



ASVAB Validation Technical Report

Aviation Ordnanceman (AO) Rating

Zannette A. Uriell
Navy Selection and Classification Office (OPNAV N-132)

Reviewed, Approved, and Released by
Jason Jacobs-Lentz
Navy Selection and Classification Office (OPNAV N-132)

July 12, 2023

REPORT DOCUMENTATION PAGE			<i>Form Approved</i> <i>OMB No. 0704-0188</i>	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.				
1. REPORT DATE (DD-MM-YYYY) 12-07-2023		2. REPORT TYPE Technical Report		3. DATES COVERED (From - To) April 2018 – May 2023
4. TITLE AND SUBTITLE ASVAB Validation Technical Report Aviation Ordnanceman (AO) Rating			5a. CONTRACT NUMBER	
			5b. GRANT NUMBER	
			5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Zannette A. Uriell			5d. PROJECT NUMBER	
			5e. TASK NUMBER	
			5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Navy Selection and Classification Office, OPNAV N132, 701 S. Courthouse Road, Arlington, VA 22204			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) Director, Navy Selection and Classification Office OPNAV N132 701 S. Courthouse Road Arlington, VA 22204			10. SPONSOR/MONITOR'S ACRONYM(S) OPNAV N132	
			11. SPONSOR/MONITOR'S REPORT NUMBER(S) 23-05	
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited				
13. SUPPLEMENTARY NOTES				
14. ABSTRACT The Armed Services Vocational Aptitude Battery (ASVAB) is used by the Navy to classify Sailors into occupations, or ratings. Periodically, the classification standards in use are re-evaluated for validity, to ensure that the standards are most likely to lead to "A" School success and thereby success in the rating. Training data for the Aviation Ordnanceman rating were evaluated to determine which composite of ASVAB test scores would be most valid for predicting training success. The data analyzed, the processes used to determine the most valid composites, and the final decision of the ASVAB Validation Review Committee are included in this report. Ultimately, the AO composites were not changed.				
15. SUBJECT TERMS ASVAB, selection and classification, Navy ASVAB validation/rating entry standards, validity coefficients, linescores, diversity				
16. SECURITY CLASSIFICATION OF: UNCLASSIFIED			17. LIMITATION OF ABSTRACT UNLIMITED	18. NUMBER OF PAGES 16
a. REPORT UNCLASSIFIED	b. ABSTRACT UNCLASSIFIED	c. THIS PAGE UNCLASSIFIED		
			19b. TELEPHONE NUMBER (include area code) 901-874-4495	
Standard Form 298 (Rev. 8-98) Prescribed by ANSI Std. Z39.18				

Table of Contents

Introduction.....	1
Aviation Ordnanceman Work.....	1
Methods.....	3
Student Data Used.....	3
Validity Coefficients.....	8
Results.....	12
Discussion and AVRC Decision.....	15
References.....	16
Appendix A – Description of the ASVAB and Additional Selection Tests	A-1
Appendix B – Current Composites in Use Across All Ratings	B-1
Appendix C – Corrections of Validity Coefficients	C-1
Appendix D – Aviation Ordnanceman (AO) Results Brief.....	D-1

Introduction

There are a number of jobs, or ratings, in the Navy, and incoming recruits are classified into these jobs using scores from the Armed Services Vocational Aptitude Battery (ASVAB). This battery of tests has been used since 1974 (*History of Military Testing*, n.d.), and predominantly includes tests of crystallized intelligence (see Appendix A for brief descriptions of each test, or visit <https://www.officialasvab.com>; see Appendix B for a list of ratings and their current ASVAB selection composites).

Historically, determination of which composite(s) should be used for classification into a rating was based on the final school grades that Sailors received in “A” School; those composites of ASVAB tests that showed the highest correlation with final school grade generally became the composites used for succeeding Sailors to enter into that rating training (see Held, Hezlett, Johnson, McCloy, Drasgow, and Salas (2014) for more information). Final school grade was replaced in the 2010s by First-Pass Pipeline Success (FPPS), or the ability to successfully complete training in the first attempt without having any academic setbacks. Sailors who have FPPS are sent to the Fleet the fastest with the lowest cost to train, as compared to a Sailor who has an academic setback (which requires a longer training time) or a Sailor who fails a course and has to be reclassified into another rating and start a different training path (thereby also needing a replacement recruited for the original rating).

Changes in rating training will likely require that composites used for classification into that training be re-evaluated, but composites are also re-assessed periodically to determine if a change may be needed for less obvious reasons. Once a revalidation occurs, suggested composites are presented to the ASVAB Validation Review Committee (AVRC), which includes representatives from recruiting, training, and rating health components within the Navy HR community. This report describes the recent revalidation study conducted of the Aviation Ordnanceman (AO) community, which had not been reviewed since prior to 2018.

Aviation Ordnanceman Work

The Navy Enlisted Manpower and Personnel Classifications and Occupational Standards (NEOCS) manuals (available at <https://www.mynavyhr.navy.mil/References/NEOCS-Manual/>) are a preliminary source of information about a rating, as the rating tasks defined by NEOCS determine the “A” School content. A shortened version of this information is contained in Navy Credentialing Opportunities On-Line (COOL; <https://www.cool.osd.mil/usn/>), which provides an overview and rating card for each rating, as well as bibliographies for advancement, roadmaps for development, and related civilian credentials and occupations.

The October 2022 COOL rating card for the AO rating indicates:

“Aviation Ordnanceman are aircraft armament (weapons) specialists in charge of storing, servicing, inspecting and handling of all types of weapons and ammunition carried on Navy aircraft.

WHAT THEY DO:

- Inspect, maintain and repair aircraft mechanical and electrical armament/ordnance systems;

- Service aircraft guns and accessories;
- Stow, assemble and load aviation ammunition including aerial mines, torpedoes, missiles and rockets;
- Service bomb, missile and rocket releasing and launching devices;
- Load supplemental munitions;
- Assemble, test and maintain air-launched guided missiles;
- Supervise operation of aviation ordnance shops, armories and stowage facilities.”

Additionally, the COOL card lists other qualifications and interests:

“People in this rating should have above average competence with tools, equipment and machinery, possess manual dexterity and be physically fit, have skills in math and the ability to work well with others and function successfully as team members. Record keeping is also very important. Other helpful qualities include the ability to do detailed work and perform repetitive tasks.”

As the goal of using an ASVAB composite for classification is to ultimately predict success in the training and thereby the job, Table 1 overlays the ASVAB tests onto the tasks an AO does. This intuitive link between ASVAB tests and tasks can be used to guide analyses in determining the best selection composite. Seemingly, Auto and Shop (AS) or Mechanical Comprehension (MC) might be expected to be part of a selection composite for the AO rating.

Table 1
ASVAB Linkages to the AO Rating

AO Tasks	GS	AR	WK	PC	MK	EI	AS	MC	AO	CS
Inspect, maintain and repair aircraft mechanical and electrical armament/ordnance systems	X					X	X	X	X	
Service aircraft guns and accessories							X	X		
Stow, assemble and load aviation ammunition including aerial mines, torpedoes, missiles and rockets							X	X	X	
Service bomb, missile and rocket releasing and launching devices							X	X		
Load supplemental munitions							X	X	X	
Assemble, test and maintain air-launched guided missiles						X	X	X	X	
Supervise operation of aviation ordnance shops, armories and stowage facilities		X	X	X	X					

Methods

Student Data Used

There are two CDPs for AO that may be taken prior to assignment to a Navy billet in the Fleet. All AO attend CDP 625Z, and about half follow that with 626A. Because of the high rate of graduation and low rate of academic setback, as well as the fewer number of students, only CDP 625Z was used to determine a selection composite.

Corporate Enterprise Training Activity Resource Systems (CeTARS) data were downloaded for those with Active Duty Service Dates (ADSD) 1 October 2016 and beyond who attended CDP 625Z. Since AO has not been analyzed within the recent past, the decision was made to only use the most recent five years of data in analyses (effective dates of training actions since 23 April 2018).

Person Event (PEVT) codes are used within CeTARS to indicate administrative changes during training. Key PEVTs found in the data for this AO course are listed in Table 2, along with the enrollment code (2) and the graduation code (288); see CeTARS for full descriptions of all codes. Table 2 shows how each PEVT used was classified: academic (and possibly related to ASVAB) vs non-academic, setback vs failure. All those with non-academic failures were removed prior to analyses, leaving those who had graduated, those who had academically failed, and those who had already had an academic setback during training but had not yet finished training.

Table 2
Person Event Codes Used

Category	Academic Code	Non-Academic Code	
Setback	48	73	
	51	294	
	53	297	
	56	298	
	855		300
			303
			305
			308
Failure	81	207	
	138	230	
	142	311	
	371		320
			969
			970
			971
			973

After removing those with non-academic failures, data remained for 4,539 Sailors. Table 3 provides descriptive information for each ASVAB subtest as well as for the Armed Forces Qualification Test (AFQT), which is comprised of the AR, MK, PC, and WK subtests. Standard scores for each subtest and AFCT are such that mean is 50 and standard deviation is 10.

Table 3
ASVAB Test Descriptives for AO Sample

Test	Count	Min	Max	Mean
GS	4539	25	73	48.80
AR	4539	27	72	48.59
WK	4539	31	74	48.68
PC	4539	29	69	50.28
MK	4539	33	71	52.04
EI	4538	20	75	47.39
AS	4539	25	78	45.34
MC	4539	24	79	49.34
VE	4538	34	68	49.28
AO	4124	26	70	55.18
CS	1565	23	72	52.00
AFQT	4539	22	99	47.21

Figures 1 and 2 are histograms for the composites used for selection into the AO ratings; the mean for AR+MK+AS+VE was 195.24 and the mean for MK+AS+AO was 152.70.

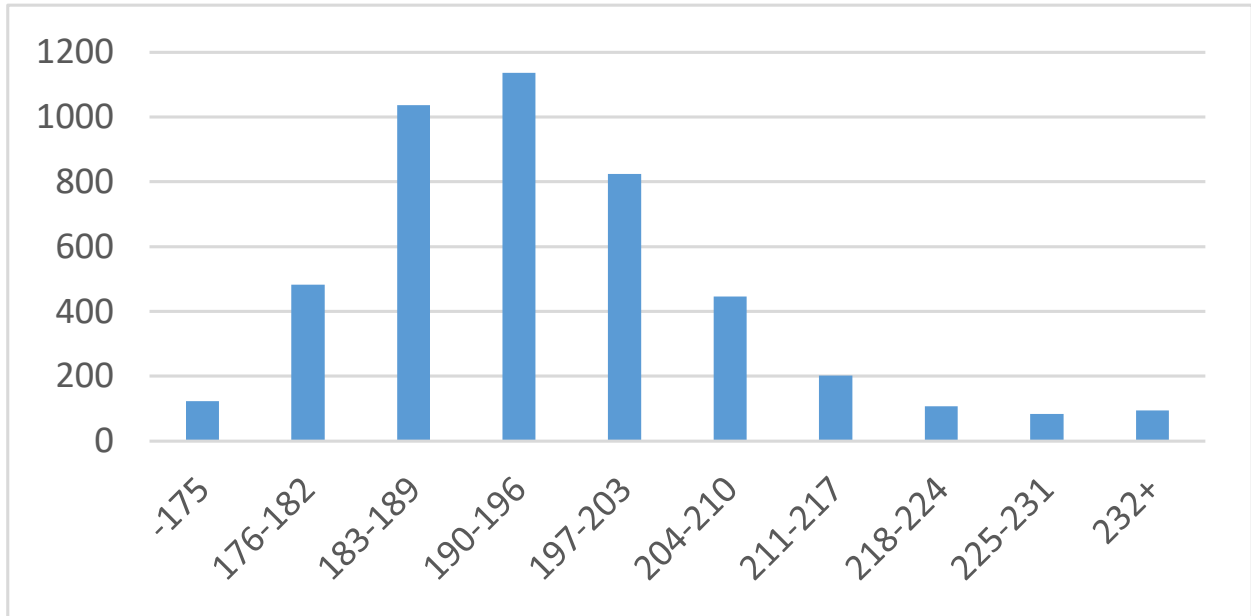


Figure 1. AR+MK+AS+VE Scores of AO Students.

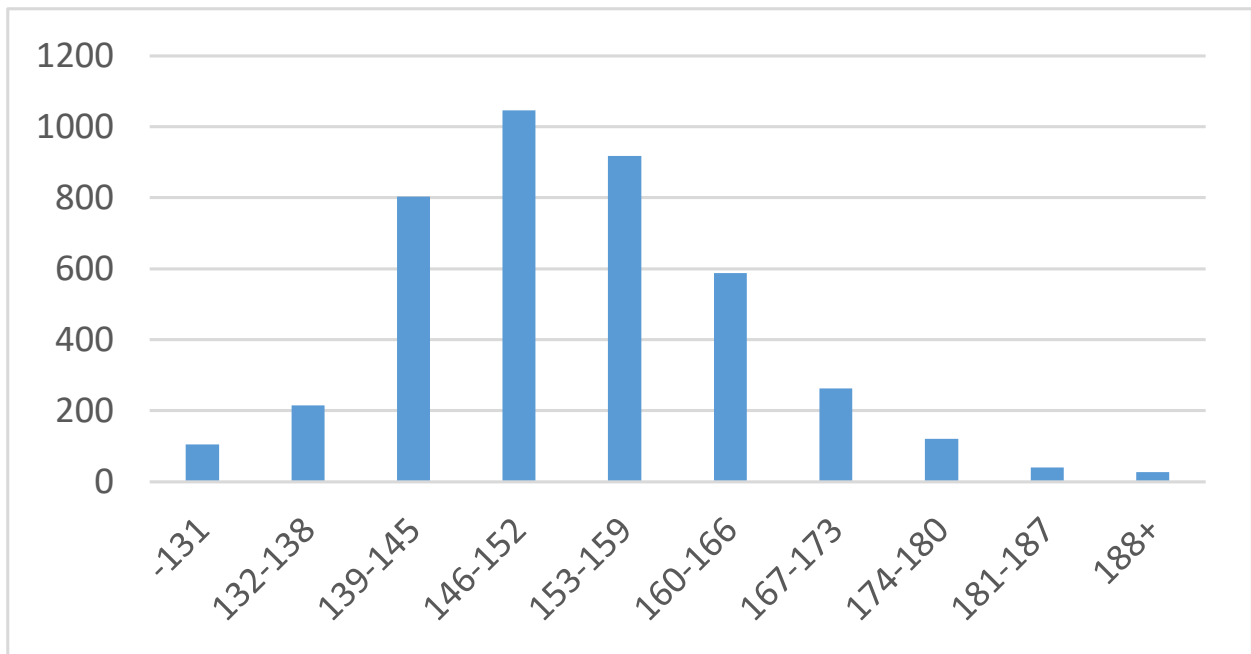


Figure 2. MK+AS+AO Scores of AO Students.

Sailors can meet selection composites by qualifying only on the first composite, only on the second composite, or by qualifying on both composites. Additionally, waivers are available of up to three points per test in an equation (*Class “A” School and Rating Entry Requirements*,

2016). Table 4 provides the decomposition based on how each qualified, and provides rates of academic setback, graduation, and FPPS for each method.

Table 4
Qualification and FPPS Rates for Each Qualification Method

	Student #	% of Sample	Academic Setback Rate	Academic Setback, Still in Training	Grad Rate	Academic Failure Rate	Observed FPPS%
Total Sample	4539	100.0%	7.3%	3	99.5%	0.5%	92.6%
Qualified Only Through AR+MK+AS+VE \geq 185	675	14.9%	5.2%	1	99.7%	0.2%	94.7%
Qualified Only Through MK+AS+AO \geq 140	721	15.9%	11.9%	0	99.0%	1.0%	88.1%
Qualified On Both	3032	66.8%	6.6%	2	99.5%	0.5%	93.3%
Qualified On Either	4428	97.6%	7.2%	3	99.4%	0.5%	92.6%
Waivered	111	2.4%	9.0%	0	100.0%	0.0%	91.0%

The graduation rate is very high – 99.5% overall – regardless of how a Sailor qualified. The FPPS varied based on qualification method, with those qualifying based on MK+AS+AO being more likely to have an academic setback that led to a lower FPPS rate of 88.1%. The majority (66.8%) qualify based on meeting both composite linescores, and have a 93.3% FPPS rate.

About 2% of those in the analyzed data were granted a waiver. However, in November 2022, the success rate of those with waivers was evaluated for this rating and for several others to determine if a reduction in the linescores could be absorbed with minimal impact to graduation rate. A temporary linescore adjustment became effective on 23 November 2022 that changed the AO linescores from 185 and 140 to 173 and 131, making the previous waiver limit the new minimum. There is very little AO data after that effective date, so the entire dataset was re-evaluated as if the new linescores had been in place the entire 5 years. Table 5 shows that the largest change is for those who qualified solely due to MK+AS+AO, which dropped from 721 Sailors with the higher linescores to 56 Sailors with the lower linescores; those who had previously qualified because of only one composite were now qualifying based on both. FPPS for this qualification method increased somewhat while the FPPS for the “Qualified On Both” method decreased slightly.

Table 5
Qualification and FPPS Rates for Each Qualification Method – Temporary Linescores

	Student #	% of Sample	Academic Setback Rate	Academic Setback, Still in Training	Grad Rate	Academic Failure Rate	Observed FPPS%
Total Sample	4539	100.0%	7.3%	3	99.5%	0.5%	92.6%
Qualified Only Through AR+MK+AS+VE \geq 173	507	11.2%	4.7%	0	99.8%	0.2%	95.1%
Qualified Only Through MK+AS+AO \geq 131	56	1.2%	8.9%	0	100.0%	0.0%	91.1%
Qualified On Both	3976	87.6%	7.6%	3	99.4%	0.6%	92.3%
Qualified On Either	4539	100.0%	7.3%	3	99.5%	0.5%	92.6%
Waivered	0	0.0%	---	---	---	---	---

Figure 3 provides a graphical representation of the FPPS, graduation, and academic setback rates of those who received a waiver from the permanent linescores of 185 and 140, with the points waived for the 3-test composite adjusted to a 4-test scale using linear equating. Between 8 and 16 received waivers of up to 1.75 points per test, but only 9 people received waivers of 2 to 3 points per test (none for 2.5 points per test), hence the large changes seen on the right side of figure 3. As indicated previously, all who received waivers did graduate, however the academic setback (AS) rate and the FPPS (which is related to AS) are relatively low and high, respectively, until 1.75 points per test (3 of 9 Sailors had an AS).

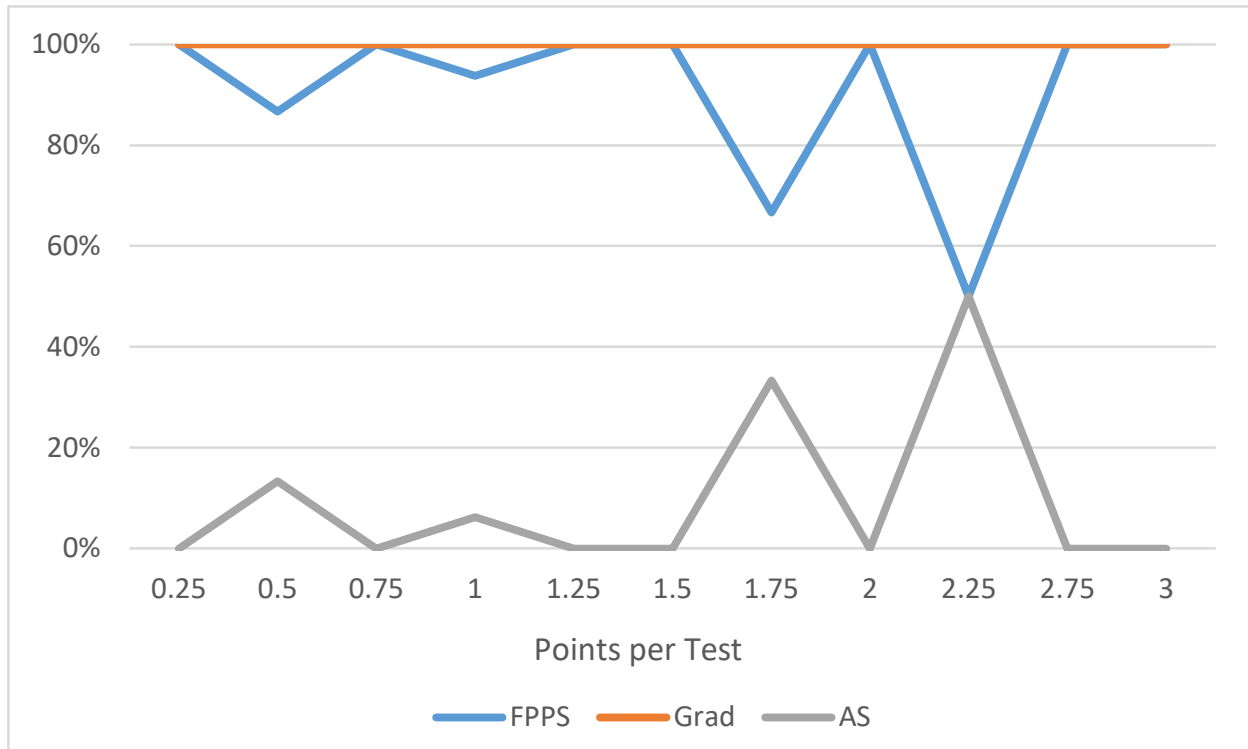


Figure 3. FPPS, graduation, and academic setback rates based on number of points per test waived.

Validity Coefficients

Because only about 1/3 of AO students had CS data available, composites with CS scores were not considered as possible selection composites. Only Sailors with complete data for the remainder of the tests (4,122 Sailors) were considered when evaluating possible selection composites based on validity coefficients.

Receiver operating characteristic (ROC) curves were drawn for both of the composites currently in use (Figures 4 and 5). The diagonal line indicates random classification (i.e., chance), and both are shown to be slightly better than chance. The area under the curve (AUC) for AR+MK+AS+VE is .6099 and for MK+AS+AO is .5865, indicating the first is a slightly better predictor than the second.

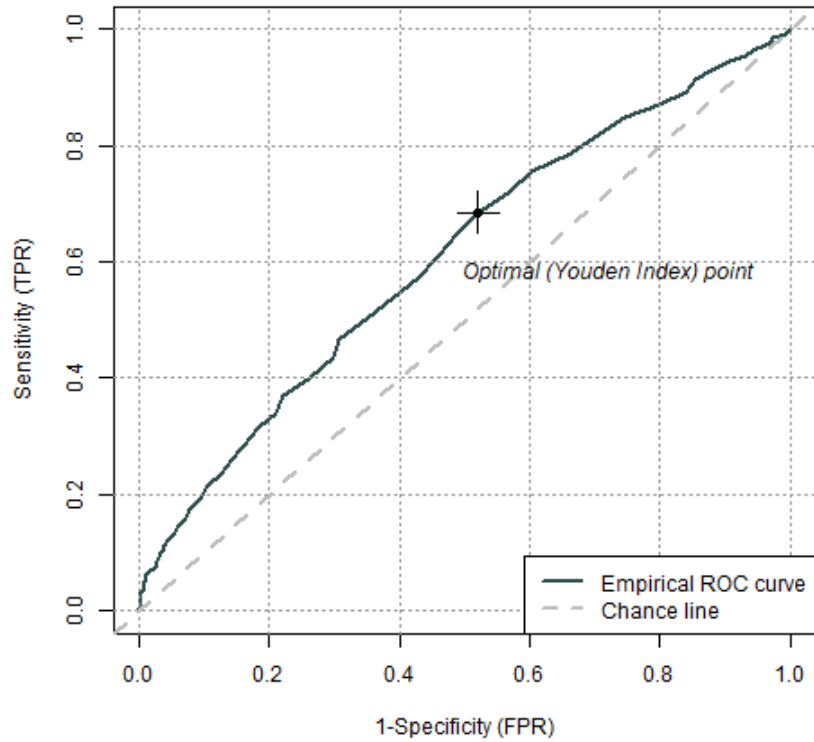


Figure 4. AR+MK+AS+VE ROC.

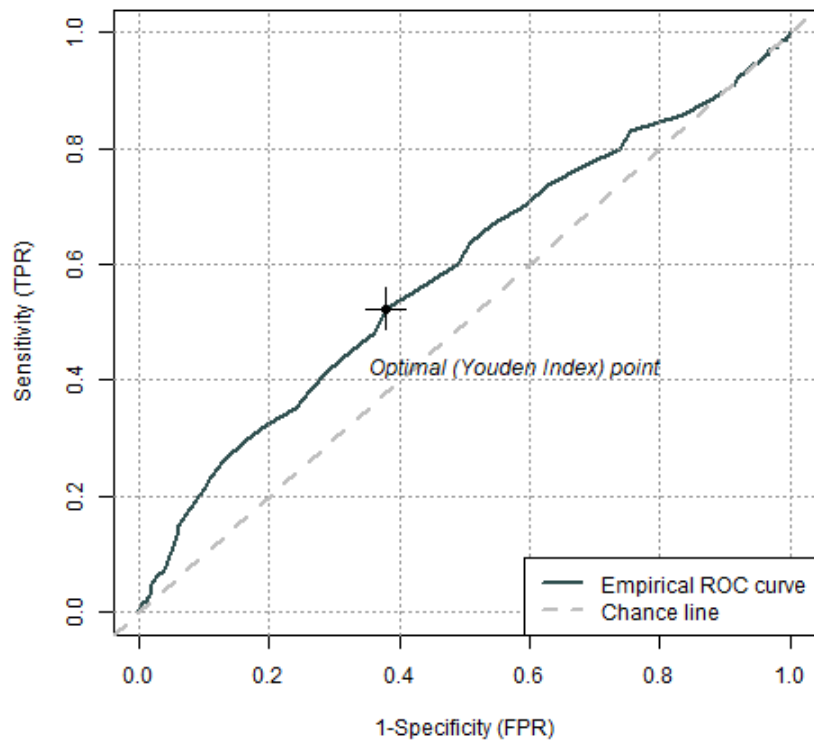


Figure 5. MK+AS+AO ROC.

There are 23 Navy classification composites that include the subtests available for consideration for AO selection. The correlation coefficient between FPPS and each test/composite was computed, and then each was corrected for the range restriction that occurs because of the selection process, and then also corrected for the dichotomous nature of the FPPS variable (see Segall, 2004, for correcting to PAY97 norms, Held, Carretta, Hezlett, Johnson, Mendoza, Abrahams, Drasgow, McCloy, and Wolfe (2015), or appendix C for more details on these corrections). The uncorrected validities as well as the validities after each correction are shown in table 6, grouped by family of the test/composite. Those underlined are currently in use for AO selection, and those highlighted are the 10 highest fully corrected validities.

Table 6
Composite Validities

Composite Family	Composite	Uncorrected Validity	Validity Corrected for Range Restriction to PAY97	Validity Corrected for Range Restriction & Dichotomy (Fully Corrected)
ASVAB test	GS	0.083	0.274	0.509
ASVAB test	AR	0.061	0.278	0.516
ASVAB test	WK	0.047	0.257	0.476
ASVAB test	PC	0.109	0.301	0.558
ASVAB test	MK	0.057	0.278	0.516
ASVAB test	EI	0.073	0.222	0.412
ASVAB test	AS	0.045	0.142	0.264
ASVAB test	MC	0.044	0.207	0.385
ASVAB test	AO	0.033	0.222	0.412
ASVAB test	VE	0.083	0.291	0.540
Administrative	MK+VE	0.101	0.311	0.577
Administrative	PC+MK	0.116	0.316	0.587
Administrative	AR+PC+MK	0.109	0.315	0.585
Mechanical	AR+AS+MC	0.066	0.246	0.457
Mechanical	MK+AS+AO	0.073	0.275	0.511
Mechanical	AR+MK+AS	0.082	0.287	0.532
Mechanical	MK+AS+VE	0.095	0.298	0.554
Operations	AR+MK+AS+VE	0.099	0.304	0.564
Operations	GS+AR+2MK	0.094	0.303	0.562
Operations	AR+MK+AO+VE	0.093	0.308	0.572
Operations	AR+MK+EI+VE	0.109	0.311	0.577
Operations	GS+MK+MC+VE	0.097	0.302	0.561
Operations	MK+EI+VE	0.107	0.309	0.573
Specialized	AR+VE	0.093	0.305	0.567
Specialized	GS+MK+VE	0.108	0.311	0.577
Specialized	AR+WK	0.073	0.292	0.543
Specialized	GS+AR+MK+VE	0.109	0.313	0.580
Specialized	GS+AR+MK	0.098	0.305	0.566
Specialized	GS+MK+2VE	0.106	0.311	0.577
Technical	AR+MK+MC+VE	0.092	0.303	0.563
Technical	GS+AR+MK+EI	0.106	0.304	0.565
Technical	GS+EI+MC	0.081	0.262	0.487
Technical	GS+AR+EI+MC	0.089	0.282	0.523

Results

A year of accessions data was extracted, in order to determine impacts of potential composites. Accessions included those with Active Duty Service Dates (ADSD) between 24 April 2022 and 23 April 2023 (31,383 records). Demographic details for this group show 74.8% were male and 25.2% were female; Whites were 42.0% while Hispanic were 24.1% and African American were 22.6% (the remainder being another, unknown, or mixed race). The ASVAB subtest descriptives for the population are provided in table 7.

Table 7
ASVAB Test Descriptives for 12 Months of Accessions

Test	Count	Min	Max	Mean
GS	31,344	21	79	51.66
AR	31,345	23	79	52.12
WK	31,331	20	77	51.38
PC	31,343	24	74	52.27
MK	31,343	28	75	53.92
EI	31,310	20	80	49.61
AS	31,340	20	80	46.00
MC	31,338	20	80	51.25
VE	31,343	21	77	51.80
AO	28,602	26	70	56.07
CS	14,751	22	73	61.74
CT	18,434	24	79	51.34
AFQT	31,360	5	99	57.36

As an available option is to keep the current composites (to minimize changes at this time), AR+MK+AS+VE and MK+AS+AO were considered in addition to the two with the highest validity, PC+MK and AR+PC+MK, as well as one that might be related to the work and also is in the top 10 for validity, AR+MK+AO+VE. Standardized group mean score differences (Cohen's d) for each composite are shown in table 8. The three possible alternatives show the most similarity between comparison groups, with all showing negligible differences (<.2) between genders. PC+MK also shows negligible difference between African American and White while AR+PC+MK and AR+MK+AO+VE show small (.2 to less than .5) differences, and all three show small differences between Hispanic and White. AR+MK+AS+VE shows a medium (.5 to less than .8) difference between genders and between Hispanic and White, and a large (.8 or greater) difference between African American and White; MK+AS+AO shows similar differences, although reduced (small differences for gender and Hispanic versus White, with medium difference for African American versus White).

Table 8
Standardized Group Mean Score Differences Based on 12 Months of Accessions

	AR+MK+AS+VE	MK+AS+AO	PC+MK	AR+PC+MK	AR+MK+AO+VE
Female-Male	-0.601	-0.317	0.109	-0.103	-0.075
African American- White	-0.843	-0.693	-0.188	-0.340	-0.432
Hispanic-White	-0.578	-0.358	-0.218	-0.239	-0.223

Predicted rates of FPPS and graduation, as well as qualification, were computed for the two composites currently in place (table 9) and for the three composites being considered as alternatives (table 10); both tables provide these rates at 4 different standardized scores, including the current permanent score (185) and the current maximum waiver from that score (173). Graduation rates are predicted to be high and relatively consistent regardless of the composite chosen. Predicted FPPS rates show slight variations between composites and between standardized scores, however are still above 90%. Qualification rates vary more by standardized score for the two more technical composites (AR+MK+AS+VE and MK+AS+AO) as well as the other composite that includes the AO test, with about 75% qualifying at 185 and almost 90% or higher qualifying at 167; about 90% qualify at 185 for the two less technical composites (PC+MK and AR+PC+MK) and about 97% at 167.

Table 9
Predicted FPPS and Qualification Rates for Current Composites based on 12 Months of Accessions

Std. Score	AR+MK+AS+VE			MK+AS+AO		
	FPPS Rate (%)	Grad Rate (%)	Qual Rate (%)	FPPS Rate (%)	Grad Rate (%)	Qual Rate (%)
185	95.2	99.6	77.9	93.6	99.4	76.7
179	94.6	99.5	85.9	93.3	99.4	82.4
173	94.1	99.5	91.8	93.1	99.4	85.5
167	93.7	99.5	95.7	92.9	99.4	88.1

Table 10
 Predicted FPPS and Qualification Rates for Alternative Composites based on 12 Months of
 Accessions

Std. Score	PC+MK			AR+PC+MK			AR+MK+AO+VE		
	FPPS Rate (%)	Grad Rate (%)	Qual Rate (%)	FPPS Rate (%)	Grad Rate (%)	Qual Rate (%)	FPPS Rate (%)	Grad Rate (%)	Qual Rate (%)
185	94.3	99.6	90.5	94.9	99.6	86.1	94.3	99.5	81.4
179	94.1	99.5	93.3	94.4	99.6	92.0	93.9	99.5	85.3
173	93.7	99.5	96.8	94.1	99.5	95.0	93.6	99.5	88.1
167	93.5	99.5	97.8	93.8	99.5	97.4	93.4	99.5	89.6

Various combinations of these composites were considered for adoption, as almost all Navy ratings have alternative options for qualification (see appendix B for current composites in use for each rating). Additionally, the temporary reduction in linescore that is currently in place for recruiting was also considered. Because of the high focus by decision makers on ensuring graduation rate does not decrease, the three new combinations chosen predict the same graduation rate as found with the permanent operational composites.

Table 11 presents the options considered and the qualification rate, predicted graduation rate, and predicted FPPS for each, as well as demographic comparisons of the qualification rate. All of those considered increase the qualification pool by at least 3,000 Sailors except for the last (adding AR+MK+AO+VE), which decreased the qualification pool by about 2,000 Sailors. The predicted FPPS is slightly lower for all options because academic setbacks would be higher when graduation rate is consistent. In terms of demographics, adding in an administrative composite (PC+MK or AR+PC+MK) gives similar qualification percentages for females compared to males and for African American and Hispanic compared to White, as evidenced by ratios of .934 or higher, although the two other options also improve the qualification ratios over the current permanent composites and linescores.

Table 11
Summary of Qualification Standards Options Considered

	AR+MK+AS+VE ≥ 185 or MK+AS+AO ≥ 140	AR+MK+AS+VE ≥ 173 or MK+AS+AO ≥ 131	AR+MK+AS+VE ≥ 177 or MK+AS+AO ≥ 133 or AR+PC+MK ≥ 88	AR+MK+AS+VE ≥ 181 or MK+AS+AO ≥ 136 or PC+MK ≥ 90	AR+MK+AS+VE ≥ 183 or MK+AS+AO ≥ 137 or AR+MK+AO+VE ≥ 183
	[Current Permanent]	[Temporary Reduction]	[Option 2]	[Option 3]	[Option 4]
QR	86.4%	96.0%	96.9%	96.6%	93.0%
Difference from Current Qual #	---	+3,006	+3,297	+3,211	-2,055
% Qual F::M	0.875	0.963	0.984	0.986	0.950
% Qual AA::W	0.729	0.903	0.934	0.934	0.854
% Qual H::W	0.900	0.973	0.980	0.975	0.958
Predicted Grad	99.5%	99.5%	99.5%	99.5%	99.5%
Predicted FPPS	94.6%	93.7%	94.1%	94.2%	94.3%

Discussion and AVRC Decision

With recruiting shortfalls from 2022 continuing into 2023 (see, for example, Anderson, 2022; Myers, 2023), the AVRC is focused on increasing qualification rates for ratings as long as there are available seats in training courses and graduation rates are not impacted. Analyses presented here show that, within the linescore range considered, graduation rates are predicted to be maintained across several different combinations of ASVAB test composites.

As the AO rating is a “hands-on” rating at least at the more junior levels, a concern is that adding an administrative composite might be detrimental to rating health overall regardless of the validity. Additionally, adding an administrative composite has minimal impact to graduation rates and qualification rates, as compared to maintaining the current composites with the reduced linescores.

When the AVRC met on 7 June 2023 (see Appendix D for briefing slides), they decided to make no change to the AO classification composites, maintaining the current composites with the reduced linescores, and leaving this as a temporary reduction that will be re-evaluated in the summer of 2024 along with all other temporary reductions recently instituted. At that time, the decision may be to allow a return to the permanent linescores of 185 and 140, or to permanently adopt the lower linescores of 173 and 131. Regardless of linescores adopted then and any time limit to those scores, the composites themselves should continue to be used.

References

- Anderson, C. (3 Oct 2022). *Navy Recruiting Command Announces Mission Results for Fiscal Year 2022 and Goals for 2023*. Downloaded October 7, 2022 from <https://www.navy.mil/Press-Office/News-Stories/Article/3177917/navy-recruiting-command-announces-mission-results-for-fiscal-year-2022-and-goal/>.
- Class "A" School and Rating Entry Requirements (MILPERSMAN 1306-618). (23 Apr 2016). Downloaded July 27, 2022 from https://www.mynavyhr.navy.mil/Portals/55/Reference/MILPERSMAN/1000/1300Assignment/1306-618.pdf?ver=4gog_6-fXVtZNdOtGr7U8g%3d%3d.
- Held, J. D., Carretta, T. R., Hezlett, S. A., Johnson, J. W., Mendoza, J. L., Abrahams, N. M., Drasgow, F., McCloy, R. A., & Wolfe, J. H. (2015). *Technical Guidance for Conducting ASVAB Validation/Standards Studies in the U. S. Navy* (NPRST-TR-15-2). Millington, TN: Navy Personnel Research, Studies, and Technology (NPRST).
- Held, J. D., Hezlett, S. A., Johnson, J. W., McCloy, R. A., Drasgow, F., & Salas, E. (2014). *Introductory Guide for Conducting ASVAB Validation/Standards Studies in the U. S. Navy* (NPRST-TR-15-1). Millington, TN: Navy Personnel Research, Studies, and Technology (NPRST).
- History of Military Testing*. (n.d.) Downloaded July 27, 2022 from <https://www.officialasvab.com/researchers/history-of-military-testing/>.
- Myers, M. (April 19, 2023). "Army, Navy and Air Force Predict Recruiting Shortfalls This Year." *Navy Times*. Downloaded April 20, 2023 from <https://www.militarytimes.com/news/your-military/2023/04/19/army-navy-and-air-force-predict-recruiting-shortfalls-this-year/>.
- Segall, D. O. (2004). *Development and evaluation of the 1997 ASVAB score scale* (Technical Report No. 2004-002). Seaside, CA: Defense Manpower Data Center.

Appendix A
Description of the ASVAB and Additional Selection Tests

Test Type	Test Name and Abbreviation	Test Description
Standard ASVAB	General Science (GS)	Knowledge of physical and biological sciences
	Arithmetic Reasoning (AR)	Ability to solve arithmetic word problems
	Word Knowledge (WK) ^a	Ability to select the correct meaning of words presented in context and correct synonyms
	Paragraph Comprehension (PC) ^a	Ability to obtain information from written passages
	Mathematics Knowledge (MK)	Knowledge of high school mathematics principles
	Electronics Information (EI)	Knowledge of electricity and electronics
	Auto and Shop Information (AS)	Knowledge of automobile and shop technologies, tools, and practices
	Mechanical Comprehension (MC)	Knowledge of mechanical and physical principles
	Assembling Objects (AO)	Ability to determine correct spatial forms from their separate parts and connection points (not administered in all versions)
Special Tests (May be Given in Conjunction with ASVAB)	Coding Speed (CS)	Ability to quickly identify correct word/number pairings from a key with many options
	MCt	Ability to maintain value of 3 counters that increment and decrement simultaneously
	Cyber Test (CT)	Information and communications technology literacy
	Navy Advanced Placement Test (NAPT)	Knowledge of advanced physics, mathematics, and chemistry
	Defense Language Aptitude Battery (DLAB)	Aptitude to learn a foreign language

^a WK and PC are combined to form the Verbal (VE) composite that is a component of the AFQT and several Navy ASVAB classification composites.

Appendix B
Current Composites in Use Across All Ratings

Composite Name	Composite Calculation	Rating/Program Entry Standards
Administration 1	VE+MK	CTI, LN, PS, QM, RP, YN
Administration 2	MK+CS+VE	OS, PS, RP, YN
Administration 3	PC+MK	CTR
Administration 4	AR+PC+MK	AC, CTR, HM
Cyber 1	MK+VE+CT	CTN, IT/ATF, IT/SG, ITS
Cyber 2	AR+MK+CT	CTT/AEF, CTT/SG
Mechanical 1	AR+AS+MC	BU, CM, EO, SW
Mechanical 2	MK+AS+AO	AO, AS, BM, MR, PR
Mechanical 3	AR+MK+AS	UT
Mechanical 4	MK+AS+VE	AD
Operations 1	AR+MK+AS+VE	ABE, ABF, ABH, AIRC, AIRR, AM, AME, AN (APACT), AO, BM, DC, EN, FN (E/PACT), GSM, HT, MM, MR, PR
Operations 2	GS+AR+2MK	AECF, CTN, CTT/SG, EA, ET, FC, FCA, GM, ITS, ND, OS, SB
Operations 3	AR+MK+AO+VE	AE, AME, AT, AV, BU, EN, GSM, IC, IC/ATF, MM, MN, MT, SO, STG, STG/AEF
Operations 4	MK+MC+CS+VE	SO
Operations 5	AR+MK+EI+VE	AS, CTM, IT/SG, MMA, MMS, TM
Operations 6	GS+MK+MC+VE	QM
Operations 7	MK+EI+VE	AD
Specialized 1	AR+VE	AZ, CS, EOD, LN, LS, MC, ND, RS, SB, SN (S/PACT), SO
Specialized 2	GS+MK+VE	AG, CTI, HM/ATF, IT/ATF, IT/SG, NC
Specialized 3	AR+WK	HM/ATF
Specialized 4	GS+AR+MK+VE	HM, HM/ATF, IS, IT/ATF, ITS
Specialized 5	GS+AR+MK	AG
Specialized 6	GS+MK+2VE	HM
Specialized 7	AR+MK+MC+VE+NAPT	EM(NUC), ET(NUC), MM(NUC), NUC
Specialized 8	GS+AR+MK+EI+NAPT	EM(NUC), ET(NUC), MM(NUC), NUC
Technical 1	AR+MK+MC+VE	AC, AE, AIRC, AIRR, AM, AS, AT, AV, CSS, CTN, DC, EM, EM(NUC), ET(NUC), ETV, FT, FN (E/PACT), GSE, HT, LSS, MA, MM(NUC), MN, MR, MT, NUC, SECF, STS, YNS
Technical 2	GS+AR+MK+EI	AECF, CE, CSS, CTT/AEF, EM, EM(NUC), ET, ET(NUC), ETV, FC, FCA, FT, GM, GSE, IC, IC/ATF, LSS, MM(NUC), NUC, SECF, STS, STG, STG/AEF, UT, YNS
Technical 3	GS+EI+MC	EOD, ND, SO
Technical 4	GS+AR+EI+MC	MMA, MMS, TM

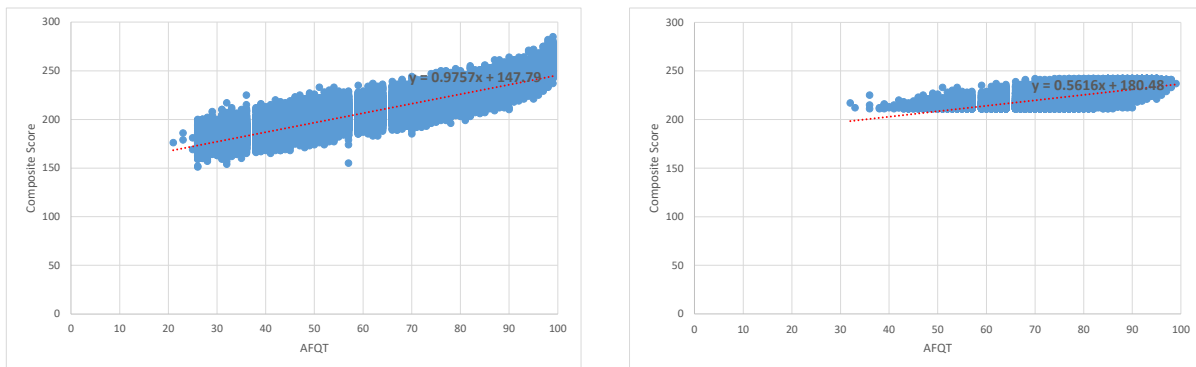
As of 5/31/2023.

Appendix C

Corrections of Validity Coefficients

Two corrections are executed before determining the fully corrected validity coefficients used to determine the best-fitting composites. The first correction is for range restriction, and the second is for dichotomy. A simplistic explanation of both is included below, with more detailed information provided in Held, Carretta, Hezlett, Johnson, Mendoza, Abrahams, Drasgow, McCloy, & Wolfe (2015).

Because a selection for the rating has already occurred prior to analyzing the training data, the validity coefficients initially computed do not cover the entire spectrum of possible ASVAB scores, as can be seen in the two graphs below with the left graph showing the complete spectrum of AFQT scores vs a composite AFQT score, and the right graph showing all AFQT but only the composite scores above a selected linescore of 210. The correlation line equation is different between the two graphs because of the restriction in range of the graph on the right.



Matrix algebra is used to correct for this range restriction by adjusting the variance/covariance matrix of the test scores and FPPS to the PAY97 variance/covariance matrix created by Segall (2004) in the PAY97 norming process. Once each individual ASVAB score is corrected, each composite of ASVAB scores can also be corrected as laid out in Held, et al (2015).

Correcting for dichotomization accounts for the dependent variable (FPPS in this report) being a 0 or 1, which is actually a measure of an underlying continuous variable Final School Grade. The Table of Normal Deviates and Ordinates is consulted to determine the y ordinate that corresponds to the FPPS rate (“B Area in the larger portion” within the table). Each range restricted correlation is then multiplied by the calculated dichotomy correction factor

$$\frac{\sqrt{FPPS*(1-FPPS)}}{y\text{-ordinate}}$$

DRAFT // PRE-DECISIONAL

Aviation Ordnanceman (AO)



Zannette A. Uriell
Navy S&C



DRAFT // PRE-DECISIONAL

UNCLASSIFIED



Background

- **Navy S&C develops and monitors ASVAB standards for all Navy ratings**
 - Goal is to balance rating qualification rate and training performance
 - About 18 months after any change in selection standards, a retrospective is conducted to determine if change is functioning as expected

- **AO composites have not changed for many years**
 - VE+AR+MK+AS \geq 185 OR MK+AS+AO \geq 140

- **AVRC decision to revalidate AO based on time since last validated**

- **AO composite linescore reduced in November 2022 based on evaluation of training success for those receiving waivers**
 - VE+AR+MK+AS \geq 173 OR MK+AS+AO \geq 131



Study Goals

- **In ideal Navy, improve FPPS to save money in training time and lessen aggravation due to training/reclassification of Sailors**
- **In recruiting-challenged Navy, maintain or improve graduation rate while increasing number who would qualify for training**
 - Use FPPS predictions to determine most valid composites (FPPS and graduation are generally related)
 - Test most valid composites and linescores to determine graduation and qualification rates
 - Consider adjustment of linescore further to account for unique recruiting environment, similar to temporary adjustments to other ratings based on rating complexity (medium) and findings of waiver analyses

DRAFT // PRE-DECISIONAL



About AO and Linkage to ASVAB

- Aviation Ordnanceman are aircraft armament (weapons) specialists in charge of storing, servicing, inspecting and handling of all types of weapons and ammunition carried on Navy aircraft. – Navy COOL, Oct 2022

	GS	AR	WK	PC	MK	EI	AS	MC	AO	CS	VE
Inspect, maintain and repair aircraft mechanical and electrical armament/ordnance systems	X					X	X	X	X		
Service aircraft guns and accessories							X	X			
Stow, assemble and load aviation ammunition including aerial mines, torpedoes, missiles and rockets							X	X	X		
Service bomb, missile and rocket releasing and launching devices							X	X			
Load supplemental munitions							X	X	X		
Assemble, test and maintain air-launched guided missiles						X	X	X	X		
Supervise operation of aviation ordnance shops, armories and stowage facilities		X			X						X

DRAFT // PRE-DECISIONAL

UNCLASSIFIED



DRAFT // PRE-DECISIONAL

Findings – CDP 625Z

- Permanent linescores (185 and 140) in place for majority of 5 year timespan
- FPPS overall 93%; lowest at 88% for those qualifying only on MK+AS+AO
- Those who may have received waivers have slightly better FPPS than those qualifying only through MK+AS+AO

	Student #	% of Sample	Academic Setback Rate	Academic Setback Still in Training	Grad Rate	Academic Failure Rate	Observed FPPS%
Total Sample	4539	100.0%	0.0727	3	0.9945	0.0051	92.6%
Qualified Only Through AR+MK+AS+VE>=185	675	14.9%	0.0519	1	0.9970	0.0015	94.7%
Qualified Only Through MK+AS+AO>=140	721	15.9%	0.1193	0	0.9903	0.0097	88.1%
Qualified On Both	3032	66.8%	0.0656	2	0.9947	0.0049	93.3%
Qualified On Either	4428	97.6%	0.0723	3	0.9944	0.0052	92.6%
Waivered	111	2.4%	0.0901	0	1.0000	0.0000	91.0%

5 years of CDP 625Z data.

UNCLASSIFIED

DRAFT // PRE-DECISIONAL



Findings – CDP 625Z

- Temporary linescores (173 and 131) were put in place for last 5 months of 5 year timespan used for analyses
- Because the temporary linescores were reduced to the waiver limit for majority of the data, all who attended CDP were qualified in some way
- FPPS for those qualifying only on MK+AS+AO (a fewer number under the temporary linescores than under permanent) increased to 91%, balanced with the FPPS for those qualifying on both composites decreasing slightly

	Student #	% of Sample	Academic Setback Rate	Academic Setback Still in Training	Grad Rate	Academic Failure Rate	Observed FPPS%
Total Sample	4539	100.0%	0.0727	3	0.9945	0.0051	92.6%
Qualified Only Through AR+MK+AS+VE>=173	507	11.2%	0.0473	0	0.9980	0.0020	95.1%
Qualified Only Through MK+AS+AO>=131	56	1.2%	0.0893	0	1.0000	0.0000	91.1%
Qualified On Both	3976	87.6%	0.0757	3	0.9940	0.0055	92.3%
Qualified On Either	4539	100.0%	0.0727	3	0.9945	0.0051	92.6%
Waivered	0	0.0%	---	---	---	---	---

5 years of CDP 625Z data.



Findings – CDP 626A

- About half of AOs attend the AO Differential course following the primary A-school course
- Very few fail for academic reasons or have academic setbacks
- Therefore composite decisions should be based only on the A-School that all attend, which seems to function as the filter into the AO rating

	Student #	% of Sample	Academic Setback Rate	Academic Setback Still in Training	Grad Rate	Academic Failure Rate	Observed FPPS%
Total Sample	2557	100.0%	0.0004	0	0.9996	0.0004	99.9%
Qualified Only Through AR+MK+AS+VE>=185	383	15.0%	0.0000	0	1.0000	0.0000	100.0%
Qualified Only Through MK+AS+AO>=140	412	16.1%	0.0000	0	1.0000	0.0000	100.0%
Qualified On Both	1697	66.4%	0.0006	0	0.9994	0.0006	99.9%
Qualified On Either	2492	97.5%	0.0004	0	0.9996	0.0004	99.9%
Waivered	65	2.5%	0.0000	0	1.0000	0.0000	100.0%

5 years of CDP 626A data.



Fully Corrected Validity Coefficients and Diversity

- Composites with highest validity coefficients (after corrections) listed below for comparison

Composites	Composite (Family)	Fully Corrected Validity Coefficients n=4,122 with AO	Standardized Group Mean Score Differences: 12month Accession Population (n=31,383)		
			F-M	AA-W	H-W
AR+MK+AS+VE	OPS1	0.564	-0.601	-0.843	-0.578
MK+AS+AO	MECH2	0.511	-0.317	-0.693	-0.358
PC+MK	ADMIN3	0.587	0.109	-0.188	-0.218
AR+PC+MK	ADMIN4	0.585	-0.103	-0.340	-0.239
GS+AR+MK+VE	SPEC4	0.580	-0.360	-0.618	-0.470
GS+MK+VE	SPEC2	0.577	-0.169	-0.421	-0.291
AR+MK+EI+VE	OPS5	0.577	-0.474	-0.685	-0.484
MK+VE	ADMIN1	0.577	-0.034	-0.320	-0.350
GS+MK+2VE	SPEC6	0.577	-0.306	-0.583	-0.534
MK+EI+VE	OPS7	0.573	-0.431	-0.662	-0.525
AR+MK+AO+VE	OPS3	0.572	-0.075	-0.432	-0.223
AR+VE	SPEC1	0.567	-0.411	-0.581	-0.420

* Effect Size, or “Cohen’s d”, are terms used for measurement of group test score differences with .20 considered small, .50 moderate, and .80 large, with zero indicating no difference.



AO Options Under Consideration

➔ **Same or better graduation rate, with more qualifying** ➔

1. **No change at present**
2. **Keep current composites and add PC+MK as alternative**
 - Small change, alternative has higher validity coefficient but seemingly less link to AO work
3. **Keep both composites and add AR+PC+MK as alternative**
 - Small change, alternative has higher validity coefficient but seemingly less link to AO work
4. **Keep current composites and add AR+MK+AO+VE alternative**
 - Small change, alternative seemingly linked to AO work



Predicted FPPS with Individual Composites

- Possible scores and impact on FPPS, Grad Rate, and Qualification Rate (QR) listed below, with the bold scores being the current permanent and temporary linescores
- Predicted graduation rates 99% across all scores shown, although QR varies greatly

Linescore Analysis for Predicted FPPS/Graduation at or above Key Scores Applied to 12month Navy Accessions N=31,383

Transformed Score	AR+MK+AS+VE (Current - Composite 1)				MK+AS+AO (Current - Composite 2)				PC+MK (Possible Composite)			
	Pred.		Grad.		Pred.		Grad.		Pred.		Grad.	
	Score	FPPS	Score	QR	Score	FPPS	Score	QR	Score	FPPS	Score	QR
188	188	95.5%	99.6%	73.4%	141	93.7%	99.4%	74.0%	94	94.6%	99.6%	86.9%
185	185	95.2%	99.6%	77.9%	139	93.6%	99.4%	76.7%	92	94.3%	99.6%	90.5%
182	182	94.9%	99.5%	82.1%	136	93.4%	99.4%	80.3%	91	94.2%	99.5%	92.0%
179	179	94.6%	99.5%	85.9%	134	93.3%	99.4%	82.4%	90	94.1%	99.5%	93.3%
176	176	94.4%	99.5%	89.2%	132	93.2%	99.4%	84.1%	88	93.9%	99.5%	95.3%
173	173	94.1%	99.5%	91.8%	130	93.1%	99.4%	85.5%	86	93.7%	99.5%	96.8%
170	170	93.9%	99.5%	94.1%	128	93.0%	99.4%	86.7%	85	93.6%	99.5%	97.3%
167	167	93.7%	99.5%	95.7%	125	92.9%	99.4%	88.1%	84	93.5%	99.5%	97.8%
164	164	93.6%	99.5%	97.0%	123	92.8%	99.4%	88.9%	82	93.4%	99.5%	98.6%
161	161	93.5%	99.5%	97.9%	121	92.8%	99.4%	89.5%	80	93.3%	99.5%	99.1%

Notes.

1. Tests transformed to be equivalent to a 4-test score.
2. 12-month Navy accessions 4/24/2022 – 4/23/2023.



Summary of Options

- Adding an administrative composite could increase qualification rate while adding an operational composite would decrease qualification rate
 - Temporary linescore reduction that is currently in place increases qualification rate by almost as much as adding a 3rd alternative

		Qualification Standard			
		AR+MK+AS+VE ≥ 177 or MK+AS+AO ≥ 133 or AR+PC+MK ≥ 88	AR+MK+AS+VE ≥ 181 or MK+AS+AO ≥ 136 or PC+MK ≥ 90	AR+MK+AS+VE ≥ 183 or MK+AS+AO ≥ 137 or AR+MK+AO+VE ≥ 183	
	[Current]	AR+MK+AS+VE ≥ 185 or MK+AS+AO ≥ 140			
QR	86.4%	[Temporary Reduction]	[Option 2]	[Option 3]	[Option 4]
Diff from Current #	---	+3,006	+3,297	+3,211	-2,055
%Qualified F::M	0.875	0.963	0.984	0.986	0.950
%Qualified AA::W	0.729	0.903	0.934	0.934	0.854
%Qualified H::W	0.900	0.973	0.980	0.975	0.958
Predicted Grad	99.5%	99.5%	99.5%	99.5%	99.5%
Predicted FPPS	94.6%	93.7%	94.1%	94.2%	94.3%

*12-month Navy accessions 4/24/2022 – 4/23/2023.

DRAFT // PRE-DECISIONAL



Recommendation

- Continue with current composites, with temporarily reduced linescores
 - AR+MK+AS+VE \geq 173
 - or
 - MK+AS+AO \geq 131
- Re-validate composites in summer 2024 to determine if temporary reductions should continue, or if composites should be modified at that point

UNCLASSIFIED

DRAFT // PRE-DECISIONAL

DRAFT // PRE-DECISIONAL



CAT IV and AO

- With temporary reductions in place, 60% or more of AFQT CAT IV could qualify as an AO

Qualification Rates by AFQT Band								
Qualification Rate	I	II	IIIA	IIIB	IVA	IVB	IVC	V
	93-99	65-92	50-64	31-49	21-30	16-20	10-15	1-9
Compared to 12 months of accessions (5/3/2022-5/2/2023)								
96.1%	100.0%	100.0%	99.8	97.0%	81.0%	67.6%	59.9%	---

DRAFT // PRE-DECISIONAL

UNCLASSIFIED

DRAFT // PRE-DECISIONAL



Backup



DRAFT // PRE-DECISIONAL

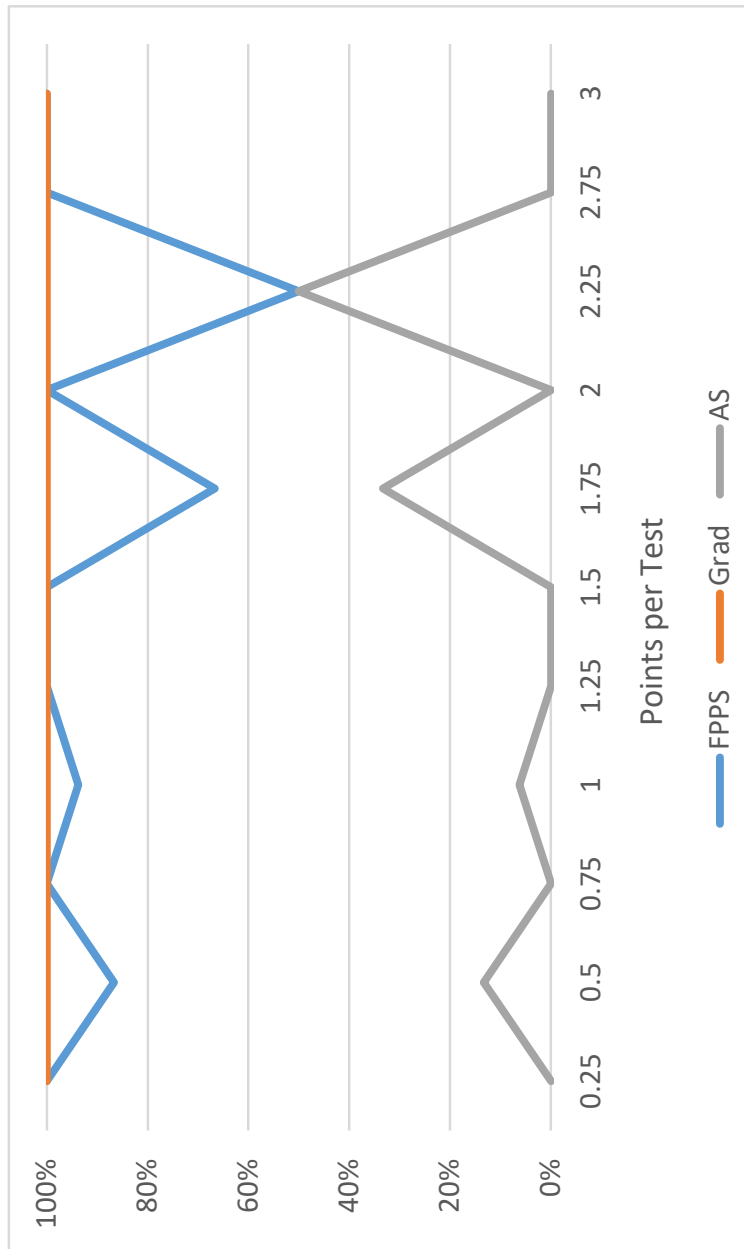
UNCLASSIFIED

DRAFT // PRE-DECISIONAL



Waivers from Permanent Cutscores

- There have been no AOs who have completed A-school since the temporary cutscore was put in place
- Using permanent cutscores, most receive waivers for 1.75 points per test or less; few received waivers of 2 points or more
 - 3 of the 9 who received a waiver of 1.75 points per test had an academic setback



UNCLASSIFIED

DRAFT // PRE-DECISIONAL



ASVAB and Special Classification Tests

Test	Content
General Science (GS)	Biological and physical sciences
Arithmetic Reasoning (AR)	Arithmetic word problems
Word Knowledge (WK)*	Synonyms/meaning of words in context
Paragraph Comprehension (PC)*	Written passages
Mathematics Knowledge (MK)	Algebra, geometry, fractions, decimals, exponents
Electronic Information (EI)	Electrical principles and electronics
Auto and Shop Information (AS)	Automotive, tool, shop, practices
Mechanical Comprehension (MC)	Mechanical and physical principles
Assembling Objects (AO)	Patterns and connection point recognition

*VE, Verbal, is a combination of 1/3 PC and 2/3 WK

Special Classification Tests:

- Coding Speed (CS) is a perceptual speed and accuracy test.
- DLAB is the Defense Language Aptitude Battery administered to CTI candidates.
- NAPT is the Navy Advanced Placement Test administered to about 1/2 of NF candidates.
- Cyber Test (CT) is operational for some computer intensive ratings.
- Mental Counters (MCt), a working memory test, may be operational in FY23.

AFQT is a combination of PC, WK, AR, and MK; 2VE+AR+MK.



More Common PEVT Codes

Non-Academic Setback

73	STBK NACAD W/O REMEDIAL ADMINISTRATIVE LEAVE
294	STBK NACAD MEDICAL W/O REMEDIAL TRNG
295	STBK NACAD PHYSICAL W/O REMEDIAL TRNG
296	STBK NACAD MILITARY W/O REMEDIAL TRNG
298	STBK NACAD ADMIN W/O REMEDIAL TRNG
300	STBK NACAD MEDICAL W/REMEDIAL TRNG
301	STBK NACAD PHYSICAL W/REMEDIAL TRNG
302	STBK NACAD MILITARY W/REMEDIAL TRNG
305	STBK NACAD ADMINISTRATIVE W/REMEDIAL TRNG
308	STBK NACAD OTHER W/O REMEDIAL TRNG

Academic Setback

48	STBK ACAD W/O REMEDIAL TRAINING ADMINISTRATIVE
51	STBK ACAD W/REMEDIAL REVIEW BOARD
53	STBK ACAD W/REMEDIAL CLSRM LACK OF COMPREHENSION
56	STBK ACAD W/REMEDIAL TRNG MOTIVATION LACK OF PERF
324	STBK ACAD W/REMEDIAL TRAINING LAB INABILITY
855	STBK ACAD W/REMEDIAL TRAINING

Non-Academic Failure

148	NON-GRAD NACAD ADMIN UNSUITABILITY
149	NON-GRAD NACAD ADMIN HARDSHIP
207	NON-GRAD NACADDEATHNON-TRAININGRELATED
211	NON-GRAD NACAD PHYSICAL NOT AQUATICALLY ADAPTABLE
212	NON-GRAD NACAD PHYSICAL PRTFailure
214	NON-GRAD NACAD PHYSICAL PERFORMANCEFAILURE
227	NON-GRAD DSNRL CLASS/COURSECANCEL
228	NON-GRADDSNRL ADMINRATING/PROGCONV
229	NON-GRAD DSNRLADMIN RECALLEDBY PARENTACTIVITY
230	NON-GRAD DSNRLADMIN NONPREREQ MED/PHY
231	NON-GRAD DSNRL ADMIN NONPREREQACADEMIC
232	NON-GRAD DSNRL ADMIN NONPREREQ SECURITY
311	NON-GRAD NACAD OTHER
320	NON-GRAD NACAD MOTIV NEGATIVE MILITARY ATTITUDE
970	NON-GRAD NACAD MEDICAL
971	NON-GRAD NACAD LEGAL - UCMJ ACTION
972	NON-GRAD NACAD LEGAL - CIVIL ACTION
973	NON-GRAD NACAD LEGAL - ADMIN ACTION
986	NON-GRAD NACAD MEDICAL 986
987	NON-GRAD NACAD LEGAL 987
994	NON-GRAD NACAD MEDICAL 994

Academic Failure

81	NON-GRAD ACAD CLSRM LACK OF CMPRH/RETENTION
103	NON-GRAD ACAD LABORATORY LACK OF MANUAL SKILLS
106	NON-GRAD ACAD LABORATORY LACK OF KNOWLEDGE APPL
135	NON-GRAD NACAD MOTIV EXPRESSED DOR
138	NON-GRAD NACAD MOTIV LACK OF PERF SCOL N/O CHOICE
141	NON-GRAD NACAD MOTIV LACK OF PERF SCOL N/W EXPCTD
142	NON-GRAD NACAD MOTIV LACK OF PERF NEG TRNG ATT
309	NON-GRAD ACAD OTHER

(NOTE: Historically PEVT 135, 138, and 141, categorized as motivational attrition, are considered academic failures for ASVAB validation analyses as these students are judged to be unable keep up in the course.)

DRAFT // PRE-DECISIONAL



Findings Table – Key Points

- Findings, or decomposition, table will show how many qualified through each possible qualification method and various success rates for each
- Non-academic failures are removed from all analyses; non-academic setbacks are not considered since a change of ASVAB would not impact these (see separate list for what is considered non-academic failure)
- Those with an academic setback but not yet done with training included in FPPS analyses, so graduation rate + academic failure rate may not total to 100%

	Student #	% of Sample	Academic Setback Rate / 100	Academic Setback Still in Training	Grad closer to 1 is better - rate = % / 100	Academic Failure Rate	Observed FPPS%
Total Sample	218	100%	.1835	5	.9343	.0657	80.73%
Qualified Only Through VE+AR+MK+AS≥210	4	1.8%	0	0	1.000	0	100.00%
Qualified Only Through MK+AS+AO≥152	135	61.9%	.2370	3	.9394	.0606	75.56%
Qualified On Both	54	24.8%	.0556	1	.9623	.0377	92.59%
Qualified On Either	193	88.5%	.1813	4	.9471	.0529	80.83%
Waivered	25	11.5%	.2000	1	.8333	.1667	80.00%

Setback closer to 0 is better - rate = % / 100

First Pass Pipeline Success - 100% is better

These can show if one composite is driving the data

More data is better for basing decisions, recommend never less than 100 total

Top line is all data being considered

Next set of lines is per individual composite as well as combination

Last set of lines is qualified (sum of the previous set) vs waived

DRAFT // PRE-DECISIONAL



Validity Chart Overview

- Chart shows multiple things – most valid composites (29 currently in use), what “family” composite is in (6 possible), what the corrected validation coefficient of the data is, and demographic comparisons of the mean scores/dispersion for each composite

Composites	Composite (Family)	Fully Corrected Validity Coefficients n=214 with AO	Standardized Group Mean Score Differences: 12month Accession Population (n=38,308)		
			F-M	AA-W	H-W
<u>VE+AR+MK+AS</u>	OPS1	.667	-0.652	-1.096	-0.644
<u>MK+AS+AO</u>	MECH2	.598	-0.549	-1.079	-0.514
VE+AR+MK+EI	OPS5	.662	-0.594	-0.961	-0.592
VE+AR+MK+MC	TECH1	.656	-0.556	-1.006	-0.585
GS+AR+MK+EI	TECH2	.655	-0.637	-1.018	-0.612
AR+MK+AS	MECH3	.654	-0.649	-1.058	-0.577
PC+AR+MK	ADMIN4	.651	-0.338	-0.753	-0.436
MK+AS+VE	MECH4	.649	-0.680	-1.130	-0.700
GS+AR+MK+VE	SPEC4	.647	-0.489	-0.934	-0.576
VE+AR	SPEC1	.645	-0.495	-0.894	-0.548
MK+EI+VE	OPS7	.644	-0.602	-0.947	-0.627

UNCLASSIFIED

DRAFT // PRE-DECISIONAL

DRAFT // PRE-DECISIONAL



Validity Chart - Composites

- Usually top 10 with highest validity are shown in descending order, with those currently in use underlined and at the top
- Coefficients closer to 1 are better; there is a greater level of prediction as the two things (in this case, composite score and FPPS) are closely related (.7 or higher is considered a very strong relationship)

Composites	Composite (Family)	Fully Corrected Validity Coefficients n=214 with AO
<u>VE+AR+MK+AS</u>	OPS1	.667
<u>MK+AS+AO</u>	MECH2	.598
VE+AR+MK+EI	OPS5	.662
VE+AR+MK+MC	TECH1	.656
GS+AR+MK+EI	TECH2	.655
AR+MK+AS	MECH3	.654
PC+AR+MK	ADMIN4	.651
MK+AS+VE	MECH4	.649
GS+AR+MK+VE	SPEC4	.647
VE+AR	SPEC1	.645
MK+EI+VE	OPS7	.644

- 6 families, roughly based on ratings that utilize the composite (Administration, Cyber, Mechanical, Operations, Specialized, Technical)
- Composites currently in use (listed at top) may not be highly correlated, but may still provide usefulness in qualification decision (e.g., AO is a test of fluid intelligence and minority groups may score higher than they would on crystallized intelligence tests)
- Very little difference (meaningless) between a validity of .645 and .644; .598 and .644 nearly similar



Validity Chart – Group Differences

3 right columns compare minority and majority (females compared to males, African Americans compared to Whites, Hispanics compared to Whites) using Cohen’s d, which looks at the size of the difference between the means and how dispersed the data is around the means

Composites	Standardized Group Mean Score Differences: 12month Accession Population (n=38,308)		
	F-M	AA-W	H-W
<u>VE+AR+MK+AS</u>	-0.652	-1.096	-0.644
<u>MK+AS+AO</u>	-0.549	-1.079	-0.514
VE+AR+MK+EI	-0.594	-0.961	-0.592
VE+AR+MK+MC	-0.556	-1.006	-0.585
GS+AR+MK+EI	-0.637	-1.018	-0.612
AR+MK+AS	-0.649	-1.058	-0.577
PC+AR+MK	-0.338	-0.753	-0.436
MK+AS+VE	-0.680	-1.130	-0.700
GS+AR+MK+VE	-0.489	-0.934	-0.576
VE+AR	-0.495	-0.894	-0.548
MK+EI+VE	-0.602	-0.947	-0.627

Negative numbers show that the first listed (minority group for this chart) is lower than the majority group

- Absolute value closer to 0 would be very little difference between the 2 groups
 - .2 or less is considered small effect size
 - .5 is considered medium effect size
 - .8 is considered large effect size
- If correlations are similar, select composite with lower effect size (may not be lower for all 3 comparisons)

DRAFT // PRE-DECISIONAL



Options Chart Overview

- Chart shows current composite combination compared to several others deemed the best of those considered during analyses
- Many issues considered when determining combinations to consider, including correlation with FPPS, graduation and FPPS rate, qualification rate, current composite (incremental changes), and demographic subgroup comparisons

	Qualification Standard			
	VE+AR+MK+AS ≥ 210 or MK+AS+AO ≥ 152	VE+AR+MK+AS ≥ 199 or VE+AR+MK+EI ≥ 199 or VE+AR+MK+MC ≥ 199	VE+AR+MK+AS ≥ 187 or VE+AR+MK+EI ≥ 187 or VE+AR+MK+MC ≥ 187	VE+AR+MK+AS ≥ 204 or VE+AR+MK+EI ≥ 204 or VE+AR+MK+MC ≥ 204
	[Current]	[Option 5 – Waiver match current FPPS]	[Option 6 – Match current FPPS]	[Option 7 – Match current QR]
QR	66.4%	75.3%	92.4%	67.3%
Diff from Current #	---	+3,443	+9,990	+357
%Qualified F::M	.699	.745	.903	.683
%Qualified AA::W	.504	.606	.836	.520
%Qualified H::W	.632	.803	.943	.752
Predicted Grad Rate	95.3%	95.6%	94.6%	96.0%
Predicted FPPS	85.9%	90.9%	86.2%	92.6%

