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MASTER OF MILITARY STUDIES

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**TITLE: Raising the Bar – The Evolution of Mental Acuity and Intelligence Standards for  
the All-Volunteer Force**

SUBMITTED IN PARTIAL FULFILLMENT  
OF THE REQUIREMENTS FOR THE DEGREE OF  
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## Executive Summary

**Title:** Raising the Bar – The Evolution of Mental Acuity and Intelligence Standards for the All-Volunteer Force

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**Thesis:** To understand the Marine Corps one must understand where Marines come from and how they are screened during recruitment. Critical to this understanding is the knowledge of mental acuity and intelligence standards used by the Department of Defense, their history, and what their implications are for the future force.

**Discussion:** Every service member, with few exceptions, can remember taking the Armed Services Vocational Aptitude Battery (ASVAB) test as part of their decision to enlist or seek a commission in the United States military. As an all-volunteer force, the recruitment and screening of prospective Soldiers, Sailors, Airmen, and Marines are central to the health of the overall military. Recently, physical standards have been at the forefront of the discussion about who should qualify to serve and who should not. Gender integration policies, growing childhood obesity levels, and immigration status debates have dominated the discussion about potential impacts to the all-volunteer force. Not in the current discussion, yet arguably more impactful, are the standards of mental acuity and intelligence. This study will examine the human capital that the Marine Corps recruits from communities across the country and forges into new Marines. It will do so by first outlining the conditions that brought about the end of the draft in the early 1970's. It will then analyze the development and subsequent validation of universal mental acuity and intelligence testing standards in the 1980s and 1990s. Finally, it will address the lessons learned by the Marine Corps concerning enlistment quality during combat operations in Iraq and Afghanistan in the early 2000s and will conclude with proposed areas for further study concerning the future operating environment as defined in the Marine Operating Concept published in 2017.

**Conclusion:** Existing mental acuity and intelligence testing methodology is an excellent tool for predicting entry-level performance. Leadership of the United States Marine Corps should leverage this existing testing capacity to better align accessions with the anticipated requirements of the future operating environment.

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THE OPINIONS AND CONCLUSIONS EXPRESSED HEREIN ARE THOSE OF THE INDIVIDUAL STUDENT AUTHOR AND DO NOT NECESSARILY REPRESENT THE VIEWS OF EITHER THE MARINE CORPS COMMAND AND STAFF COLLEGE OR ANY OTHER GOVERNMENTAL AGENCY. REFERENCES TO THIS STUDY SHOULD INCLUDE THE FOREGOING STATEMENT.

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*Table of Contents*

	Page
EXECUTIVE SUMMARY.....	ii
DISCLAIMER.....	iii
INTRODUCTION.....	1
THE END OF THE DRAFT.....	2
ISSUES WITH CAT IV & SECTION 718.....	6
DEVELOPMENT OF MEPCOM AND THE ASVAB.....	9
UNDERSTANDING THE ASVAB & AFQT SCORES.....	10
GETTING IT RIGHT – MISNORMING OF THE ASVAB.....	12
PROJECT A – VALIDATING THE ASVAB.....	15
TESTED BY THE LONG WAR.....	20
IMPLICATIONS FOR THE FUTURE FORCE.....	22
LIST OF ILLUSTRATIONS.....	A-1
BIBLIOGRAPHY .....	B-1
END NOTES.....	C-1

The United States Marine Corps takes great pride in the fact that it is the smallest branch of the United States military and has long leveraged the phrase, “The Few. The Proud. The Marines.” to attract the youth of America to serve within its ranks. What is not as well known is that the United States Marine Corps is also the youngest service by average age and that nearly 70 percent of Marines are on their first term of service. This manpower model drives an institutional turnover rate of more than two-thirds every four years and thus relies on the constant intake of new Marines as the lifeblood of the service. The Marine Corps recruits and trains more than 30,000 new Marines a year and counts on these first-term junior enlisted men and women for success in the operational environment.<sup>1</sup> Thus, to understand the Marine Corps one must understand the population from which Marines come and how they screened during recruitment. Critical to this understanding is the knowledge of mental acuity and intelligence standards utilized by the Department of Defense, their history, and what their implications are for the future force.

Every service member, with few exceptions, can remember taking the Armed Services Vocational Aptitude Battery (ASVAB) test as part of their decision to enlist or seek a commission in the United States military. As an all-volunteer force, the recruitment and screening of prospective Soldiers, Sailors, Airmen, and Marines are central to the health of the overall military. Recently, physical standards have been at the forefront of the discussion about who should qualify to serve and who should not. Gender integration policies, growing childhood obesity levels, and immigration status debates have dominated the discussion about potential impacts to the all-volunteer force. Not in the current discussion, yet arguably more impactful, are the standards of mental acuity and intelligence.

This study examines the human capital that the Marine Corps recruits from communities across the country and forges into new Marines. It does so by first outlining the conditions that brought about the end of the draft in the early 1970's. It then analyzes the development and subsequent validation of universal mental acuity and intelligence testing standards in the 1980s and 1990s. Finally, it addresses the lessons learned by the Marine Corps concerning enlistment quality during combat operations in Iraq and Afghanistan in the early 2000s and concludes with proposed areas for further study concerning the future operating environment as defined in the Marine Operating Concept published in 2017.

While recruiting and entry-level training are beyond the scope of this study, the findings of this paper are inextricably linked to these downstream actions. So too is the ongoing debate about physical qualifications as they relate to gender-neutral standards as the Marine Corps continues to open combat arms jobs to women. This study will instead focus on the lessons learned by examining the evolution of the all-volunteer force concerning the vital factor of intelligence levels of the men and women who are recruited to serve. The evolution of the Marine Corps and the challenges it will face in the future operating environment are central to the study of standards of enlistment. The question of how the Marine Corps continues to evolve and maintain an advantage against the enemies of the United States can be answered by who is recruited to wear the eagle, globe, and anchor. In answering this question, the Marine Corps will ensure that it continues to be an adaptive organization that is positioned well for the future.

## **THE END OF THE DRAFT**

The decision by the government of the United States to transition to an all-volunteer military was one of the most significant defense policy changes in the last fifty years, yet the

implications of ending conscription via a universal draft are not well understood. The common narrative is that the negative social response to the Vietnam war in the late 1960's and early 1970's is what brought an end the draft. While social unrest was one factor, so too were population size and the needs of the military. A deeper understanding of how the draft was developed and implemented is required to understand the decision to end the policy and ultimately transition to an all-volunteer force.

The first national draft occurred in 1863 when the federal government levied a conscription requirement on the states in defense of the Union during the Civil War. At the end

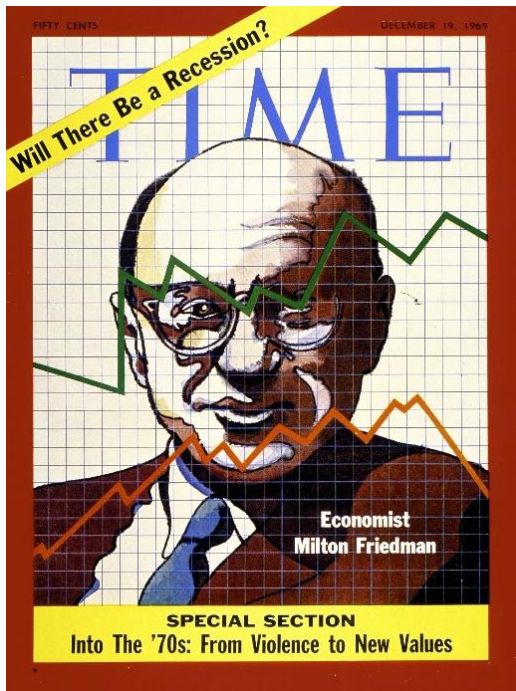


of the war, the Adjutant General of the state of Illinois codified the existing policy in which states were apportioned requirements for future conscripts from Washington. The states then divided these quotas and assigned them to individual counties based on

population data. This concept was adopted by the federal government and modified slightly to ensure that draft-eligible men were assigned to a military occupational field that best supported the war effort. This adjustment, known at the time as 'channeling' would evolve into the modern day Selective Service System. The adapted system was put into use for the first time in support of World War I and was implemented again in identical fashion in 1940 on the eve of World War II.<sup>2</sup> The draft was ended by President Truman in 1947 but was reinstated in 1948 in response to rising tensions with the Soviet Union and remained in place until the policy was ended in 1973 by the Nixon administration.<sup>3</sup>

By the 1960's the size of the population of young men reaching draft age each year had grown to a level that made the existing policy, unaltered for almost a century, untenable. The size of the military was so small during the Kennedy administration that the draft was no longer universal as it had originally been intended.<sup>4</sup> One example of the disparity between population size and the needs of the military can be seen in the 1962 draft statistics which show that 76,000 men were drafted compared to more than 430,000 receiving educational deferments and more than 1,300,000 receiving deferments for paternity.<sup>5</sup> Even with the rapid expansion of military action in Vietnam later in the decade, the math of the old system no longer supported the needs of the military. The population of draft-eligible young men had reached a tipping point and thus created a situation where those that could afford higher education were receiving ever-increasing deferments while those that could not attain deferment criteria were drafted. This disparity in military requirements and population size resulted in the disproportionate drafting of young men from the lower socioeconomic levels which in turn resulted in the draft process of the 1960's being termed as socially unfair. Richard Nixon, as a candidate for President in 1968, commented on this draft disparity during a campaign speech when he said that a system that, "arbitrarily selects some and not others simply cannot be squared with the whole concept of liberty, justice, and equality under the law...in the long run, the only way to stop the inequities is to stop using the system."<sup>6</sup>

Nixon, having identified that ending the current draft process had transitioned from a policy decision based on military requirements to a discussion of social justice and inequality, directed the creation of the Gates Commission to examine the issue further and develop policy



recommendations. The commission, consisting of fifteen members, included two retired generals, educators and industry leaders to include women and minorities, and three prominent economists.<sup>7</sup>

Surprisingly, it would be prominent economists who would have the most impact on the commission.

Milton Friedman, Alan Greenspan, and W. Allen

Walls would argue that the current draft process placed what they termed a “hidden tax” upon those who

served. This tax, consisting of suppressed wages and

lost earning potential when compared to the civilian sector, was enough to outweigh the relative cost of transitioning to an all-volunteer force.<sup>8</sup> The commission went on to publish their conclusions that:

This concept of the tax does not include the income loss suffered by true volunteers whose military compensation is held below the level which would be required to maintain an all-volunteer force, nor does it include the amount by which all-volunteer pay rates would exceed the pay levels at which some current draftees and draft-induced enlistees would enter on a voluntary basis.<sup>9</sup>

The commission, emphasizing this economically centric argument mixed with the undercurrent of social justice, summarized their findings by concluding that individual liberty was “the most essential American value, and the free market is the best means to preserve it.”<sup>10</sup>

President Nixon, accepting the findings of the Gates Commission, signed a bill in September of

1971 that extended the draft for only two more years and committed the country to a transition to an all-volunteer force coinciding with the end of conventional military involvement in Vietnam.<sup>11</sup>

The conditions that brought about the end of the draft are important for understanding the context of the modern military and who should be selected to serve. The inverse relationship between population size and military manpower requirements occurred despite the war in Vietnam. By the beginning of the Kennedy administration, World War II levels of mobilization were no longer required to support the modern military infrastructure. Instead, the nation took the logical step towards an all-volunteer force recruited and screened specifically for the needs of each military branch. Those today that would argue for a return to the draft to fix contemporary issues within the military do so without the context of history. The transition to an all-volunteer force was an evolutionary change the Department of Defense needed. Once the decision had been made, the next step was the establishment of standards for enlistment. The debate over intelligence, and how it impacted the ability of first-term enlistees to serve, would not be settled overnight and would adversely influence the tenure of the Commandant of the Marine Corps faced with challenges of implementing the all-volunteer force.

### **ISSUES WITH CAT IV & SECTION 718**

The simultaneous end to the United States involvement in Vietnam and transition to the all-volunteer force resulted in a challenging environment for the leadership of the Marine Corps. None more so than to General Robert E. Cushman who assumed the office of Commandant on the first of January 1972.<sup>12</sup> The Marine Corps that Cushman was



responsible for manning, training, and equipping did not reflect the disciplined force he or the other senior leaders were accustomed to. In fact, discipline was so poor that by the end of 1975 the Marine Corps had the highest rates of imprisonment, unauthorized absence, and courts-martial in the armed forces.<sup>13</sup> Increased racial tensions and drug abuse that permeated the ranks compounded this breakdown in good order and discipline.

To make matters worse, the Marine Corps was having trouble recruiting suitable replacements. One of the Department of Defense policy measures put in place in support of the transition to the all-volunteer force was a requirement that at least 55 percent of all enlistments would be high school graduates. This policy, referred to as Section 718, was based on the findings that high school graduates consistently demonstrated the ability to complete their first term of enlistment at a higher percentage than do those recruits who did not earn a high school diploma.<sup>14</sup>

Section 718 had a significant negative impact on Marine Corps recruiting and was a primary reason that the service failed to reach its annual recruiting mission by more than 9,000 recruits in the fiscal year 1974.<sup>15</sup> Marine recruiters had weathered the storm that was the end of the draft by taking anyone who they could convince to enlist. Unfortunately, this resulted in a flow of high school dropouts which, if they could make it through recruit training, went on to compound the morale and discipline issues in the Fleet Marine Force. A report later conducted by Marine Corps Recruiting Command would write of this period that:

Section 718 led to the unfortunate circumstance of General Cushman trudging up to the Hill to seek relief from Congress from the requirement of enlisting 55 percent high school graduates; Cushman told the members that he did not believe in the value of a high school diploma as a sole indicator of success as a Marine. The spectacle of a Marine Corps Commandant asking Congress to lower enlistment standards was not a happy start to Marine Corps recruiting. The results were predictably disastrous.<sup>16</sup>

Linked to the discussion of high school graduation was the question relating to how intelligent a first-term Marine needed to be to acquire the skills required to contribute to the service. This question, also being wrestled with by the other services at the time, was exasperated by the fact that there was not a universal qualification test. Instead, the existing policy standard stated that each service would enlist no less than 55 percent high school graduates and no more than 18 % Mental Group Category IV personnel. To demonstrate just how low the bar had been set, Mental Group Category IV personnel are between the 10th and the 30th percentile of the overall population. On the Stanford-Binet IQ test, a standard intelligence test, this represents an IQ score range between 72 and 91. One estimate calculated that by the end of 1974, more than 40 percent of Marine Corps personnel were evaluated to be in the Mental Category IV.<sup>17</sup> Repeated studies demonstrated that this trend was unsustainable. Low quality recruits consistently performed below their more intelligent counterparts. Analysis repeatedly showed that those scoring in the Category IV mental group struggled to learn basic technical skills required in the modern military while also accounting for an increased percentage of disciplinary issues. The once proud and disciplined Marine Corps was being poisoned by a constant infusion of sub-standard recruits.

Only a few years into the transition to the all-volunteer force the services were struggling to shift away from the draft era mindset that emphasized quantity over quality. The new force looked and acted like the force that had departed Vietnam and was wrought with the same discipline and conduct issues. The challenge had become how to build an all-volunteer force that both reflected society and could perform like the modern professional military it was intended to be. Marine Corps leadership, despite the early insistence of General Cushman, was beginning to realize that quality mattered. If the service was going to survive the transition to the all-volunteer

force, it was going to need to focus its screening and recruiting efforts towards a more intelligent population. Thankfully, the Marine Corps and the rest of the services would benefit from a well-timed policy change by the Department of Defense that focused on just that.

### **DEVELOPMENT OF MEPCOM AND THE ASVAB**

One issue that the Department of Defense had not accounted for during the transition to the all-volunteer force was the way in which recruits would be screened and accepted for enlistment. During the years of the draft, the Armed Forces Examining and Entrance Stations (AFEES) distributed throughout the country accomplished this task. The existing system soon proved to be inefficient as the pressure increased on the services to recruit for the all-volunteer force. One example of this inefficiency was the fact that by the end of the fiscal year 1974 ten and a half percent of all recruits sent to basic training were discharged for administrative and background issues that the Government Accounting Office felt should have been identified and corrected by AFEES.<sup>18</sup>

A second issue that the services faced concerning processing new enlistees was the lack of universal mental acuity and intelligence standards. As part of the bill signed by President Nixon in 1972 that ended the draft, each service was empowered to establish independent quality standards and qualifications tests. This policy resulted in a lack of overall quality control by the Department of Defense and compounded issues with the AAFES system. By 1975 the Department of Defense was compelled to act, and in July a series of policies and procedures were enacted that would standardize screening practices across the services for the first time. This consolidation and standardization would evolve into the Military Enlistment Processing

Command (MEPCOM) which today reports to the Undersecretary of Defense for Manpower and Reserve Affairs.<sup>19</sup>

One of the most significant aspects of the transition to consolidated recruiting standards across the services was the creation and implementation of the Armed Services Vocational Aptitude Battery (ASVAB) test. Originally recommended for use by the Central All-Volunteer Force Task Force in 1972, the ASVAB was not universally implemented as the qualification test for the recruitment of the all-volunteer force until June 1, 1976.<sup>20</sup>

By the end of the 1970's the Department of Defense had learned the hard way the importance of controlling the quality of the force. By ending the draft and subsequently implementing baseline enlistment standards for all the services, the military was on its way to an effective all-volunteer force. The lessons of this period continue to shape the way recruits are screened today as MEPCOM has developed into a critical component for all enlisted and officer accessions. Central to the role of MEPCOM is control of the ASVAB test. Proving the value and validity of this test would be the next challenge in the development of how recruits were screened and selected for service.

## **UNDERSTANDING THE ASVAB & AFQT SCORES**

The ASVAB is a ten-part multiple-choice test that evaluates knowledge in general science, arithmetic reasoning, word knowledge, paragraph comprehension, mathematical knowledge, electronics knowledge, auto information, shop information, mechanical comprehension, and the ability to assemble objects. (See Insert Figure) The test, which today has been modernized to an adaptive computer form, results in a percentile score from 1 to 99 as compared to a normative control group of men and women ages 18 to 23.<sup>21</sup> For example, an

ASVAB score of 67 indicates that the test taker is in the 67th percentile of all test takers in the collective normative group.<sup>22</sup>

Once the ASVAB has been taken and scored, the Armed Forces Qualifications Test (AFQT) score is derived. The AFQT score, based on the word knowledge, paragraph comprehension, arithmetic reasoning, and mathematics knowledge sub-sets of the

ASVAB indicate which Mental Group Category the applicant will be assigned. The Mental Group Category distribution are controlled by the Department of Defense to ensure that at least 60 percent of all enlistees score in the top three mental group categories. The Marine Corps independently increased this standard to no less than 63 percent.<sup>23</sup>

The final score derived from ASVAB testing is the General Technical (GT) score. Again, calculating this score requires the ten sub-set scores from the ASVAB. In the case of the GT score, word knowledge, paragraph comprehension, arithmetic reasoning scores are compiled. With the third and final score, the applicant can be determined to be eligible for enlistment and assignment to a Military Occupational Specialty (MOS).<sup>24</sup> The scoring of the ASVAB and

## The ASVAB Tests

The ASVAB tests are designed to measure aptitudes in four domains: Verbal, Math, Science and Technical, and Spatial. The table below describes the content of the ASVAB tests. The tests are presented in the order in which they are administered.

Test	Description	Domain
General Science (GS)	Knowledge of physical and biological sciences	Science/Technical
Arithmetic Reasoning (AR)	Ability to solve arithmetic word problems	Math
Word Knowledge (WK)	Ability to select the correct meaning of a word presented in context and to identify best synonym for a given word	Verbal
Paragraph Comprehension (PC)	Ability to obtain information from written passages	Verbal
Mathematics Knowledge (MK)	Knowledge of high school mathematics principles	Math
Electronics Information (EI)	Knowledge of electricity and electronics	Science/Technical
*Auto Information (AI)	Knowledge of automobile technology	Science/Technical
*Shop Information (SI)	Knowledge of tools and shop terminology and practices	Science/Technical
Mechanical Comprehension (MC)	Knowledge of mechanical and physical principles	Science/Technical

determination of the AFQT score also results in the placement of the applicant into one of five Department of Defense Mental Group Categories as depicted below:<sup>25</sup>

Category I:	AFQT 93 - 99
Category II:	AFQT 65 - 92
Category IIIA:	AFQT 50 - 64
Category IIIB:	AFQT 31 - 49
Category IV:	AFQT 21 - 30

The implementation of the ASVAB and its control by MEPCOM was a significant step in the development of modern assessment standards. The ASVAB, as the universal screening tool for mental acuity and intelligence, allowed for the Department of Defense to better monitor who the services were accessing into the force. More importantly, a policy limiting each service to no more than four percent of annual recruits coming from the Category IV mental group meant that significant steps had been taken to ensure higher overall mental acuity and intelligence levels across the force. While one would assume that the services would push back against such centralized control, they did not. Instead, the challenge to the validity of the ASVAB and of MEPCOM's ability to control it would come from the halls of the United States Congress.

### **GETTING IT RIGHT – FIXING THE ASVAB**

By the end of the 1970's the Marine Corps, along with the rest of the services, had seemingly corrected the quality issue through policy changes that addressed high school graduation requirements and Category IV mental group standards. Testing data from the ASVAB that was universally implemented in 1976 showed an increasing level of quality in mental acuity and intelligence scores across the services. However, reports from commanders in the field across the Department of Defense did not reflect this increasing quality. Instead of an apparent increase in quality recruits, the services were dealing with continued dysfunction through the

breakdown of good order and discipline and enlistees failing to complete their first term of service. These frustrations, and the apparent gap between the data that MEPCOM was producing and the reality in the field, came to a head in a series of Senate Armed Services Committee meetings in 1980.<sup>26</sup>

Senator Sam Nunn of Georgia, having heard concerns from uniformed leadership, brought the issue to the committee when questioning MEPCOM representatives on the disparity between ASVAB testing data and continued issues in the operational forces. In the hearing Senator Nunn revealed that analysis conducted by his office indicated that, “The reported mental test scores of recruits at the lower ability levels have, in fact, been inflated and that as many as 28 percent of DoD accessions may be in the category IV mental group instead of the 5 percent previously reported.”<sup>27</sup> Senator Nunn went on to state that, “If this information holds up, that is an astounding change in the quality of the enlisted force in the US Army is it not? I mean you are talking about a very significant deterioration in the quality of the US Army.”<sup>28</sup>

Research conducted by MEPCOM and the Government Accounting Office following these accusations revealed that Senator Nunn was indeed correct and that the ASVAB testing data was somehow flawed. Further examination found that the ASVAB that was adopted by all the services in 1976 as the universal qualification test for enlistment had not been correctly calibrated. The flawed test was “normed” incorrectly and had failed in the process of accurately transferring raw test scores into a score that could be compared to a representative sample of young Americans.<sup>29</sup>

The leadership of the services was correct in their analysis that the overall quality of recruits had not changed. The flawed scoring system of the ASVAB resulted in a four-year period in which recruiters from all services were unwittingly enlisting accessions that would not

have been eligible for enlistment had the test been correct. A correctly calibrated ASVAB was introduced in October of 1980, but by that point, the damage had been done. One study conducted at the time found that re-norming of the AFQT scores from the flawed test would result in the determination that nearly half of the Army's recruits from the fiscal year 1980 were in the Category IV mental group.<sup>30</sup> The other services were impacted in a similarly negative fashion resulting in a total force that was a long way from the four percent limit on Category IV enlistees. Researchers Lawrence and Ramsberger, having studied the issue ten years later, found:

The ASVAB Misnorming was a "tragedy of errors." A travesty of sound psychometric practices and common sense. Rather than being attributable to one technical mistake, this five-year period was nurtured by reactionary decisions, Service disagreements, haste, a multitude of testing and sampling mistakes, test compromise, and inexperience with what the results of the recruiting of volunteers should look like.<sup>31</sup>

By 1982, nearly a decade into the existence of the all-volunteer force, the issue of quality continued to cause both friction and consternation for the services. The post-Vietnam discipline issues persisted and were attributed to the low quality of recruits. The development of the ASVAB and the policy to make it the universal entrance test for the Department of Defense was a step in the right direction, yet the faulty test calibration and the subsequent realization that the quality of enlistments had not improved was a significant setback. Equally as disruptive to the development of the all-volunteer force was the loss of confidence in the ASVAB as a metric for determining mental acuity and intelligence in recruits. The services were frustrated that four years of recruiting efforts had been undermined by MEPCOM's failure to implement the ASVAB effectively. The trust that the services had placed in MEPCOM and the new universal qualification system had been violated.

One silver lining to this period is that the services learned the hard lesson of validating testing procedures and the requirement for constant validation of the tools relied upon for screening. The failure of the ASVAB test version utilized from 1976-1980 would result in the implementation of control mechanisms and increased oversight of MEPCOM by both the Department of Defense and the individual services. The “tragedy of errors” of the ASVAB misnorming was a setback, but the lessons learned by the services was a critical one. Never again would the services allow MEPCOM to operate without checks and balances. The fact that accurate mental acuity and intelligence testing played a pivotal role in the success of the all-volunteer force was no longer up for debate. The services were on board and had aligned their recruiting efforts accordingly. It was now up to MEPCOM to rebuild the relationship. The first step in this process was to see if the ASVAB was indeed the best tool for the screening of enlistees. The resulting analysis would take more than a decade and would become one of the largest and most ambitious single research effort ever undertaken in the history of personnel research.<sup>32</sup>

### **“PROJECT A” & VALIDATION OF THE ASVAB**

The personnel research project, which would come to be known as “Project A” was intended to do more than simply validate the ASVAB as the primary enlistment screening tool. Instead, the comprehensive study was designed to examine both predictive training performance and post-training enlistment performance plus first-term attrition levels, reenlistment decision making, and performance during the second term of enlistment. To complete such a long-term and comprehensive research project the directors of Project A would require a level of longitudinal data that had never been recorded by the Department of Defense.<sup>33</sup>



compared against alternative testing methods and applied to both first term and second term performance of service members. The alternative testing method chosen by Campbell and his team was the Assessment of Background and Life Experiences (ABLE) exam. This test, comprised of 199 questions, included scales for achievement, adjustment, dependability, and social desirability, was viewed as a viable alternative to the ASVAB at the outset of the study.<sup>36</sup>

While initial results of ABLE testing were positive, the reality of personality testing soon became apparent to the Project A researchers through concerns voiced by the services about the vulnerability of the test. Researchers would go on to write that, “The Services decided not to implement ABLE-based selection procedures...largely due to concerns about its fakability and potential compromise. Some individuals believed that any large-scale operational screening using self-reported measures, like ABLE, would lead to widespread faking and degradation of predictive validity over time.”<sup>37</sup>

A decade into Project A John Campbell and his team produced their initial findings. The most significant of these results was that the study strengthened the case for the ASVAB. While some researchers did not agree with the Services about the susceptibility of personality tests to corruption, there was near universal acceptance of the findings that the ASVAB performed its selection function very effectively. The existing test, having been properly normed in 1981, strongly distinguished between applicants that could perform well as first-term servicemembers from those who could not. More than anything, the research and findings produced by Project A found that the ASVAB was, “an excellent predictor of the future job performance of applicants from enlistment.”<sup>38</sup>

John Campbell would later write that Project A found that, “the original objectives set by the sponsor for Project A were met. Using well-developed measures and large representative

samples, it was possible to estimate the validity of the current system and to estimate the degree of selection validity and classification efficiency that could be achieved.”<sup>39</sup> He would go on to conclude that, “trying to improve our models of relevant domains, as well as the interrelationship among them, is as critical for practice as it is for science.”<sup>40</sup>

By 1993 the question of what level of mental acuity and intelligence was required to serve in the military had been settled. Project A had definitively demonstrated that cognitive ability, as measured by the ASVAB test and derived AFQT and GT scores, was a strong predictor of job performance across a variety of military occupational specialties.<sup>41</sup> The simple formula of high school graduation and superior performance on the ASVAB was sufficient to predict first-term success by enlistees across the Army, Air Force, Navy and Marine Corps. The next question would be how expensive it be to recruit this high-quality population and could the Department of Defense afford the cost.

The answer to these questions came from Steven Sellman, the Director of Accession Policy for the office of the Secretary of Defense. Sellman, working with the National Academy of Sciences and others, developed a mathematical model that connected recruit quality as determined by Project A to the budgetary dollars and resources expended to recruit high-quality enlistees in sufficient numbers.<sup>42</sup> This formula, which resulted in a calculated trade-off between recruiting cost and job performance, produced policy guidelines that would come to be known as the “60/90 Rule”. This rule was first published as a policy in the 1993 Defense Planning Guidance which said, “Service programs will ensure that at least 90 percent of non-prior service recruits are high school diploma graduates with 60 percent...drawn from Armed Forces Qualification Test Categories I-III A. No more than 4 percent of the recruits will come from Category IV.”<sup>43</sup>

The distinction between the mental group categories was significant because it further delineated those scoring in the 50-99th percentile, referred to as “Alphas” from the “Bravos” scoring in the 31st to the 49th percentile. The “60/90” policy requirement for no less than sixty percent of the force to come from the top 50 percentiles of the testable group reinforced that such high-quality accessions were both attainable and cost-effective. Furthermore, the limit to Category IV mental group accessions was codified as part of the policy thus ensuring that the mistakes of the late 1970s were not repeated.

Twenty years after the initiation of the all-volunteer force, the Marine Corps, and its sister services had their marching orders. The decades of research on mental acuity and intelligence standards had proven the validity of the ASVAB test and the AFQT score derived from its results. The reality of the Fleet Marine Force that higher quality recruits produce higher quality Marines was evident in decreased rates of courts-martial, desertions, and drug use. This evolved thought process was a long way from the early 1970s when General Cushman, as the Commandant, advocated for lowering standards. Instead, the new attitude towards recruiting and the impact of high-quality enlistments can be seen in the words of Lieutenant General Walter Boomer who at the time wrote:

Recruiting is where it all begins – in the schools and on the streets of our nation. As we face the next decade, we cannot forget this axiom. We have proved time and again that our recruit training, good as it is, cannot turn unintelligent, poorly motivated, physical wrecks into Marines. Recruiting high-quality applicants for the Corps is terribly expensive, but the price of not doing it is a disaster. Fine young men and women can be recruited only by good Marines. We must be able to bear the pain of having to do without our best and brightest while they serve a tour on recruiting duty. Otherwise, we mortgage our future, with bankruptcy an eventual certainty. Unfavorable demographic trends will make recruiting even more difficult during the early 1990s. We can face this challenge in two ways: lower our quality or maintain the same standards we have insisted upon for the last decade – and work harder. Only the latter is acceptable. The short-term price may be that even more recruiters must hit the pavement to acquire the good people we need. Or we can opt

for a lower-cost solution of maintaining our present recruiting force levels at the expense of other force structure. We cannot cut our recruiting program and still obtain the high-quality recruits we must have through the decade.<sup>44</sup>

Lieutenant General Boomer's insight and emphasis on maintaining standards were shaped by both his command of I MEF during Operation Desert Storm and his time as the Director of the 4th Marine Corps Recruiting District. Having seen Marines in action on both fronts, Lieutenant General Boomer and the other senior leadership of the Marine Corps understood that success in one resulted in success in the other.<sup>45</sup> To be seen was how this new emphasis on high-quality enlistments, and the force that it produced, would respond to a type of war drastically different from the one fought in Operation Desert Storm.

### **TESTED BY THE LONG WAR**

By the end of the 1990s, the growing pains of the All-Volunteer Force had resulted in high mental acuity and intelligence standards across the Department of Defense, especially in the Marine Corps. The pressure applied by Lieutenant General Boomer and other institutional leaders on Marine Corps Recruiting Command in the 1990s resulted in a decade that averaged 95.3 percent of all enlistees possessing a high school diploma.<sup>46</sup> Additionally, less than one percent of new Marines were Category IV over the same period, demonstrating that quality levels once thought unattainable just twenty years before had become the norm across the all-volunteer force.<sup>47</sup>

The terrorist attacks in New York and Washington D.C. on September 11, 2001, had a far-reaching impact on the Department of Defense and the individual services. Recruiting stations across the nation witnessed an increase in interest from men and women of all ages who

desired to enlist in response to the attacks. While not as immediate, subsequent operations in Afghanistan in late 2001 and Iraq in 2003 resulted in increased active-duty retention and thus reduced overall recruiting missions for a period. It was not until 2006, when the realization that the nation was now involved in multiple open-ended counter-insurgency campaigns, that end strength authorizations resulted in higher accession requirements.<sup>48</sup> Marine Corps Recruiting Command now faced the challenge of growing the force from 176,000 active duty Marines to 202,000.

The increase of the 26,000 new Marines was planned to occur over five fiscal years from 2007-2012, resulting in an annual increase to the overall mission of approximately 5,200 additional enlistments. The Marine Corps reinforced its recruiting command with additional personnel to spread the burden and braced for challenges. Surprisingly, the high-quality standards that the service had attained in the 1990s were maintained despite the increased mission. This trend continued, with the only modification occurring when General Conway, Commandant of the Marine Corps from 2006 to 2010, removed the two-percent limit on Category IV enlistments for 2007 and 2008 and allowed Recruiting Command to use the higher Department of Defense standard of four-percent. This precautionary measure proved not to be needed, and even with the policy change the overall accession of Category IV recruits never rose above two percent. In 2009 the Marine Corps returned to the self-imposed two-percent limit. The success of Marine Corps Recruiting Command to recruit high-quality young men and women during a time of war is evident in the 2009 statistics which show that 42.2 percent of all enlistments were in the top two mental categories (65th to 99th percentile).<sup>49</sup> The build-up to 202,000 active duty Marines also validated the previous findings of Project A. The longitudinal

data collection continued, and analysis showed that previous historical trends in the performance of the lower mental categories were consistent with Marines recruited from 2003 to 2009.<sup>50</sup>

The beginning of the 2000s and the Global War on Terror witnessed the first large-scale growth of the force under the “60/90” rule and policies outlining AFQT scores and mental group categories. By the end of the decade, the Marine Corps had proven that it could continue to recruit high-quality young men and women despite being involved in open-ended counter-insurgency campaigns in Iraq and Afghanistan. Research conducted on enlistment cohorts from the 1990s and 2000s show that the baseline requirements for high school completion and high AFQT score continued to be the best indicator of overall quality of first-term personnel. An example of this reinforced belief in the ASVAB test and AFQT score as a predictor can be seen in a RAND study published in 2005 which finds that “our research confirms the importance of AFQT scores in screening qualified applicants for enlistment”.<sup>51</sup> The study goes on to state that the trends of AFQT score and performance continue to hold true, finding that those having higher AFQT scores outperform those who do not go through mid-career.<sup>52</sup>

The mental acuity and intelligence testing methodology developed through the 1970s and 1980s had resulted in a highly technical and lethal force that was successful in Operation Desert Storm. More importantly, the continued focus on recruiting high-quality accessions combined with analysis of ASVAB results in the 1990s produced a force that could both operate in the ambiguity of counter-insurgency operations and continue to recruit suitable levels of personnel to maintain pre-war intelligence standards. Throughout this period the ASVAB test and the AFQT score continued to be the critical metric for determining performance potential of first-term servicemembers.

## IMPLICATIONS FOR THE FUTURE FORCE

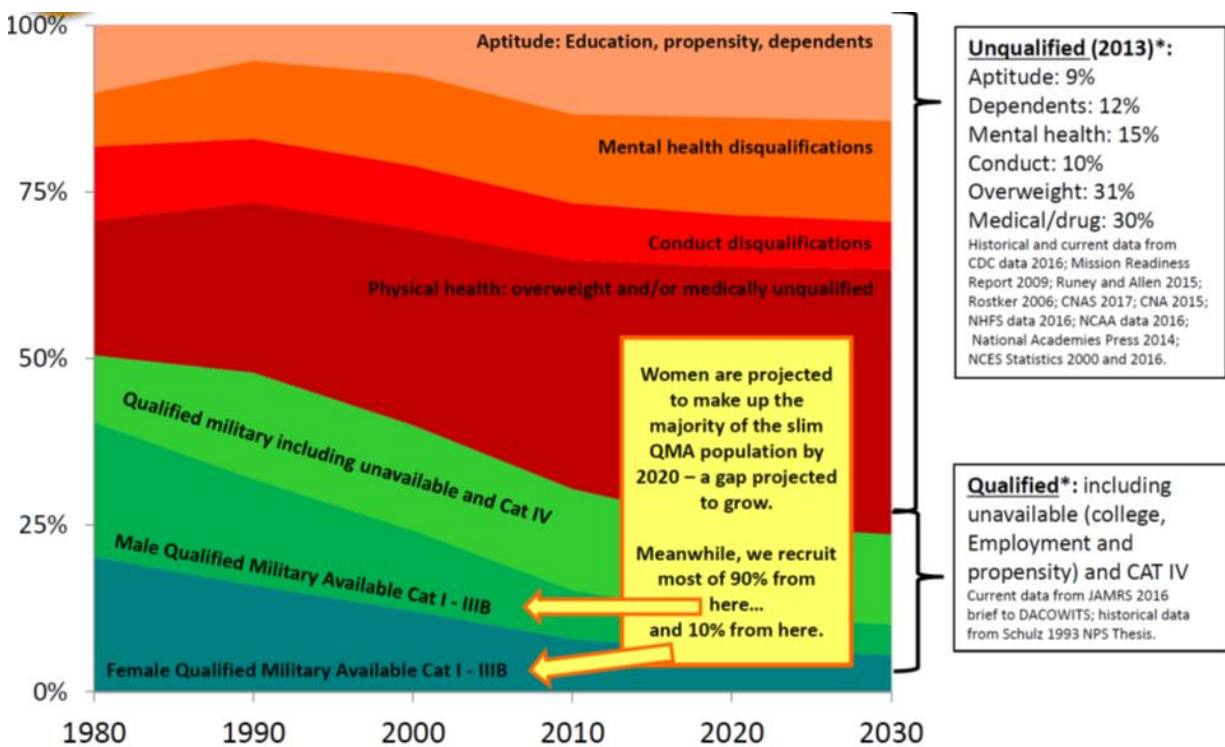
In the forty-five years since the transition to the all-volunteer force, the quality metrics of high school completion and AFQT score continue to be the best indicator of success upon enlistment. The growing pains of the ASVAB misnorming scandal and the subsequent validation of the corrected test by Project A resulted in a force that was both professional and capable enough to respond to the changing character of war in the early part of this century. The question for today's leaders as they envision the future battlefield is if these quality metrics will continue to be effective. One way to answer this question is to look at who will fill the ranks of the future force. The Marine Operating Concept, published in September of 2016, addresses the continued need for high-quality accessions when it states that:

We always screen for individuals that can demonstrate the physical strength, intestinal fortitude, temperament, and maturity required to lead Marines in combat. Given the advances in technology and complexity of the future environment, the qualities of critical thinking and mental dexterity are just as important.<sup>53</sup> Cognitive capabilities, especially critical thinking-based approaches such as negotiating skills and problem-solving methods, are highly valuable in certain situations where the use of lethal force might be counterproductive to the larger mission. We need Marines with mental acuity and resilience no less than physical fitness if we are to remain a professional, disciplined and moral force that can be effective in chaotic environments and complex terrain.<sup>54</sup>

One aspect of the future force that the Marine Corps envisions is the integration of women into Military Occupational Specialty fields from which they were previously excluded. A Marine Corps Recruiting Command staff study recently found that the female demographic is a potential source for the high-quality recruits that the Marine Corps seeks. The combination of intellect and physical fitness within the female demographic, attributed in the study to Title IX legislation, results in a growing number of young women who meet the physical and the mental requirements defined in the Marine Operating Concept.<sup>55</sup> Unfortunately, the focus on female

integration has been on physical capacity instead of mental acuity. This hyper-focus on the physical at the expense of the mental can be seen in the fact that a 2015 RAND study titled, Implications of Integrating Women into the Marine Corps Infantry, does not address the demographic's AFQT scores despite its 215 pages in length.<sup>56</sup>

The Marine Corps Recruiting Command study also reflects the growing trend in childhood obesity and its negative impact on the pool of potentially qualified applicants from which the Marine Corps can recruit. As seen in the chart below, the percentage of young men and women ages 17-24 who are disqualified from service due to weight or existing medical condition grows significantly from 2020-2030.<sup>57</sup> While this trend is important, the Marine Corps has proven that it's entry-level training, when combining with diet and physical conditioning



support recruits receive in the Delayed Entry Program, can mitigate the trend in overweight youth. What is yet to be seen is if the same level of effort can be applied to raising AFQT scores of those physically qualified to enlist. To date, the Marine Corps has not emphasized this effort.

Another factor in who the Marine Corps recruits to serve in the operating forces is the institutional assessment of what level of mental acuity and intelligence Marines will need to be successful on the future battlefield. Unfortunately, despite the emphasis on intelligence and decision making emphasized in the Marine Operating Concept, the service has yet to undertake a comprehensive assessment of current AFQT standards as they apply to occupational field assignments. One example of this can be seen in the Marine Corps standards of enlistment for infantry Marines. The Marine Operating Concept states that “The ability of Marine infantry to close with the enemy in every type of terrain and environment is an asymmetric advantage. This places a premium on the GCE’s ability to conduct sustained, foot-mobile operations while bearing mission-essential equipment and personal protective gear.”<sup>58</sup> While this statement conforms to traditional expectations of the infantry community, it fails to address the intellectual foundation infantry Marines will require to be successful in the future. Increased reliance on technology, specifically the integration of precision fires and satellite communication suites in support of distributed operations, should result in an updated accession standard tied to AFQT and GT score. As of 2017, the standards for enlistment for infantry Marines remain the lowest in the service, with the minimum GT score being ten points lower than what is required for the food service occupational field. This is just one example of how current standards do not meet anticipated future requirements.

In response to the changing character of war and the challenges of the future, the Marine Corps should use the existing tools of the ASVAB test and the AFQT score to update its standards for enlistment. As this study demonstrates, these tools have been proven over time to provide accurate predictors of performance. The decades of data available since Project A allow for comparative assessments of occupational fields as well as between the services. The Marine

Corps should invest in a comprehensive review of current baseline standards for enlistment to see if the human capital that is recruited will continue to meet future requirements. Furthermore, the Marine Corps should move on from continued analysis of physical requirements and examine the gender-neutral AFQT score standards for all Military Occupational Specialties within its inventory. In doing so, the force will be able to tailor occupational field requirements and prioritize elements of the Marine Air Ground Task Force accordingly. The tools for this level of analysis already exist, and the Marine Corps should utilize them.

The development of mental acuity and intelligence standards for the all-volunteer force is central to the accomplishments of the United States military since the end of the draft. The last half century has proven that a more intelligent force is a more capable and disciplined force. This period has also proven that a modern military relies on intelligent personnel as much as it does on technology, and the continued recruitment of this high-quality personnel is essential to the continued success of the force. Understanding the development of mental acuity and intelligence standards, and the tests with which they are determined is central to understanding the capabilities and limitations of this force. If it is true, that “what is past is prologue” then current leaders would be remiss if they did not understand how the standards of today were developed, and what mistakes were made along the way, as they establish policy and concepts for the future force.

Illustrations:

Page 3	World War I Draft Board
Page 5	Milton Friedman Time Magazine Cover
Page 6	General Cushman, Commandant of the Marine Corps
Page 11	ASVAB Smart Sheet
Page 16	Project A Longitudinal Data Matrix
Page 24	MCRC Military Age Population Data by Gender to 2030

## Bibliography:

Armor, David, Richard Fernandez, Kathy Bers, and David Schwarsbach. *Recruit Aptitudes and Army Job Performance: Setting Enlistment Standards for Infantryman*. The Rand Corporation, September 1982.

Asch, Beth, Rebecca Kilburn, and Jacob Klerman. *Attracting College-Bound Youth Into The Military: The Development of New Recruiting Policy Options*. National Defense Research Institute, 1999.

Asch, Beth, John Romley, and Mark Totten. *The Quality of Personnel in the Enlisted Ranks*. The Rand Corporation, 2005.

Commanding General, Marine Corps Recruiting Command. Marine Corps Recruiting Command Enlistment Processing Manual. MCRCO 1100.1, November 9, 2011.

Commandant of the Marine Corps. Infantry Training and Readiness Manual. MAVMC 3500.44B, August 30, 2013.

Flynn, George Q. *Lewis B. Hersey, Mr. Selective Service*. Chapel Hill: University of North Carolina Press, 1985.

Headquarters US Marine Corps. *Approximation of Qualified Male Applicants from 1980-2030 and the Impact of Title IX on the General Female Population*. Staff Study, 2017.

Headquarters US Marine Corps. *Marine Corps Operating Concept: How an Expeditionary Force Operates in the 21st Century*. Washington, DC: Headquarters Marine Corps, September 2016.

Headquarters Marine Corps Combat Development Command - Marine Corps Warfighting Lab.  
*The Expeditionary Force 21 MAGTF: Ground Combat Element*. Staff Study, 2014.

Headquarters Marine Corps Recruiting Command. *Making Marines in the All-Volunteer Era: Recruiting, Core Values, and the Perpetuation of our Ethos*. Case Study, 2014.

Hosek, James, John Antel, and Christine Peterson. *Who Stays, Who Leaves? Attrition Among First-Term Enlistees*. The Rand Corporation, May 1989.

Gereben-Schaefer, Agnes, Jennie Wenger, Jennifer Kavanagh, Jonathan Wong, Gillian Oak, Thomas Trail, and Todd Nichols. *Implications of Integrating Women into the Marine Corps Infantry*. The Rand Corporation, 2015.

Laurence, Janice and Peter Ramsberger. *Low-Aptitude Men in the Military: Who Profits, Who Pays?* New York: Praeger Publishers, 1991.

Millett, Allen R. *Semper Fidelis: The History of the United States Marine Corps*. New York: The Free Press, 1991.

Quester, Aline. *Marine Corps Recruits: A Historical Look at Accessions and Bootcamp Performance*. Center for Naval Analysis, September 2010.

Rostker, Bernard. *I Want You!: The Evolution of the All-Volunteer Force*. Santa Monica: Rand Corporation, 2006.

## End Notes

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- <sup>1</sup> Bowers, "Making Marines in the All-Volunteer Force Era" *Marine Corps Gazette*, November 2014: 83.
- <sup>2</sup> Bernard Rostker, *I Want You!: The Evolution of the All-Volunteer Force* (Santa Monica: Rand Corporation, 2006), 2.
- <sup>3</sup> Ibid.
- <sup>4</sup> George Q Flynn, *Lewis B. Hersey, Mr. Selective Service* (Chapel Hill: University of North Carolina Press, 1985), 218.
- <sup>5</sup> Ibid.
- <sup>6</sup> Richard M. Nixon, "The All-Volunteer Armed Force: A Radio Address by the Republican Presidential Nominee," Washington DC: Republican National Committee, 1968.
- <sup>7</sup> Beth Bailey, *America's Army* (Cambridge: Harvard University Press, 2009), 23.
- <sup>8</sup> Rostker, *I Want You!: The Evolution of the All-Volunteer Force*, 80.
- <sup>9</sup> Bailey, *America's Army*, 33.
- <sup>10</sup> Ibid.
- <sup>11</sup> Gus C. Lee and Geoffrey Y. Parker, "Ending the Draft: The Story of the All-Volunteer Force," Washington, DC: *Human Resources Research Organization*, 1977: 140.
- <sup>12</sup> Allen R. Millet and Jack Shulimson, *Commandants of the Marine Corps* (Annapolis: Naval Institute Press, 2004), 417.
- <sup>13</sup> Allan R. Millet, *Semper Fidelis: The History of the United States Marine Corps* (New York: The Free Press, 1991), 612.
- <sup>14</sup> LtCol Joseph D. Riech and Maj Gary Kozlusky, "The New Recruiting Command and the Story of Marine Corps Recruiting" *Marine Corps Gazette*, August 1994: 65.
- <sup>15</sup> Ibid.
- <sup>16</sup> Headquarters, Marine Corps Recruiting Command. *Making Marines in the All-Volunteer Era: Recruiting, Core Values, and the Perpetuation of our Ethos*. Staff Study, 2014, Part I, 13.
- <sup>17</sup> Janice H. Laurence, Office of Undersecretary of Defense for Force Management Policy. *The All-Volunteer Force*, Staff Study, 2004.
- <sup>18</sup> Office of the Assistant Secretary of Defense for Manpower and Reserve Affairs, Central All Volunteer Task Force, *Qualitative Accession Requirements: A Report on the Qualitative Accession Needs of the Military Services*, November 1972.
- <sup>19</sup> Rostker, *I Want You!: The Evolution of the All-Volunteer Force*, 289.
- <sup>20</sup> Ibid., 290.
- <sup>21</sup> ASVAB Technical Bulletin No. 2: CAT-ASVAB Forms 3 and 4, Personnel Testing Division of the Defense Manpower Data Center, August 2009. [http://www.official-asvab.com/documentation\\_res.htm](http://www.official-asvab.com/documentation_res.htm)
- <sup>22</sup> Ibid.
- <sup>23</sup> Commanding General, Marine Corps Recruiting Command. *Marine Corps Recruiting Command Enlistment Processing Manual*. MCRCO 1100.1, November 9, 2011, 3-59.
- <sup>24</sup> ASVAB Technical Bulletin No. 2: CAT-ASVAB Forms 3 and 4, Personnel Testing Division of the Defense Manpower Data Center, August 2009. [http://www.official-asvab.com/documentation\\_res.htm](http://www.official-asvab.com/documentation_res.htm)
- <sup>25</sup> Commanding General, Marine Corps Recruiting Command. *Marine Corps Recruiting Command Enlistment Processing Manual*. MCRCO 1100.1, November 9, 2011. Pg 3-59.
- <sup>26</sup> Rostker, *I Want You!: The Evolution of the All-Volunteer Force*, 392.
- <sup>27</sup> *Department of Defense Authorizations for Appropriations for Fiscal Year 1981: Active Duty, Reserve, Civilian Manpower: Hearing before the Senate Armed Services Committee*, Washington DC, March 10, 1980, 1286-1287.
- <sup>28</sup> Ibid., 1313.
- <sup>29</sup> Rostker, *I Want You!: The Evolution of the All-Volunteer Force*, 394.
- <sup>30</sup> Ibid.
- <sup>31</sup> Laurence, Janice H. and Peter F. Ramsberger, *Low Aptitude Men in the Military* (New York: Praeger, 1991), 72.
- <sup>32</sup> Rostker, *I Want You!: The Evolution of the All-Volunteer Force*, 596.
- <sup>33</sup> John P. Campbell, "An Overview of the Army Selection and Classification Project (Project A)" *Personnel Psychology*, Vol. 42, No 2, 1990: 231.
- <sup>34</sup> Rostker, *I Want You!: The Evolution of the All-Volunteer Force*, 596
- <sup>35</sup> Campbell, "An Overview of the Army Selection and Classification Project (Project A)" 232.

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- <sup>36</sup> Leonard A. White, Mark C. Young, and Michael G. Rumsey, “ABLE Implementation Issues and Related Research” in John P. Campbell and Deidre J. Knapp, *Exploring the Limits in Personnel Selection and Classification*, (Mahwah NJ: Lawrence Erlbaum Associates Publishers, 2001), 537.
- <sup>37</sup> *Ibid.*, 546-547.
- <sup>38</sup> Walker, Clinton B. and Michael G. Rumsey, “Application of Findings: ASVAB, New Aptitude Tests, and Personnel Classification” in John P. Campbell and Deidre J. Knapp, *Exploring the Limits in Personnel Selection and Classification*, (Mahwah NJ: Lawrence Erlbaum Associates Publishers, 2001), 560.
- <sup>39</sup> John P. Campbell and Deidre J. Knapp, “Implications for Future Research and Personnel Management” *Exploring the Limits in Personnel Selection and Classification*, (Mahwah NJ: Lawrence Erlbaum Associates Publishers, 2001), 587-588.
- <sup>40</sup> *Ibid.*, 589.
- <sup>41</sup> Janice H. Laurence and Peter F. Ramsberger, *Low Aptitude Men in the Military* (New York: Praeger, 1991), 38.
- <sup>42</sup> Wayne S. Sellman, “The Nexus Between Science and Policy” in Bert F. Green and Anne S. Mavor, *Modeling Cost and Performance for Military Enlistment*, (Washington DC: National Academy Press, 1994), 9.
- <sup>43</sup> Rostker, *I Want You!: The Evolution of the All-Volunteer Force*, 607.
- <sup>44</sup> General Walter E. Boomer, “Smaller and Better In the 1990s,” *Marine Corps Gazette*, October 1992: 19.
- <sup>45</sup> Headquarters Marine Corps Recruiting Command. *Making Marines in the All-Volunteer Era: Recruiting, Core Values, and the Perpetuation of our Ethos*. Case Study, 2014. (Part II Page.5).
- <sup>46</sup> Beth Asch, John Romley, and Mark Totten. *The Quality of Personnel in the Enlisted Ranks* (Santa Monica: The Rand Corporation, 2005), 19.
- <sup>47</sup> Aline Quester, *Marine Corps Recruits: A Historical Look at Accessions and Bootcamp Performance*, Center for Naval Analysis, September 2010, 14.
- <sup>48</sup> *United States Marine Corps Force Posture: Hearing before the House Armed Services Committee*, March 1, 2007. (Statement of General James T. Conway, Commandant, United States Marine Corps).
- <sup>49</sup> Quester, *Marine Corps Recruits: A Historical Look at Accessions and Bootcamp Performance*, 14.
- <sup>50</sup> *Ibid.*, 11.
- <sup>51</sup> Asch, Romley, and Totten. *The Quality of Personnel in the Enlisted Ranks*, 61.
- <sup>52</sup> *Ibid.*, 57.
- <sup>53</sup> Headquarters US Marine Corps. *Marine Corps Operating Concept: How an Expeditionary Force Operates in the 21<sup>st</sup> Century*. Washington, DC: Headquarters Marine Corps, September 2016. 24.
- <sup>54</sup> *Ibid.*, 25.
- <sup>55</sup> Headquarters US Marine Corps. *Approximation of Qualified Male Applicants from 1980-2030 and the Impact of Title IX on the General Female Population*. Staff Study, 2017.
- <sup>56</sup> Agnes Gereben-Schaefer, Jennie Wenger, Jennifer Kavanagh, Jonathan Wong, Gillian Oak, Thomas Trail, and Todd Nichols. *Implications of Integrating Women into the Marine Corps Infantry* (Santa Monica: The Rand Corporation, 2015).
- <sup>57</sup> Headquarters US Marine Corps. *Approximation of Qualified Male Applicants from 1980-2030 and the Impact of Title IX on the General Female Population*. Staff Study, 2017.
- <sup>58</sup> Headquarters US Marine Corps. *Marine Corps Operating Concept: How an Expeditionary Force Operates in the 21<sup>st</sup> Century*. Washington, DC: Headquarters Marine Corps, September 2016, 20.