Parameter Estimate	Standard Error	Wald Test Statistic	df	P-value	Odds Ratio	95 Percent C.I. for Odds Ratio	
							Lower CI	Upper CI
Early/Late			0.0638	1	0.8005			
Late Responders	0.0207	0.0818	0.0638	1	0.8005	1.042	0.756	1.436
Race/Ethnicity			75.1177	4	<.0001			
Black	0.2442	0.0670	13.2664	1	0.0003	2.648	2.024	3.464
Hispanic	0.2648	0.0647	16.746	1	<.0001	2.703	2.073	3.526
Asian	0.3039	0.0641	22.4954	1	<.0001	2.811	2.160	3.659
All Other Races	-0.0832	0.0709	1.3762	1	0.2407	1.909	1.450	2.513
Gender			2.8994	1	0.0886			
Female	0.1045	0.0614	2.8994	1	0.0886	1.232	0.969	1.567
Paygrade			16.9845	4	0.0019			
E5-E9	0.1144	0.1335	0.7353	1	0.3912	0.59	0.421	0.827
W1-W5	-0.5816	0.2417	5.7903	1	0.0161	0.294	0.151	0.572
O1-O3	0.0136	0.1671	0.0067	1	0.935	0.533	0.322	0.884
O4-O6	-0.1886	0.2084	0.8191	1	0.3655	0.436	0.235	0.81
Service			47.999	4	<.0001			
Navy	0.0653	0.0968	0.4547	1	0.5001	0.615	0.471	0.805
Marine Corps	0.0229	0.1253	0.0334	1	0.855	0.59	0.418	0.833
Air Force	-0.4401	0.1073	16.830	1	<.0001	0.371	0.275	0.502
Coast Guard	-0.1988	0.1207	2.7109	1	0.0997	0.473	0.341	0.654
Location			4.0959	2	0.129			
Asia & Pacific Islands	0.2572	0.1704	2.2778	1	0.1312	1.635	0.997	2.682
Europe	-0.0227	0.1584	0.0206	1	0.8858	1.236	0.791	1.932
Age			16.3623	4	0.0026			
25-29 Years Old	0.0297	0.1028	0.0833	1	0.7728	1.691	1.211	2.361
30-35 Years Old	0.2815	0.0998	7.9502	1	0.0048	2.175	1.478	3.202
36-44 Years Old	0.1554	0.1076	2.0836	1	0.1489	1.917	1.260	2.918
45+ Years Old	0.0291	0.1727	0.0284	1	0.8662	1.69	0.982	2.908
Occupation Group			0.8080	2	0.6676			
Average Responders	0.0369	0.0820	0.2028	1	0.6524	1.11	0.882	1.396
Good Responders	0.0303	0.1294	0.0549	1	0.8147	1.102	0.732	1.661
On/Off base			0.7811	1	0.3768			
Off Base	0.0684	0.0774	0.7811	1	0.3768	1.147	0.846	1.553
Constant	-2.0484	0.1482	191.0393	1	<.0001			

The odds ratio for each variable in the model is interpreted taking the impact of the other variables in the model into consideration. For example, the odds ratio for race/ethnicity level Hispanic is 2.703, indicating that Hispanic members are about 3 times as likely as non-Hispanic whites to experience Racial Discrimination after controlling for the other variables in the model.

Table 9 shows that the early/late predictor variable is not significant (p-value is 0.8005) and the odds ratio is only 1.042. This shows that the late responders experience Racial Discrimination at almost the exact same rate as early responders, after controlling for demographic differences between the two groups.[8]

Table 10 shows the composition of early/late respondents broken down by race/ethnicity. Additionally, the table shows the number of unweighted reports of Racial Discrimination cases and the unweighted rates by race/ethnicity. The late respondents report higher overall unweighted Racial Discrimination rates (14.4% versus 12.2%), and higher for each race/ethnicity group; however, this is expected because later respondents are disproportionately high risk groups (e.g., E1-E4).

Table 10.
Comparison of Early and Late Respondents by Race/Ethnicity for Racial Discrimination Cases and Unweighted Rates

Time Period	Race	Respondents	Unweighted Racial Discrimination Cases	Racial Discrimination Unweighted Rate (Percent)
Early Respondents	**Non-Hispanic White**	2,885	145	5.0
	Minority	13,407	1,839	13.7
	Black	2,628	426	16.2
	Hispanic	2,569	388	15.1
	Asian	2,382	409	17.2
	All Other Races	5,828	616	10.6
	Total	**16,292**	**1,984**	**12.2**
Late Respondents	**Non-Hispanic White**	268	16	6.0
	Minority	1,458	233	16.0
	Black	333	62	18.6
	Hispanic	271	47	17.3
	Asian	250	47	18.8
	All Other Races	604	77	12.7
	Total	**1,726**	**249**	**14.4**

[8] An unweighted model was also ran to test the sensitivity of the weights on the estimated parameters, but the early/late predictor variable was still not significant, and the odds ratio was only slightly higher at 1.126.

Summary of Using Late Respondents as a Proxy for Nonrespondents

Observing the unweighted Racial Discrimination rates in Table 10, the late respondents have higher rates (14.4% versus 12.2%) than early respondents. Because there is little difference in non-Hispanic whites (5.0% for early and 6.0% for late respondents) and each level of minorities presenting higher rates, there may be some concern for NRB. However, due to late respondents being composed primarily of low response rate groups, as seen in Table 7 (e.g., E1-E4, minorities), who also have higher Racial Discrimination rates, this increase is expected.

Additionally, the analysis of late respondents using the logistic regression model provides no significant evidence of NRB in the estimates of the Racial Discrimination rate. The model controlled for the demographic differences, and the early/late predictor variable was not significant in predicting whether a sample member experienced Racial Discrimination. Therefore, if late respondents serve as proxies for survey nonrespondents, then there is no evidence that nonrespondents would have different Racial Discrimination rates.

Section IV:
Analyze Item Missing Data for Racial Discrimination Questions

In this section, we analyze item missing data for the Racial Discrimination questions to investigate the hypothesis that some respondents refuse to answer questions or quit the survey all together (i.e., drop-off) because of the sensitivity of the questions. If the decision to refuse to answer the question is not random (i.e., those who avoid the Racial Discrimination questions have different harassment rates than complete respondents), then a source of NRB exists. We cannot directly test this hypothesis because the Racial Discrimination status for respondents that avoid the question is unknown. However, we examine item missing data to assess the NRB in the Racial Discrimination questions.

To understand whether respondents specifically avoided the Racial Discrimination questions, or whether they quit the survey prior to ever seeing the questions, DMDC conducted a "drop-off analysis". Our drop-off analysis shows the last question that a survey respondent answered on the survey. For example, if a respondent answered Q1-10 and quit, the drop-off analysis would place that respondent in the frequency count at Q10. Drop-off analysis does not account for "standard item missing data", for instance when a respondent skips one question (accidentally or on purpose), but returns to answer further questions. For instance, if a member answered Q1-10, skipped to 12 and answered Q12-20, and then answered no further questions, the drop-off analysis would include the member in the count where Q20 was last answered.

In the *2013 WEOA* survey, there were only fifteen questions on the web survey where a large number of respondents (over 100) dropped off. Of these fifteen questions, four were directly related to the Racial Discrimination rate (Questions 28, 29, 31, and 32, See Appendix A). However, this does not prove that the subject matter of equal opportunity was the cause for the drop-off. Another reason respondents may drop out of the survey is survey burden, as measured by question length. Table 11 breaks down the fifteen questions with large drop-offs by showing the amount of drop-offs as well as the number of sub items for the following question. Of the fifteen major instances, thirteen show that the following question involved multiple sub items, and these long sub items may appear burdensome to respondents.

Table 11.
Breakdown of Large Drop-off Questions

Last Question Answered	Number of Drop-offs	Number of Sub items in Next Question
8	250	1
10	165	6
13	284	12
18	211	9
25	192	10
26	190	8
27	*347	18
28	*241	1
30	*113	21
31	*117	4
33	477	8
50	114	16
55	156	5
58	395	10
60	158	7

*Indicates the number of drop-offs when arriving at the four questions that lead into the Racial Discrimination rate.

Specifically, two of the Racial Discrimination questions have the most sub items with 18 and 21 levels, but do not represent the most drop-offs within the survey. DMDC also observed that large sets of questions presented on a single web screen induced drop offs during the *2012 Workplace and Gender Relations Survey of Active Duty Members: Nonresponse Bias Analysis Report* NRB (DMDC 2013d).

Summary of Analyzing Item Missing Data for Racial Discrimination Question

Similar to all DMDC surveys, unit missing data (members that fail to start the survey) is a much more severe problem than item missing data (skipping questions on the survey), but we investigated the item missing data for the Racial Discrimination questions in search of potential NRB. Although numerous members dropped off at the key questions that lead to the Racial Discrimination rate, the long series of scale questions (e.g., respondent burden) for both Q28 (harassment) and Q31 (discrimination) seem to cause the missing data.

Section V:
Analyze Whether Past Racial Discrimination Victims Respond to Later WEOA Surveys at Different Rates

NRB occurs when survey respondents would report different experiences than survey nonrespondents. DMDC has historical data to assess whether prior Racial Discrimination victims[9] respond to future WEOA surveys at different rates than non-victims. For example, if members who reported experiencing Racial Discrimination on the *2009 WEOA* responded to the 2013 survey at significantly higher or lower rates than members who reported no Racial Discrimination experience, this may suggest NRB exists in the *2013 WEOA* Racial Discrimination estimates. Some critics may argue that members who have experienced this situation in the past are more likely to respond to tell the story. For the NRB to occur, the effect of a 4-year old Racial Discrimination victimization on current survey response (e.g., 2009 victimization affecting 2013 response) would need to be similar to the effect of a recent victimization (within last 12 months) on response propensity to the current survey. Note that we cannot test this assumption with the data.

For the survey iterations available (2009 and 2013), DMDC traced the distribution of members by race/ethnicity, Service, paygrade, and gender. DMDC sampled 87,302 members in the 2009 survey of which 26,167 were complete respondents. DMDC then sampled 3,757 of the 2009 respondents in the 2013 survey. The 3,757 respondents from the earlier administration that were sampled again in the later administration are shown in Table 12 broken down by their response to the Racial Discrimination question in the 2009 survey (experienced Racial Discrimination or did not experience Racial Discrimination). Table 12 also displays the unweighted and weighted response rates for each subgroup. The weighted response rates were based on the sampling weights from the *2013 WEOA* survey.

DMDC also conducted this analysis for our *2012 Workplace and Gender Relations Survey* (DMDC Report No. 2013-059), and an important conclusion can be drawn across both studies. Prior survey respondents, whether harassed or not (either due to gender or race), respond to future surveys at very high rates. What this implies is that even after conditioning on Service, paygrade, race, gender, and many other variables, there are a subset of Service members that are extremely cooperative (i.e., take surveys), which also means there also exists a set of non-cooperative Service members. Because these two subgroups cannot be identified through observable characteristics, DMDC is unable to properly account for them during weighting. Therefore, if these cooperative members have attitudes/opinions that differ from the uncooperative, this analysis provides evidence of NRB.

[9] Prior Racial Discrimination victims reported a Racial Discrimination experience on a previous administration of the survey.

Table 12.
Demographic Breakdown of the Overlap Between 2013 WEOA and 2009 WEOA

	Experienced Racial Discrimination (Victims) in 2009 and in 2013 Sample				Did Not Experience Racial Discrimination (non-Victims) in 2009 and in 2013 Sample			
	Frequency	Percent of Total	2013 Unweighted Response Rate (percent)	2013 Weighted Response Rate (percent)	Frequency	Percent of Total	2013 Unweighted Response Rate (percent)	2013 Weighted Response Rate (percent)
Total	563	100	44	48	3,194	100	45	51
Race/Ethnicity								
Non-Hispanic White	7	1	71	99	104	3	57	64
Minority	556	99	43	43	3,090	97	44	48
Black	88	16	38	36	281	9	52	52
Hispanic	43	8	53	50	246	8	44	42
Asian	112	20	46	48	443	14	51	52
All Other Races	313	56	42	44	2,120	66	42	47
Service								
Army	125	22	38	41	459	14	41	51
Navy	139	25	42	56	667	21	41	54
Marine Corps	79	14	43	44	588	18	47	46
Air Force	106	19	44	41	966	30	40	45
Coast Guard	114	20	50	55	514	16	58	60
Paygrade								
E1-E4	215	38	36	38	1,084	34	32	38
E5-E9	234	42	47	55	1,332	42	50	57
W1-W5	9	2	33	22	74	2	61	78
O1-O3	60	11	53	49	461	14	49	47
O4-O6	45	8	51	50	243	8	61	63
Gender								
Male	446	79	45	46	2,592	81	45	54
Female	117	21	38	55	602	19	42	39

Table 12 shows the *2013 WEOA* response rates (unweighted and weighted) by demographic subgroups unweighted response rates for the 2013 survey by response to the 2009 survey's Racial Discrimination question. The top row shows that response rates for prior victims and non-victims are very similar (45% versus 44% unweighted and 51% versus 48% weighted)[10]. When we examine the 'percent of total' columns for victims and non-victims, the largest differences in composition are in race/ethnicity and Service. Although the overall minority proportion is similar (99% versus 97%), Black and Asian make up a higher percentage

[10] It is important to note that the analysis is made almost exclusively on the minority group (3,646 out of 3,757 of the resampled members are minorities due to the intentional oversampling of minorities for the WEOA surveys)

of victims (16% versus 9% for Black and 20% versus 14% for Asian) while All Others Races have the opposite effect and make up the largest percentage in both but make up a smaller percentage (56% versus 66%) in the victims group. For Service, victims are disproportionately Army and Navy. While demographic breakdowns differ based on prior reporting of victimization, NRB will only result if the response rates for these subgroups differ between those who experienced Racial Discrimination and those who did not.

Two competing hypotheses for WEOA surveys may be 1) victims are more likely to respond to "tell their story" or make the military aware of this serious problem, or 2) victims avoid this survey because it may cause them to re-experience a traumatic event. Although it's encouraging that response rates for victims and non-victims are similar, estimates of Racial Discrimination rates could still be biased if these similarities are influenced by demographic differences between subgroups. However, if these response propensities are explained by demographic variables, the weighting also reduces nonresponse bias. For instance, some demographic subgroups that disproportionately experience Racial Discrimination, such as junior enlisted, are also traditionally poor respondents. Therefore, as described above, the slightly lower weighted response rates for victims (48% versus 51%) may be a result of their demographics (38% E1-E4 compared with 34% for non-victims) rather than their experience. Because DMDC accounts for paygrade during weighting, the slightly different response rates by victimization may be accounted for due to the correlation between paygrade and experience.

To investigate further, DMDC ran unweighted and weighted logistic regression models where the dependent variable was response to the survey and the independent variables were Service, paygrade, gender, race/ethnicity, and a dummy variable for prior Racial Discrimination (victimization). Table 13 shows the weighted logistic regression because the weights account for differences in the composition of the two groups (as mentioned earlier, the higher proportion of Black and Asian in the "experienced" group), and we therefore consider the weighted model better.

Table 13 shows the output from the weighted logistic regression using SAS PROC SURVEYLOGISTIC. The analysis of statistical significance and the odds ratios used in Section III can be used here as well. The results show many typical conclusions, such as all paygrade groupings are more likely to respond to the survey than the E1-E4 reference group (all odds ratios are greater than 1). All services are more likely to respond to the survey than Army, and in particular the Coast Guard and Air Force (odds ratios of 2.907 and 1.883, respectively). After controlling for the other independent variables, prior experience does not affect one's likelihood to respond to a later survey. The odds ratio is very close to one (1.096)[11], and far from statistically significant ($p = 0.6889$), and we conclude that prior victimization has a very small influence on future response to the *2013 WEOA*.

[11] The odds ratio is 0.973 in the unweighed model, and also far from statistically significant.

Table 13.
Logistic Model Predicting Response to the 2013 WEOA Survey (weighted, n=3,757)

	Parameter Estimate	Standard Error	Wald Test Statistic	df	P-value	Odds Ratio	95 Percent C.I. for Odds Ratio	
							Lower C.I.	Upper C.I.
Racial Discrimination			0.1603	1	0.6889			
Did Experience	0.0457	0.1141	0.1603	1	0.6889	1.096	0.7	1.714
Race/Ethnicity			12.6044	4	0.0134			
Black	0.00407	0.1996	0.0004	1	0.9837	0.674	0.32	1.418
Hispanic	-0.4492	0.1826	6.0529	1	0.0139	0.428	0.212	0.866
Asian	0.228	0.1369	2.7733	1	0.0958	0.843	0.445	1.598
All Other Races	-0.1816	0.1166	2.4256	1	0.1194	0.56	0.303	1.035
Gender			3.9997	1	0.0455			
Female	-0.2467	0.1233	3.9997	1	0.0455	0.611	0.377	0.99
Paygrade			18.614	4	0.0009			
E5-E9	0.1591	0.1943	0.6708	1	0.4128	2.421	1.556	3.765
W1-W5	0.7845	0.522	2.2585	1	0.1329	4.524	1.207	16.958
O1-O3	-0.3808	0.2641	2.078	1	0.1494	1.411	0.738	2.696
O4-O6	0.1621	0.3417	0.2249	1	0.6353	2.428	1.032	5.712
Service			23.6554	4	<.0001			
Navy	-0.0203	0.1469	0.0191	1	0.8902	1.498	0.918	2.444
Marine Corps	-0.4071	0.2408	2.8579	1	0.0909	1.017	0.507	2.04
Air Force	0.2086	0.1812	1.3265	1	0.2494	1.883	1.068	3.32
Coast Guard	0.643	0.1513	18.0494	1	<.0001	2.907	1.784	4.739
Constant	-0.1766	0.199	0.7878	1	0.3748			

Summary of Analyzing Whether Past Victims' Respond to Later WEOA Surveys at Different Rates

To assess NRB, DMDC checked whether Racial Discrimination victims may be more (or less) likely to respond than non-victims by tracing prior WEOA survey respondents and examining their response rates to the *2013 WEOA*. DMDC also ran logistic regression models where the key independent variable was a dummy variable representing prior victimization. There were 3,757 *2009 WEOA* respondents that were sampled for the *2013 WEOA* survey. Of the 3,757 members, 563 had reported racial victimizations while 3,194 had not. Prior victims and non-victims had extremely similar response rates to the *2013 WEOA* (44% versus 45% unweighted and 48% versus 51% weighted). We caution against drawing conclusions from this study alone due to the small number of prior victims, but the similar unweighted and weighted 2013 response rates between the two groups and the lack of significance of prior victimization on response rates from our logistic regression models provides no evidence of NRB in the *2013 WEOA* estimates.

Section VI:
Analyze Mean Armed Forces Qualification Test Scores Between Active Duty Population and WEOA Survey Respondents

The Armed Forces Qualification Test, or AFQT, consists of the following four sections from the Armed Services Vocational Aptitude Battery (ASVAB): Word Knowledge, Paragraph Comprehension, Arithmetic Reasoning, and Mathematics Knowledge. The scores from these four sections make up the Military Entrance Score, which is also known as the AFQT. The AFQT score is used to determine eligibility for entrance into the Armed Services, as well as your training potential with the Armed Services. DMDC compared weighted estimates of AFQT score for WEOA respondents to the known population value for the corresponding active duty population. If the weighted survey estimates differed substantially from the mean AFQT score in the population, this would provide evidence of possible NRB in *2013 WEOA* estimates. Note that DMDC does not currently use AFQT score as an administrative variable when calculating survey weights. If weighted estimates from survey respondents' mean AFQT score exceeded the active duty populations, this would show that 'intelligent' Service members respond to surveys at higher rates. If intelligence were correlated with other attributes and experiences (e.g., racial harassment), then survey estimates may be biased due to our failure to include AFQT in our weighting models.

DMDC focused on the AFQT percentile and ran PROC SURVEYMEANS on the 1,150,283 active duty members in the population as well as the 13,895 respondents to the *2013 WEOA* that had an AFQT percentile on file. Only enlisted members have AFQT scores; therefore, the analysis was only performed on a subset of the population and survey respondents.[12]

Table 14 shows the mean AFQT percentile overall and by subgroups for the entire enlisted population versus the weighted mean based on the 13,895 *2013 WEOA* respondents.

[12] 98.9% of enlisted members in the sample had an AFQT percentile on file with the others having an "Unknown" value.

Table 14.
Comparison of Mean AFQT Percentile (Active Duty Population versus Survey Respondents)

Variable	Population		Survey Respondents	
	Size	Mean AFQT Percentile	Size	Weighted Mean AFQT Percentile
Overall	1,150,283	63	13,895	64
Race/Ethnicity				
Non-minority/White	709,014	67	1,609	68
Minority	441,269	57	12,286	59
Black	198,241	53	2,487	55
Hispanic	144,121	57	2,384	59
Asian	38,727	61	1,980	62
All Other Races	60,180	65	5,435	66
Service				
Army	435,956	59	3,345	62
Navy	254,292	65	3,790	65
Marine Corps	171,602	62	2,377	65
Air Force	256,432	67	2,962	67
Coast Guard	32,001	68	1,421	69
Paygrade[1]				
E1-E4	611,066	63	5,871	66
E5-E9	539,217	62	8,024	62
Gender				
Male	986,226	63	11,201	65
Female	164,057	60	2,694	61

[1]Note that only enlisted members have an AFQT percentile on file.

Table 14 shows that the weighted mean AFQT percentile of the respondents is nearly the same as that of the population (64% versus 63%). Although similar, the weighted mean from the survey respondents is always slightly greater than or equal to the population mean across all other domains shown in the table. If anything, we conclude that more 'intelligent' members respond to the WEOA survey at slightly higher rates, but again differences are so small it is unlikely that this contributes much toward NRB.

Summary of Analyzing Mean Armed Forces Qualification Test Scores Between Active Duty Population and WEOA Survey Respondents

DMDC investigated whether respondents to the WEOA had systematically different AFQT scores than nonrespondents after controlling (through weighting) demographic differences between survey respondents and nonrespondents. If the respondents systematically differ from nonrespondents and the differences could not be controlled by survey weighting, estimates of any parameter correlated with intelligence, as measured by AFQT, are likely biased. In summary, DMDC concludes that this study provides very little evidence of NRB because the weighted estimates almost exactly match the known population values.

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Appendix A.
Creation of Racial/Ethnic Harassment/Discrimination Rate

Creation of Racial/Ethnic Harassment/Discrimination Rate

For the *2013 WEOA*, DMDC created the Racial/Ethnic Harassment/Discrimination rate based on one of two criteria spanned over four separate questions.

1. Harassment: The member must have answered "Once or Twice", "Sometimes", or "Often" on any sub item a-r on Question 28 and answered "Some" or "All" on Question 29.

(OR)

2. Discrimination: The member must have answered 'Yes', and my race/ethnicity was/is a factor" on any sub item a-u on Question 31 and answered "Some" or "All" on Question 32a indicating "Racial/ethnic discrimination."

The questions involved in creating the Racial Discrimination rate can be seen in Figure A-1, Figure A-2, Figure A-3, and Figure A-4.

Figure A-1.
Question 28

28. How frequently during the past 12 months have you been in circumstances where you thought

- **Military Personnel (Active Duty or Reserve)**
  - **on- or off-duty**
  - **on- or off-installation; and/or**
- **DoD/DHS Civilian Employees and/or Contractors**
  - **In your workplace or on or off your installation/ship...** ***Mark one answer for each item.***

	Often	Sometimes	Once or twice	Never
a. Made unwelcome attempts to draw you into an offensive discussion of racial/ethnic matters?	☒	☒	☒	☒
b. Told stories or jokes which were racist or depicted your race/ethnicity negatively?	☒	☒	☒	☒
c. Were condescending to you because of your race/ ethnicity?	☒	☒	☒	☒
d. Put up or distributed materials (for example, pictures, leaflets, symbols, graffiti, music, stories) which were racist or showed your race/ethnicity negatively?	☒	☒	☒	☒
e. Displayed tattoos or wore distinctive clothes which were racist?	☒	☒	☒	☒
f. Did not include you in social activities because of your race/ethnicity?	☒	☒	☒	☒
g. Made you feel uncomfortable by hostile looks or stares because of your race/ ethnicity?	☒	☒	☒	☒
h. Made offensive remarks about your appearance (for example, about skin color) because of your race/ ethnicity?	☒	☒	☒	☒
i. Made offensive remarks about your accent or language skills?	☒	☒	☒	☒
j. Made remarks suggesting that people of your race/ ethnicity are not suited for the kind of work you do?	☒	☒	☒	☒
k. Made other offensive remarks about your race/ ethnicity (for example,	☒	☒	☒	☒

	referred to your race/ ethnicity with an offensive name)?				
l.	Vandalized your property because of your race/ ethnicity?	☒	☒	☒	☒
m.	Hazed you (for example, experienced forced behaviors that were cruel, abusive, oppressive, or harmful) because of your race/ ethnicity?	☒	☒	☒	☒
n.	Bullied you (for example, experienced verbal or physical behaviors that were threatening, humiliating, or intimidating) because of your race/ethnicity?.....	☒	☒	☒	☒
o.	Made you feel threatened with retaliation if you did not go along with things that were racially/ethnically offensive to you?	☒	☒	☒	☒
p.	Physically threatened or intimidated you because of your race/ethnicity?	☒	☒	☒	☒
q.	Assaulted you physically because of your race/ ethnicity?	☒	☒	☒	☒
r.	Other race/ethnicity-related experiences?.....	☒	☒	☒	☒

Figure A-2.
Question 29

29. [Ask if Any Q28 a - r GT Never] **Do you consider ANY of the behaviors which <u>you marked as happening to you</u> in the previous question to have been racial/ ethnic harassment?**

☒ None
☒ Some
☒ All

Figure A-3.
Question 31

31. During the <u>past 12 months</u>, did any of the following happen to you? If it did, do you believe your race/ ethnicity was a factor? ***Mark one answer for each statement*.**

	No, or does not apply	Yes, but my race/ethnicity was/is NOT a factor	Yes, and my race/ethnicity was/is a factor
a. You were rated lower than you deserved on your last evaluation.	☒	☒	☒
b. Your last evaluation contained unjustified negative comments.	☒	☒	☒
c. You were held to a higher performance standard than others in your job.	☒	☒	☒
d. You did not get an award or decoration given to others in similar circumstances.	☒	☒	☒
e. Your current assignment has not made use of your job skills.	☒	☒	☒
f. You were not able to attend a major school needed for your specialty.	☒	☒	☒
g. You did not get to go to short (1- to 3-day) courses that would provide you with needed skills for your job.	☒	☒	☒
h. You received lower grades than you deserved in your training.	☒	☒	☒
i. You did not get a job assignment that you wanted because of scores that you got on tests.	☒	☒	☒
j. Your current assignment is not good for your career if you continue in the military.	☒	☒	☒
k. You did not receive day-to-day, short-term tasks that would help you prepare for advancement.	☒	☒	☒
l. You did not have a professional relationship with someone who	☒	☒	☒

advised (mentored) you on career development or advancement.			
m. You did not learn until it was too late of opportunities that would help your career.	☒	☒	☒
n. You were unable to get straight answers about your promotion possibilities.	☒	☒	☒
o. You were taken to nonjudicial punishment or court martial when you should not have been.....	☒	☒	☒
p. You were punished at your job for something that others did without being punished.	☒	☒	☒
q. You were excluded by your peers from social activities.	☒	☒	☒
r. You got poorer military services (for example, at commissaries, exchanges, clubs, and rec centers) than others did.	☒	☒	☒
s. You received poorer treatment than you deserved from a military health care provider.	☒	☒	☒
t. You were harassed by armed forces police.....	☒	☒	☒
u. You had other bothersome experiences at your job.	☒	☒	☒

Figure A-4.
Question 32

32. [Ask if Any Q31 a - u = "Yes, and my race/ethnicity was a factor" OR "Yes, but my race/ethnicity was NOT a factor"] **Do you consider ANY of the behaviors which <u>you marked</u> in the previous question to have been...** ***Mark one answer for each item*.**

	None	Some	All
a. Racial/ethnic discrimination?.....	☒	☒	☒
b. Sex discrimination?.....	☒	☒	☒
c. Religious discrimination?.....	☒	☒	☒
d. Other type of discrimination?.....	☒	☒	☒

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14. ABSTRACT

The Defense Manpower Data Center conducted several studies to assess the presence of nonresponse bias in estimates from the 2013 Workplace and Equal Opportunity Survey of Active Duty Members. The objective of this research was to assess the extent of nonresponse bias for the estimated rate of Racial/Ethnic Harassment/Discrimination in the active duty military. The level of nonresponse bias can vary for every question on the survey, but DMDC focused on the Racial/Ethnic Harassment/Discrimination rate because this is the central question on the survey.

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