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Officers need training and education in order to perform assigned duties. Problem: How much of what type of education and/or training does an Air Force officer need? This paper analyzes how an officer's level of professional military and academic education influence subordinate perceptions of managerial/supervisory issues. An analysis of covariance (ANCOVA) is performed using a 2x4 factorial design (level of college degree x level of PME). The data show that officer professional military and graduate

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education positively influence the perceptions of subordinates on key supervisory measures. To determine how the Air Force compares to industry, information was collected from four defense related corporations. These industries place as much or more emphasis on the professional eduction of employees than the Air Force. In the area of advanced education, what may appear costly in the present should reap enormous benefits in the future.

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THE IMPACT OF VARIOUS LEVELS OF PROFESSIONAL MILITARY EDUCATION AND FORMAL EDUCATION ON SELECTED SUPERVISORY DIMENSIONS

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AUGUST 1983

LEADERSHIP AND MANAGEMENT DEVELOPMENT CENTER
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INTRODUCTION

It is essential that officers of the armed services receive advanced professional education in order to carry out their assigned duties in the interests of national security. Due to the ever increasing complexity of society and a constantly changing international political environment, this need for advanced officer education becomes more important over time. National security requirements have become more comprehensive and national policy formulation involves greater interaction among several disciplines - military, political, economic and technological (Brodsky, 1970). Since the military is a key element in formulating and achieving national policy objectives, the need for Air Force officers to be able to competently deal in areas outside their military specialty is evident. The problem centers on the question: How much of what type of education and/or training does the Air Force officer need? This paper will analyze how an officer's level of professional military education and academic education interact on his/her subordinate's perceptions of managerial and supervisory issues. A comparison to industry will be made to determine the similarities and differences (if they exist) that some major corporations might have with the Air Force in regard to the advanced education of their employees.

The need for advanced professional schooling will be put in better perspective after a brief look at the overall environmental demands on officers. Specifically, the seriousness of growing Soviet influence around the world, coupled with the deterioration of the United States' advantage in advanced technology, will be addressed. It will be shown that service schools and higher education in civilian institutions are essential in preparing Air Force officers to meet these challenges.

A REVIEW OF THE LITERATURE

The Need for Professional Education

To deal with aspects of national policy other than strictly military issues, today's Air Force officers must be able to function effectively in a wide variety of academic disciplines. They must be able to "communicate with policy formulators, with economic analysts, with political decision makers, with systems analysts, with sociologists, psychologists, scientists, and engineers," to name a few of the requirements (Brodsky, 1970, p. 429). The importance of highly educated officers in the scientific/technological field can never be overemphasized. Our superiority in these fields has been a hallmark of American society. This traditional superiority is eroding, partially due to inadequate technical education and research.

> Even as there has been a steady erosion in U.S. activity in the basic sciences, there has been an increase in the level of such activity in Western Europe and Japan. If that continues, we are in danger of losing our position of scientific leadership (Fitch, 1982, p. 56).

As Walsh & Walsh (1982) note, if the Reagan Administration follows through with its education policy on science and technology, the nation's schools will be on their own. Reactions to this policy from education organizations, most of which favor federal support, are negative. Already there are signs that industry is answering distress signals from engineering schools and university science faculties. The military has also acted on this subject.

> As a result of concern in the armed forces about dimming technological prowess, at least one ambitious program has been launched jointly by the military and industry to work through Reserve Officer Training Corps units in high school and college to promote interest in careers in science and engineering (Walsh & Walsh, 1982, p. 39).

Yet, know-how alone does not ensure success in countering Soviet expansionism, a major threat to our national security. The nature and extent of soviet intentions is stated well in Nixon's book The Real War:

> The Soviets have been waging World War III since the closing days of World War II. It has proceeded from the Soviet seizure of Eastern Europe through the communist victory in China, the wars in Korea and Indochina, and the establishment of a Soviet outpost in Cuba, to the present intrusions by the Soviets and their allies in Africa, the Islamic crescent, and Central America...Angola, Ethiopia, Afghanistan, South Yemen, Mozambique, Laos, Cambodia, South Vietnam [and Nicaragua], all have been brought under communist domination since 1974... The Soviet Union today is the most powerfully armed expansionist nation the world has ever known, and it's arms buildup continues at a pace nearly twice that of the United States. There is no mystery about Soviet intentions. The Kremlin leaders do not want war, but they do want the world. And they are rapidly moving into position to get what they want (1981, p. 3).

The Soviets, therefore, do not appear reluctant to deploy combat forces wherever and whenever their national objectives would be served. The fact that they seldom receive more than token criticism when they do use force might speak well of their resolve to maintain and use the forces and equipment necessary to achieve their national objectives. By contrast, Bletz and Taylor (1974) suggest that after the Vietnam experience, except in instances where vital national security interests are directly threatened, the United States does not intend to intervene militarily on behalf of another nation. To counter Soviet expansionism, the United States will have to make its military assistance program work to its fullest potential. Military officers employed as advisors and contingency planners can anticipate a vastly expanded role. The success of our military assistance program will depend heavily on these officers. Familiarity with languages and knowledge of other cultures, in addition to the special military expertise they display, will impact significantly on the effectiveness of the program. The military must also be politically aware.

> The political - military environment of the 1980s will necessitate a military profession that rejects the limitations of the liberal traditional alliance, [an alliance which believes that the military should concentrate solely on the art of warfare and leave the political dimensions, which it is inextricably involved in, to the people in Washington]. The profession must engender a true spirit of intellectualism conditioned by political and military realities (Sarkesian, 1979, p.52).

The struggle being waged in El Salvador between leftist guerillas and government forces is an immediate example of the importance of the need for a well coordinated, efficient and successful effort between United States civilian and military personnel involved in that country. United States military planners and advisors involved in El Salvador must be aware of American public and political sentiment towards that country. They should also have an understanding of the people of that region, their customs, religions, history, etc. This will help insure clear and accurate communication and exchange of information and ideas between the United States and El Salvador and among American military, civilian and government personnel. "Central America is too close and the strategic stakes are too high for us to ignore the danger of governments seizing power there with idealogical and military ties close to the Soviet Union" ("A Plan to Win," 1983). Based on the information researched for this section, it is my opinion that our national leadership will be demanding more professional military advice and expertise on the political, military, sociological, economic, and technical - dimensions of the nation's security goals.

Professional Military Education

In order to meet these challenges facing the military, advanced professional education is a must. The primary function of formal professional education should be "to equip the student to use in subsequent learning and in professional work an understanding of the fundamental concepts, principles, techniques, and ways of thought of his profession in order that he may develop throughout life an analytical and creative power" (Pittman, 1980, p. 14).

The unique role and structure of the military necessitate a professional education program different from those found in civilian industry and civilian professions (Dorger, 1979). Since few civilian educational institutions and in-house industry education programs teach courses that relate directly to the military, it has been necessary to establish in-house Professional Military Education (PME). This has been made easy by the fact that the military is both a profession and an exclusive bureaucracy (Pittman).

Professional military education is defined as "those educational activities which provide participating students with the broad service knowledge required to meet the greater responsibility inherent in their progression in rank" (used by a 1966 study of officer education by the Assistant Secretary of Defense, Manpower) (Pittman, 1980, p. 3).

The unique role of the military is determined by the needs of the society it serves. It doesn't have the luxury of choosing its own role. The role of the military is not static. It is established in the context of rapid technological, social, and political change. The professional military education system is responsive to these changes. Thus PME is used as a primary source of providing officers the capability to fill this role (Dorger).

The structure of the Air Force is based on the specialized division of labor along functional lines. This serves to diffuse the possibility of the accumulation of excessive power; it is also necessary due to the sheer size and complexity of the Air Force. Specialization is necessary in order to deal with rapid technological change and knowledge obsolescence. Also, personnel rotations have been reduced considerably in recent years and officers are more likely to find themselves retained in limited functional areas for greater periods of time due to new functional management techniques such as the Rated Distribution and Training Management System. Yet while specialization serves many useful purposes it has the potential to adversly impact the professional identity of military officers and destroy a sense of military corporateness, a characteristic which has always been considered important. This could cause a trend towards an occupational, rather than professional, outlook on the Air Force. Another possible danger attributed to specialization is a lack of coordination and cohesion of the unit as a whole. Only through PME, and the social and professional exchanges associated with it, can the proper knowledge and attitudes necessary to ensure professional identity and teamwork at all levels, be promoted (Dorger).

As is characteristic of most organizations, the military is also structured along hierarchical or vertical lines. Specialization is maximized at the lowest organizational levels. At successively higher levels, "similar functions are grouped together to facilitate management, prevent the duplication of effort in subordinate functions, and to ensure effective team effort among the various agencies" (Dorger, 1979, p.20). In fact:

> Managerial responsibility is inherent within each officer position. Normally, it increases in proportion to the officer's progression to higher and more responsible positions. In senior field grade positions, managerial responsibilities generally outweigh the requirement for specific technical job knowledge, except in a few of the most highly complex areas (Dorger, 1979, p.20).

Since the military must draw upon its own ranks for required management skills, PME must be capable of preparing officers for these positions of broader responsibility.

On the surface, there appears to be a conflict between the bureaucratic requirement of top leaders to have a broad knowledge base and the trend of specialization. This problem is placated by the military "through a distinction between two tracks of officer development, the specialist and the future commander, and through formal education and training" (Pittman) 1980, p.20).

Those who perform best in positions of command, spending much of their time with line units, are selected for successively higher commands. Alternatively officers may concentrate their careers along functional lines, e.g., personnel, operations, plans, recruiting, project management. Still others become specialists along such lines as automated data processing, research & development, logistics, or information (Taylor, undated).

According to Pittman (1980), PME is often thought of as "training" whereas civilian graduate school is "education". With regard to PME, these terms are often used interchangeably. A closer look reveals that PME is a mixture of "training" and "education", the former structured to predominate at the lower levels and the latter at the higher levels of PME. The purpose of "training" is to teach a trade or skill (basic military subjects), while the purpose of "education" is to develop thinking and reasoning as well as knowledge. The military profession, like architecture, law, engineering, and medicine, combines a variety of skills with an underlying body of knowledge. It distinguishes itself from most other professions, however, by differentiating between "training" and "education", though there is some overlap:

> At all levels, professional courses are a mixture of training and education, with the former tending to predominate at the lower levels. Even the higher professional schools devote some attention to developing skills and techniques and to imparting doctrine, but the higher up the ladder, the more dominant the educational content of the courses (Taylor, undated, p.20).

When officers enter the service they are expected to have some knowledge of the military profession (through a precommissioning program) in addition to a field of academic study. Once in the service, they attend various education and training programs to sharpen their knowledge and skills in their particular area of expertise. Yet this does not entirely fulfill their professional development needs. Without a program to further develop officers' leadership and management capabilities, qualities of discipline, dedication, motivation, ethics, etc., the professional development of an officer is not complete. PME serves to provide these capabilities and qualities (Dorger). Through PME, Air Force officers are able to acquire an understanding of how the Air Force is organized and operates. They are better able to see how their roles fit into the overall scheme of things. They are able to understand how, when, to whom, and why the Air Force does some of the things it does. Thus, Air Force officers are better able to appreciate the complexity of the Air Force and some of the problems encountered in it (Dent, 1975).

PME is a unique system in that it is phased in time to match the officers' potential with years of service (Rogers, 1975). It does this by interspersing periods of formal training/education between periods of practical experience over the course of an officer's career. If all this knowledge were presented to officers at the beginning of their careers, much of it would be forgotten or would become obsolete once it was used. Also, money would be wasted on the training and education of officers who don't intend to remain in the service (Dorger).

For the military, professional schooling is particularly significant because of the limited opportunities officers have to practice their profession--to command and manage troops in combat. Other than war, school is one of the principal means by which officers can develop professional expertise (Pittman). PME, therefore, serves to improve officers' capabilities in the art of warfare and national security.

Also, the interaction of students and faculty serves as a review board of aerospace experts to evaluate and recommend improved aerospace concepts, doctrine, and strategy (Rogers). For the most part, the PME system is designed to produce an officer who is a "generalist", as opposed to a "specialist". This is not to imply that one should be a "jack of all trades but master of none." Rather, one should be a multi-specialist, able to manage the integration of multiple specialties in pursuit of a common objective (Bletz & Taylor).

Squadron Officer School

The first level of PME for officers is Squadron Officer School (SOS). It is an intensive, 8 1/2 week program whose educational philosophy emphasizes professional development for officers whose primary responsibility is force employment. The key attributes of these officers should be the ability to lead and the ability to communicate. Four curriculum areas - officership, force employment, leadership, and communications skills directly support the SOS mission, objectives and philosophy (AU Catalog, 1982-1983). PME at this level:

> Seeks to deepen officers competencies in their primary specialties, i.e., to teach them the latest management techniques in training, maintenance, supply, fire control, etc., and to prepare them for the greater leadership and responsibility involved (Taylor, undated, p.21).

At SOS, basics such as writing, speaking, techniques of research, etc., are stressed. Students also become familiar with doctrine and elementary tactics (Pittman).

"The emphasis at this level, again, is on imparting techniques and military doctrine rather than generating independent thinking and analysis" (Taylor, undated, p. 21).

Air Command and Staff College

Air Command and Staff College (ACSC) is the intermediate level Air Force PME program. It is 40 weeks long and the AU Catalog notes its mission is "to enhance the professional knowledge, skills, and perspectives of mid-career officers for increased leadership roles in command and staff positions." Since ACSC is the highest level of PME that most officers will attend, it has traditionally focused attention "on bringing all of them to a uniform level of staff competence and to a common understanding of the principles of military leadership and command of forces in the field" (Taylor, undated, p. 23). The four curriculum areas of ACSC are Staff Communications and Research, Command Leadership and Resource Management, National Security Affairs, and Warfare Studies. At this level of PME there is a shift in emphasis away from "training," towards "education".

> As the officer progresses from relatively technical jobs to those of broader scope, his basic skills retain their importance, but require refinement. Writing ability is channeled into the distinctive formats and styles of the staff paper, the talking paper, and military correspondence. An understanding of Air Force organizations--their form, purposes, and procedures -- becomes necessary... Study of tactics and doctrine expands and deepens. The specific focus of this type of knowledge will vary depending upon the individual's assignment--whether his duties are on a staff or in operations, in the field or at a headquarters (Pittman, 1980, p.25).

National Security Affairs deals with US national security policy and regional studies, i.e., global perspectives. Warfare Studies covers military theory and history, and the types of warfare. Additionally, a sizeable number of officers are sent each year to attend intermediate level professional military education at other institutions, i.e., the Armed Forces

Staff College, the Army Command and General Staff College, the Naval War College (Command and Staff Course), the Marine Corps Command and Staff College, the Royal Air Force Staff College, the Canadian Forces Staff College, and the German Armed Forces Staff College (Dorger).

Air War College

Senior level PME is provided by the Air War College. The mission of the Air War College is to prepare select officers for key command and staff assignments where they have responsibility for developing, managing, and employing air power as a component of national security (AU Catalog). It is assumed at the senior level PME that students already have acquired the specific skills of the various professions:

> Thus, military officers are thought to know the intricacies of deploying, operating, and maintaining the weapons systems of their various services... Through curricula thought to be professionally unique, the colleges seek to provide them organized bodies of knowledge and enhanced perspectives on national defense in order to prepare them for high positions of public trust and responsibility (Taylor, undated, p.25).

It is at the Air War College that management skills and the ability to integrate multiple specialties in pursuit of a common objective, are developed to the fullest potential.

Again, a number of officers attend senior level professional military education at other institutions. Some of these institutions are the National War College, the Industrial College of the Armed Forces, the Army War College, the Naval War College (Naval Warfare Course), the Royal Air Force College of Air Warfare, the NATO Defense College, and the Canadian Forces National Defense College (Dorger).

Despite abundant praise coming from military and civilian leaders, and the many elaborate systems used to review, update, and modify the programs of the various PME schools, the services are constantly facing major challenges to their PME systems (from both inside and outside the military). The reason for this is the cost of providing professional military education in an era of austere defense budgets.

> In this type of austere environment, it always becomes difficult to maintain programs which invest in long-term growth and development in the face of immediate demands, where the consequences of failing to provide must be managed by the current decision - makers rather than their successors. In the case of truly long-term development, such as that represented by education, the difficulty is increased. Professional military education is such a long-term program. The inability to quantify or categorically identify the benefits derived from PME makes it particularly hard to convincingly articulate its value, especially in the highly pragmatic atmosphere of the panels and committees of the Air Staff Board Structure as they discharge their responsibility of "balancing" the Air Force budget (Pittman, 1980, p.1).

The services can not fund all of their legitimate requirements. The result has been a growing emphasis in recent years on reducing the costs associated with all officer educational programs, including professional military education (Dorger). There are some knowledgeable observers, though, who believe the services' need for professional military education is growing. For example, a former Assistant Secretary of Defense, Education, wrote recently:

> The challenge... is clear. Manifold factors compound and intensify the problems of continuing the thoughtful and purposeful development of the officer corps of the services. Knowledge obsolescence at an increasing rate, rapidly changing social patterns, and an increasingly sophisticated work environment demand that <u>even more... attention be devoted to the professional development and educational preparation of the officer of the future</u>... With the increasing responsibility which all officers must assume in the increasingly complex environment of the future, a telling argument is made for the <u>need to expand the base of attendance at professional military education</u> (Dorger, 1979, p.4).

The importance which the Air Force places on PME can be seen by the number of people (Air Force Officers) involved in the program (Appendix A). A total of 2,498 officers graduated from residence PME between August '81 and June '82. This figure was derived from data supplied by the Director of Evaluation of each PME school. An additional 18,828 graduated through correspondence and seminar courses (FY 82), and 39,882 officers were enrolled in the PME program at the end of FY 82. The correspondence and seminar course data were provided by SOS's Plans, Programs and Research Division, ACSC's Records Division, and AWC's Records, Reports, and Analysis Section. These figures do not include officers from the other branches of the service and civilians who attend Air Force PME.

Graduate Degree Education

AFIT Resident and NonResident Courses

In addition to the "generalized" PME common course content offered selected officers, more specialized education and training is available to fulfill the specific educational requirements of the Air Force. The bulk of these programs are administered by the Air Force Institute of Technology (AFIT), a subordinate agency of the Air University.

AFIT provides education to meet Air Force requirements in scientific, technological, managerial, and other designated professional areas (AU Catalog). It is through AFIT that officers receive fully funded graduate degree education.

AFIT courses are administered in one of two ways: resident AFIT programs and AFIT administered programs conducted on civilian campuses (Dorger). Students are sent to graduate school on civilian campuses for courses and areas of study which the AFIT residence programs don't cover. Most of these civilian campus programs normally last for one or two (exceptionally three) years at an accredited civilian institution to complete a master's degree or a doctorate.

According to AFMPC there were a total of 728 fully-funded, AFIT administered, officer graduate degree slots awarded in 1982. The areas of study, numbers of students assigned to each area, and the corresponding percentage each area represents of the total, are as follows:

Engineering	197	35%
International Area	149	26%
Technical Management	146	25%
Physical Sciences	64	11%
Social Sciences	9	2%
Communications	8	1%
Mathematics	0	0%
	573	100%

AFIT Administered Civilian Graduate Education

Prior to the 60's, civilian graduate education for Air Force officers was primarily in the scientific and engineering areas. This has been expanded to cover such areas as political science, economics, international relations, psychology, sociology, business administration, etc., (Taylor). According to Bletz and Taylor, civilian graduate schooling serves three main purposes.

Analytical skills and critical judgement. First, it teaches analytical skills and critical judgement different from traditional military practices. The military seems to lean toward learning through historical and inductive methodology, as opposed to deductive reasoning and speculation towards the future. The military is said to rely on field manuals, technical manuals, current statements of policy, etc. - wisdom based on lessons of the past.

Civilian graduate schools tend to use not only inductive reasoning, but deductive reasoning as well, the result being a mind that is conditioned to recognize the limitations of conventional doctrine applied to situations different from those in which it was developed. This brings to mind our experience in Vietnam where the military tended to view pessimistically threats to national security (the worst case syndrome), to report optimistically on military capabilities to get the job done (the can do syndrome), and to show progress toward achieving objectives by whatever measures their civilian masters established. These problems are a result, in part, from a less than adequate understanding of public policy or marginal and multivariate analysis and a lack of understanding of the country (Vietnam) itself - problems with which civilian graduate schools deal (Bletz & Taylor).

(2) Exposure of officers to civilian attitudes and opinions. Second, on-campus education also provides one of the few opportunities for Air Force officers to get a feeling first-hand for the attitudes and opinions of civilians on issues of common interest. Many military officers and their families are physically isolated from adjacent civilian communities. Air Force bases are designed to provide every conceivable service to its people.

> Physical isolation leads to cultural isolation: the horizons for most officers may end at the base bounderies and their interests will tend to become superparochial. For officers commissioned from the service academies the problem will be exacerbated by the lack of the leavening experience of four years of civilian undergraduate education... For an increasing proportion of officers, the experience of full-time graduate school on a civilian campus will represent the only opportunity for significant exposure to the pulse of the civilian society they serve - its problems, fears, ideals and aspirations (Bletz & Taylor, 1974, p. 258).

The converse is also true; those in academia are given a rare opportunity to meet and work with members of the military establishment, an experience that undoubtedly serves a positive cause (Bletz & Taylor).

Attraction and retention of better qualified officers. Third, graduate civilian schooling serves to attract and retain better qualified people. Most officers consider graduate education a vital and expected aspect of their career. Retention is a key factor in the cost-benefit analysis of officers whose graduate education has been provided by the government. We can assume greater productivity from officers with graduate education although this is difficult to measure (Bletz & Taylor, 1974, p. 256).

> Interviews with executives of four major corporations in 1973 yielded general agreement concerning the positive correlation between advanced degree holders and high performance (resulting in increased return to the corporation), with emphasis on the broadening effect of graduate education. There was general agreement, too, that graduate education is associated with lower personnel turnover (Bletz & Taylor, 1974, p. 256).

Data correlating fully-funded graduate civilian schooling and retention was scarce prior to 1973. In 1973, the Department of Defense administered a random sample survey questionnaire to 18,000 officers of the four services who had obtained at least a master's degree (Bletz & Taylor). Officers with "professional" degrees (i.e., chaplains, dentists, doctors, lawyers, etc.) were not included. The sampling plan sought a disproportionately large number of respondents in the lower grades. The response was approximately 70% and useable data base consisted of 11,568 officers. Positive career intent was relatively clear. Fifty-three percent responded that they intend to remain in the service as long as possible; 36% intend to stay for a minimal career and only 11% intend to leave the service before eligible to retire. It appears significant that 93% of the respondents believe their advanced degrees are useful in making them more effective officers. Officers responding to the OSD survey were motivated positively by graduate civilian schooling. This has important implications for the recruitment and retention of quality officers in the Volunteer Armed Forces (Bletz & Taylor).

Need for Civilian Graduate Education: Pros and Cons

Opinions differ widely as to whether or not officers need the amount of civilian graduate education they currently receive. Civilian critics would like to see the military isolated from society as much as possible. Military critics fear that civilian education for military personnel could have a contaminating effect, causing some to stray from the paths of duty. Cost-benefit arguments are raised, where costs are easily measured and benefits not so readily definable (Taylor). When one weighs these arguments against the unique purposes civilian graduate schooling serves, the need for graduate civilian education is compelling. The four primary reasons for civilian graduate education are: First, civilian graduate school teaches analytical skills and critical judgement different from traditional military practices; second, it provides one of the few opportunities for Air Force officers to get a feeling, first-hand, for the attitudes and opinions of civilians on issues of common interest, and vice versa; third, civilian graduate education serves to attract and retain better qualified officers; and fourth, it provides specialized education to meet Air Force educational needs not available in PME courses or resident AFIT programs. This need for civilian graduate education is especially true considering the expanded roles and ever increasing responsibilities of today's Air Force officer.

Other Graduate Degree Opportunities

In 1982, an additional 155 officers began pursuing graduate degrees in specialized areas, i.e., legal master's program, Air Force Academy sponsored degrees, the Senior Commander's Sponsored Education Programs, etc. Also, a total of 131 officers attended education in industry (IBM, etc.).

Officers may fulfill graduate degree requirements by enrolling in programs cosponsored by civilian colleges and universities and some of the professional military educational institutions. In these programs, students at

the military institution take courses and meet requirements of the cooperating civilian institution. Also, an important number of officers choose to complete their advanced degrees on their off duty time and at their own expense, with some assistance through military and Veterans Administration sponsorship (Bletz & Taylor).

Other Non-AFIT Specialized Education Programs

There are numerous other specialized education programs available to the Air Force through non-AFIT sources. Examples would be the Defense Systems Management School which prepares Air Force officers for future executive positions in systems management and acquisition, and several specialized courses at the Leadership and Management Development Center (Dorger).

Each year there are more advanced specialized education slots than there are intermediate and senior level PME slots combined. These programs are essential in providing Air Force officers with needed academic knowledge. Continuing education courses are also available through the Air Force. They are used to prevent the knowledge learned in the graduate degree programs and PME from becoming obsolete. AFIT conducts such courses in residency and through cooperating civilian institutions (Dorger).

The Air Force conducts numerous training programs which differ from the educational programs "primarily in their scope and emphasis on skills, as opposed to knowledge" (Pittman, 1979, p. 49). One can appreciate the size of the Air Force training effort when one considers the fact that about 5000 officer training slots are available each year in various basic training programs, and an additional 1500-2000 slots are available each year in advanced functional training courses.

The element of experience in an officer's professional development process is administered by the Air Force personnel system through the Career Management Program. Its purpose is to "provide the Air Force with a sufficient number of qualified officers available to assume positions of responsibility by developing the capabilities of individual officers to handle increasingly more challenging responsibilities" (Dorger, 1979, p.50).

Comparison to Industry

In order to get a feel for how the Air Force compares to industry on the subject of the professional education of its people, information from four defense related corporations is provided here. The four corporations that will be discussed are McDonnell Douglas Corporation, The Communications Satellite Company (COMSAT), the BDM Corporation and the Boeing Aircraft Corporation. These four companies were chosen for their prominence in the defense and aircraft industries.

McDonnell Douglas Corporation

According to Mr. Bill Johnson, (1983) Training Representative, Personnel Training, McDonnell Douglas will reimburse any of its employees a portion of the cost of college courses. The courses must be job related, and a grade of C or better is necessary to receive reimbursement. Should a person decide to pursue an undergraduate degree, each course cost is reimbursed 60% and the employee is allowed $20 for books. Upon completion of the degree an additional 15% of the total tuition is reimbursed. The same holds true for anyone wishing to pursue a graduate degree, the only difference being that instead of receiving an additional 15% reimbursement of the total tuition upon completion of the degree, an employee is awarded an additional 40%, for a total of 100%. Any employee wishing to pursue a doctorate will receive 100% reimbursement up front. For anyone wishing to pursue a college degree with reimbursement, the curriculum must first be approved.

Engineers who wish to acquire an MBA must have a masters in engineering or five years experience as a supervisor (there are exceptions to this policy).

Basic adult education is another program in which McDonnell Douglas will help pay for costs (not a college credit program). This program consists of remedial training, technical training and obtainment of high school diplomas. Under Basic Adult Education, the employee is reimbursed 100% of whatever costs are incurred.

In the separate category of Skill Improvement, 60% of costs is reimbursed for individual courses which are job related.

Between 1 July 1982 and the end of March 1983, 596 persons wishing to obtain a college degree received curriculum approval, and 55 employees had some sort of curriculum approved under Basic Adult Education (Johnson).

The Communications Satellite Company (COMSAT)

COMSAT also reimburses employees for educational degrees. This is available to everyone and is considered a benefit. An executive marked for an important promotion is sent out to attend an advanced management program at such schools as Harvard, MIT, etc. This only averages about one person per year. Additionally, with an individual managers approval, an employee may attend an external seminar. In 1982, out of a total population of 2,705 people, COMSAT spent $165,000 on education (an average of $61 per employee). Ten percent of COMSAT's employees availed themselves of educational assistance, 25% of which took two or more courses at one time (Ramsdale, 1983).

The BDM Corporation

This company offers professional services in research, experiments, analyses, design and tests in such areas as defense, communications, energy, environment, transportation and public policy. Major General W.R. MacDonald, USAF (Ret.) Corporate Vice President of BDM, states:

> To further enhance our success through the continued technical and management education and training of our professional staff, we have strongly supported the personal growth of our people through a combination of education and training programs. All permanent, full time employees are eligible to receive 100 percent reimbursement for the cost of tuition, books, and related fees associated with attending courses at college and universities. During 1982, 301 BDM personnel attended 525 courses leading to graduate degrees (1983).

Out of an estimated BDM population of 2300 employees, approximately 18% pursued graduate degrees in 1982 (employees who receive fully-funded education incur no obligations).

In addition to full-time, fully-funded education, BDM employees may attend short courses, seminars, and symposia which will enhance their skills or broaden their knowledge in a particular interest area.

Finally, BDM has developed a program similar, in some respects, to Air Force PME. As General MacDonald explained:

> The BDM style of management makes many demands, especially on relatively new people at the middle management level. Rapid growth, plus the dynamics of our unique matrix management organizational structure, have demanded an effective, systematic program to impart BDM management expertise to newer managers. To meet this demand, BDM has developed an in-house, management development system which trains professional personnel in various aspects of management... Additionally, BDM sent seven of its personnel to special management training courses at Harvard University, Psychological Associates, etc, in 1982 (1983).

The Boeing Aircraft Corporation

Between July 1, 1981 and August 31, 1982, Boeing funded a total of 12,570 employees pursuing graduate (3,328 masters, 61 PhDs) and undergraduate degrees (6,932), and individual courses (2,249). This figure represents approximately 14% of a total Boeing population of 90,000 persons (3.8% pursued graduate degrees). During this period, 114 individuals received graduate degrees (113 masters, 1 PhD) and 92 received undergraduate degrees, for a total of 206 (Gayton, 1983). Also, many employees develop their managerial skills in the Boeing Management Development System. Corporate policy states that:

Following are the eight key programs which comprise the overall management development system, and their respective participation levels: Pre-Management ('80-1500, '81-824), Basics of Supervision ('80-1066, '81-447), Management for excellence ('80-244, '81-185), Senior Boeing Management Seminar (120 participants per year), Program Management ('81-57), Aerospace Industry Manufacturing Seminar (40 participants per year), Executive Program ('80-65, '81-13, 5 military participants each year), and Sloan Fellowships (50 participants over the last 20 years). Also, Management Development organizations within the major operating organizations provide for a wide range of management training operations. These programs fall in the general areas of One-hour Management Skill Courses, Functional and Cross-Functional Programs, and Outside Short Courses and Seminars. Finally, Boeing has the Expo Program, designed to identify, early in their careers, people who have high potential for eventual promotion to executive level responsibilities (Niven).

It appears that these four defense related industries place as much emphasis on the professional education of its employees, if not more, than does the Air Force. A figure for the total number of Air Force officers pursuing graduate degrees in 1982 was not readily obtainable. With 728 new graduate degree slots started in FY 82, and graduate degree programs lasting normally two years, not more then 2% of the entire Air Force officer corps can be involved in pursuing a fully-funded graduate degree at any one time (.72% of the entire Air Force officer corps began pursuing graduate degrees

Summary

Thus far we have looked at: The need for professional education for Air Force officers; professional military education; AFIT administered graduate degree programs and the various other educational programs available to officers, and a comparison of Air Force professional education to industry. It is evident that a considerable amount of money is being spent on officer professional education by the Air Force. This trend is also apparent in industry. While there is considerable intuitive justification for these programs, there is a scarcity of hard evidence to support these expenditures. At the Leadership and Management Development Center there are data which can be used to explore the interactions and effects which PME and graduate education might have on officers in the areas of supervisory and management skill.

METHOD

In an attempt to determine what influence PME and civilian graduate school has on the supervision and management abilities of officers, an analysis was conducted to measure how subordinates view their officer supervisors on such matters as Management and Supervision, Supervisory Communications Climate, Job Related Satisfaction, and a host of other factors (Appendix B). The data within the Organizational Assessment Package (OAP) data base, used for this study, contains survey information collected since January 1979 by the Air Force Leadership and Management Development Center (LMDC). The 109 question survey was designed by the Air Force Human Resources Laboratory to aid LMDC in its mission to: (a) provide management consulting services to Air Force commanders upon request, (b) to provide leadership and management training, and (c) to conduct research on Air Force systemic issues with information within the accumulated data base (Hendrix & Halverson, 1979).

Administration of the survey is the first step in the consultation process. The survey is given to a stratified random sample of the organization to which LMDC has been invited. The results of the survey are an important feature in the assessment of the organization. The results are handled in a confidential manner between LMDC and the client. After approximately five to six weeks for analysis, feedback of data is then provided to commanders and supervisors within the organization.

When specific problems are revealed, a consultant and the supervisor develop a management action plan designed to reduce the problem at that level of the organization. Within six months, the consulting team returns to readminister the survey instrument as a means to help assess the impact of the consulting process.

The data from each consulting effort are stored in a cumulating data base for research purposes. These data are aggregated by work group codes developed for this instrument. The data may be recalled by demographics such as personnel category, age, sex, Air Force Specialty Code (AFSC), pay grade, time in service and educational level. Through factor analysis, the 93 attitudinal items are combined into 24 measures which cover job content, job interferences, and various types of supervisory and organizational dimensions.

Using the data from the LMDC data base, several notions about the impact of PME and formal education can be tested. In general, the purpose of this study is to analyze the perceptions of subordinates of officers across key supervisory dimensions to determine the impact of various levels of PME and formal education. To reduce maturational impact, time in sevice will be used as a covariate. Specifically, the following null hypotheses were tested by this study:

1. There will be no significant differences in subordinate mean responses across the levels of PME.

2. There will be no significant differences in mean responses of subordinates whose supervisors have a bachelors degree (as highest level of education completed), vs those whose supervisors have acquired either a masters or doctorate.

3. There is no significant interaction between level of PME and level of degree.

To test the null hypotheses, an analysis of covariance (ANCOVA) was performed (ANCOVA tests main effects and interaction effects controlling for a covariate) using a 2 (level of college degree obtained) X 4 (level of PME completed) factorial design. Differences between/among the various cells are considered statistically significant at or below the .05 alpha level of

significance. This establishes a 95% confidence level that the null hypothesis will not be rejected in error. The effect of time in service was made a covariate, and thus factored out. Medical doctors were excluded from the study due to the fact that they usually identify themselves as holding a doctorate degree during survey administration.

The first independent variable, level of college degree obtained, consists of 2 levels: (a) officer supervisors who hold a bachelors degree and (b) officer supervisors who hold a graduate degree. This study compares the perceptions, as indicated by overall mean responses, of subordinates of officers grouped into these two categories.

The second independent variable, level of PME completed by officers consists of 4 levels: (a) no PME, (b) Squadron Officer School, (c) Intermediate Service School and (d) Senior Service School. Comparisons are made of the overall mean responses of subordinates of officers who have completed these various levels of PME.

In addition to investigating these main effects by level, this research determines any interaction effect on each of the OAP factors selected of the two independent variables (level of education and level of PME) operating together, as distinguished from the main effect of each independent variable.

Twelve dimensions (factors and items) measured by the OAP were selected for the study. The selection was based on the dimension's relationship to the purported benefits of the various types of education. The dimensions are further defined at Appendix B and depicted graphically at Appendix C.

Subjects

The selected sample for this study includes all officers with subordinate workgroups within the LMDC data base from 1 Oct 1980 through 1 Jan 1983. While the selected statistical procedures from the Statistical Package for the Social Sciences (Nie, Hull, Jenkins, Steinbrenner, Bent, 1975) use differing treatments for missing cases, the subject pool by category is presented in Table 1.

TABLE 1
Officer Sample By Category

	PME				
Education	NONE	SOS	ACSC	AWC	TOTAL
Bachelors	224	251	156	76	707
Graduate	50	222	449	310	1031
TOTAL	274	473	605	386	1738

Results

A total of 12 dependent measures were used in the analysis of each of the hypotheses. These measures were chosen for their representativeness as supervisory and management indicators.

Null Hypothesis 1: There will be no significant differences in subordinate mean responses across the levels of PME which their supervisors have completed. Null Hypothesis 1 was rejected in 10 of the 12 factors and variables.

A summary of the significant differences are provided in Table 2. A detailed statistical presentation is provided in Appendix B, Tables 3 through 12.

TABLE 2
Summary of Significant Main Effects On Level of Professional Military Education

Factors	Items
Job Motivation	To what extent do you feel accountable to your supervisor in accomplishing your job?
Task Autonomy	My supervisor performs well under pressure.
Management and Supervision	My supervisor explains how my job contributes to the overall mission.
Supervisory Communications Climate	When I need technical advice, I usually go to my supervisor.
Organizational Communications Climate	
General Organizational Climate	

The two variables that reflect no significant difference are Job Related Satisfaction (Table 13) and Pride (Table 14). It is apparent that those with higher levels of PME are rated more positively on supervisory dimensions by their subordinates.

Null Hypothesis 2: There will be no significant differences in mean responses of subordinates whose supervisors have a bachelors degree, (as highest level of education completed) vs those whose supervisors have acquired either a masters or doctorate. The only variable that revealed a significant main effect was Job Satisfaction [$F(1, 8) = 7.85$, $p. \leq .05$]. In this case, the subordinates of those with graduate degrees shared greater Job Satisfaction (Table 13, Figure 11). However, the trend across all other dependent variables, as portrayed by Figures 1-10, 12, shows a slight (not significant) edge to those with graduate degrees.

Null Hypothesis 3: There is no significant interaction between level of PME and level of degree. Of the 12 selected dependent variables, only one produced a significant interaction. The Item, "When I Need Technical Advice, I Usually Go To My Supervisor," was found to produce an interaction [$F(3, 8) = 2.93$, $p. \leq .05$]. The data is presented in Table 12 and depicted in Figure 10.

The only variable that showed no significant main effects was Pride (Table 14). It is noted that the trends once again appear to favor advanced education and PME, although not significantly (Figure 12).

Finally, as suspected, the variable "Time in Service" that was used as a covariate to eliminate its effect on the findings, was significant in all cases (Tables 3 - 14).

DISCUSSION

Overall, the data shows that officer's professional military education has an extremely positive relationship with the perceptions of their subordinates on many key supervisory measures. PME is significantly positive in 10 of the 12 measures chosen for this study.

Only one measure, Job Related Satisfaction, indicates that graduate school has a significantly positive effect. Apparently, subordinates whose supervisors had obtained either a masters or doctorate degree seemed to have more job satisfaction. Additionally, there is a trend across all the data in favor of graduate school, though not significant. This can be seen in Figures 1-12.

Interactions turned out to be, for the most part, as expected. On the item concerning technical advice, graduate degrees appear to provide officers the knowledge necessary for them to answer technical questions across the board. PME does not have much of an effect, except that having no PME and no graduate education leaves the supervisor unable to field technical questions with much proficiency. Normally, we would have expected to see relatively parallel lines between the two groups. This is not the case on technical advice.

CONCLUSIONS

From the discussions and analyses presented in this study, the author believes a case has been made to support several conclusions. First, the Air Force exists to serve as one of several instruments of American foreign policy. It serves as a deterrent, hopefully at all levels, to aggression aimed by adversaries against the United States and its allies. Its very existence allows the United States an extra amount of leverage to influence events in a way favorable to the national security interests of the United States and its allies, and, if all else fails, the American military establishment must have a war-fighting capability, second to none, to protect vital national interests.

> The key to both deterrence and war-fighting capability is unit operational readiness. The military establishment is not just another American institution and its leaders are not simply members of another profession ... military officers carry from the time of commission, extraordinary responsibilities, endure unusual hardships, receive no additional compensation for longer and harder work, and bear unlimited liability extending to the risk of life itself. Military units train and fight only as well as they are led by their officers (Taylor, undated, p. 44).

The volatile and constantly changing international scene, and the new technological age in which the military must operate, presupposes a military that is well educated and trained to meet the many challenges facing it. As the world environment increases in complexity, the 1980's will put even greater demands on officers. Officer effectiveness will be dependent on the amount and quality of education and training invested in these officers. "Higher education for the military professional in both civilian institutions and service schools is probably the best way to develop the intellectual sensitivity and analytical insights he/she will need" (Sarkesian, 1979, p. 45).

Second, industry, like the Air Force, considers the development and maintaining of a highly-educated and trained staff an essential element for a quality professional organization, as indicated by a sampling of four defense related firms. Between 1 July 1982 and the end of March 1983, 596 McDonnell

Douglas employees wishing to obtain a college degree received curriculum approval, and 55 employees had some sort of curriculum approved under Basic Adult Education. In 1982, out of a total COMSAT population of 2,705 people, $165,000 was spent on education (an average of $61 per employee). Ten percent of COMSAT's employees availed themselves of educational assistance, 25% of which took two or more courses at one time. Out of a total BDM Corporation population of not less than 2300 employees, approximately 18% pursued graduate degrees in 1982 (employees who receive fully-funded education incur no obligation). Between July 1, 1981 and August 31, 1982, 14% of a total Boeing Aircraft Corporation population of 90,000 employees pursued some sort of academic degree. 3.8% of the Corporation was pursuing a graduate degree. With 728 new graduate degree slots started in FY 82, and graduate degree programs lasting normally two years, approximately 2% of the entire Air Force officer corps can be involved in pursuing graduate degrees at any one time (.72% of the entire Air Force officer corps began pursuing graduate degrees on a full-time basis in FY 82). These figures indicate that industry places high, if not higher, emphasis on professional education than the Air Force.

Third, responses to LMDC's OAP survey, as determined by an analysis of co-variance, indicate that service schools and graduate education may help prepare Air Force officers to be better managers and supervisors. Ten of the twelve factors chosen showed PME vs. no PME as having had a significantly positive effect on the perceptions and attitudes of subordinates on managerial and supervisory issues. One of the factors showed the Masters-Ph.D. combination as having had a significantly positive effect. Overall, the responses to the OAP survey strongly support PME as being a positive and worthwhile influence on Air Force officers.

Finally, the importance of professional education for Air Force officers has been shown. The Air Force places heavy emphasis on training and scholarship. This is seen by the number of officers actively involved in PME and other educational programs. PME is the most widely used tool for officer professional development, as participation levels indicate. Rapid advances in technology and constant changes in the international political arena assure that the need for PME and other educational programs shall not diminish. If anything, the need will increase, particularly in the area of graduate education. Information supplied by four defense-related corporations indicate their understanding of the need to keep abreast of current knowledge and information. Taking this into consideration, the current level of Air Force emphasis on graduate education (2%) may be low. Although cost and manpower requirements may seem prohibitive to increasing graduate education expenditures, the Air Force emphasis on PME reveals the desire for a well trained and educated officer. What appear to be mostly costs now, in the area of education, could very well reap enormous benefits in the future.

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APPENDIX A

Air Force Officer PME Participation Levels

RESIDENCE PME

SOS

Total graduated (August '81 - May '82)	1900

ACSC

Total graduated (August '81 - June '82)	434

AWC

Total graduated (August '81 - May '82)	164
Total residence PME graduated	2498

NON-RESIDENCE PME FISCAL YEAR 1982

SOS

Correspondence

Total graduated	2,479
Total enrolled at end of FY '82	24,824

ACSC

Correspondence

Total graduated	9242
Total enrolled at end of FY '82	9377

Seminar

Total graduated	6022
Total enrolled at end of FY '82	738

AWC

Correspondence

Total graduated	336
Total enrolled at end of FY '82	1927

Seminar

Total graduated	749
Total enrolled at end of FY '82	3016
Total non-residence PME graduates	18828
Total non-residence PME enrolled at end of FY '82	39882

APPENDIX B

OAP Factors and Variables

Table 3

Z807 Job Motivation Index

Analysis of Means

Mean (Count)	NONE	SOS	ACSC	AWC
Bachelors	111.01 (231)	118.35 (252)	121.93 (159)	127.73 (75)
Graduate	119.94 (54)	119.70 (228)	121.97 (456)	136.77 (313)

Analysis of Variance

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	41417.450	4	10354.363	4.434	0.001
Degree	1428.598	1	1428.598	0.612	0.434
PME	37866.540	3	12622.180	5.405	0.001
2-WAY INTERACTIONS					
Degree PME	5327.863	3	1775.954	0.761	0.516
Covariate					
Time in Service	97245.067	1	97245.067	41.643	0.000

Table 4

Z813 Task Autonomy

Analysis of Means

Mean (Count)	NONE	SOS	ACSC	AWC
Bachelors	4.19 (238)	4.28 (257)	4.45 (160)	4.70 (76)
Graduate	4.40 (55)	4.37 (229)	4.52 (458)	4.89 (313)

Analysis of Variance

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	50.665	4	12.666	12.143	0.
Degree	3.199	1	3.199	3.067	0.080
PME	40.851	3	13.617	13.054	0.000
2-WAY INTERACTIONS					
Degree PME	1.053	3	0.351	0.337	0.799
Covariate					
Time in Service	45.413	1	45.413	43.537	0.000

Table 5

Z818 Management and Supervison

Analysis of Means

Mean (Count)	NONE	SOS	ACSC	AWC
Bachelors	4.70 (237)	5.18 (248)	5.21 (158)	5.37 (76)
Graduate	4.87 (51)	5.14 (226)	5.30 (456)	5.42 (311)

Analysis of Variance

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	29.440	4	7.360	6.470	0.000
Degree	0.383	1	0.383	0.337	0.562
PME	24.943	3	8.314	7.309	0.000
2-WAY INTERACTIONS					
Degree PME	1.428	3	0.476	0.419	0.740
Covariate					
Time in Service	62.791	1	62.791	55.199	0.000

Table 6

Z819 Supervisory Communications Climate

Analysis of Means

Mean (Count)	NONE	SOS	ACSC	AWC
Bachelors	4.37 (237)	4.74 (248)	4.80 (158)	4.88 (76)
Graduate	4.61 (51)	4.78 (226)	4.90 (456)	4.98 (311)

Analysis of Variance

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	19.603	4	4.901	4.118	0.003
Degree	2.329	1	2.329	1.957	0.162
PME	12.516	3	4.172	3.506	0.015
2-WAY INTERACTIONS					
Degree PME	0.838	3	0.279	0.235	0.872
Covariate					
Time In Service	44.967	1	44.967	37.785	0.000

Table 7

Z820 Organizational Communications Climate

Analysis of Means

Mean (Count)	NONE	SOS	ACSC	AWC
Bachelors	4.48 (224)	4.73 (251)	4.78 (156)	4.87 (76)
Graduate	4.59 (50)	4.83 (222)	4.80 (449)	4.93 (310)

Analysis of Variance

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	11.227	4	2.807	2.968	0.019
Degree	1.104	1	1.104	1.167	0.280
PME	8.260	3	2.753	2.911	0.033
2-WAY INTERACTIONS					
Degree PME	0.511	3	0.170	0.180	0.910
Covariate					
Time In Service	23.404	1	23.404	24.744	0.000

Table 8

Z824 General Organizational Climate

Analysis of Means

Mean (Count)	NONE	SOS	ACSC	AWC
Bachelors	4.67 (224)	4.94 (251)	5.08 (156)	5.16 (76)
Graduate	4.92 (50)	5.02 (222)	5.13 (449)	5.23 (310)

Analysis of Variance

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	15.264	4	3.816	4.058	0.003
Degree	1.895	1	1.895	2.015	0.156
PME	9.417	3	3.139	3.338	0.019
2-WAY INTERACTIONS					
Degree PME	0.844	3	0.281	0.299	0.826
Covariate					
Time In Service	39.706	1	39.706	42.225	0.000

Table 9

Z216 To What Extent Do You Feel Accountable To Your Supervisor In Accomplishing Your Job?

Analysis of Means

Mean (Count)	NONE	SOS	ACSC	AWC
Bachelors	4.94 (242)	5.16 (256)	5.33 (161)	5.66 (76)
Graduate	5.23 (54)	5.19 (231)	5.34 (460)	5.63 (316)

Analysis of Variance

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	44.885	4	11.221	9.779	0.000
Degree	0.463	1	0.463	0.404	0.525
PME	39.352	3	13.117	11.432	0.000
2-WAY INTERACTIONS					
Degree PME	2.737	3	0.912	0.795	0.497
Covariate					
Time In Service	37.794	1	37.794	32.937	0.000

Table 10

Z416 My Supervisor Performs Well Under Pressure

Analysis of Means

Mean (Count)	NONE	SOS	ACSC	AWC
Bachelors	4.72 (231)	5.31 (252)	5.30 (159)	5.57 (75)
Graduate	5.06 (54)	5.28 (228)	5.54 (456)	5.67 (313)

Analysis of Variance

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	37.363	4	9.341	5.609	0.000
Degree	3.805	1	3.805	2.285	0.131
PME	25.153	3	8.384	5.035	0.002
2-WAY INTERACTIONS					
Degree PME	4.821	3	1.607	0.965	0.408
Covariate					
Time In Service	132.012	1	132.012	79.275	0.000

Table 11

Z428 My Supervisor Explains How My Job Contributes to the Overall Mission

Analysis of Means

Mean (Count)	NONE	SOS	ACSC	AWC
Bachelors	4.38 (237)	4.78 (248)	4.97 (158)	4.84 (76)
Graduate	4.55 (51)	4.83 (226)	5.00 (456)	5.03 (311)

Analysis of Variance

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	22.436	4	5.609	3.695	0.005
Degree	1.492	1	1.492	0.983	0.322
PME	16.152	3	5.384	3.547	0.014
2-WAY INTERACTIONS					
Degree PME	1.459	3	0.486	0.320	0.811
Covariate					
Time in Service	66.926	1	66.926	44.085	0.000

Table 12

Z439 When I Need Technical Advice, I Usually Go To My Supervisor

Analysis of Means

Mean (Count)	NONE	SOS	ACSC	AWC
Bachelors	3.77 (237)	4.30 (248)	4.13 (158)	4.41 (76)
Graduate	4.32 (51)	4.20 (226)	4.24 (456)	4.14 (311)

Analysis of Variance

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	18.652	4	4.663	2.128	0.075
Degree	0.108	1	0.108	0.049	0.825
PME	17.772	3	5.924	2.703	0.044
2-WAY INTERACTIONS					
Degree PME	19.275	3	6.425	2.932	0.032
Covariate					
Time in Service	12.521	1	12.521	5.714	0.017

Table 13

Z822 Job Related Satisfaction

Analysis of Means

Mean (Count)	NONE	SOS	ACSC	AWC
Bachelors	4.92 (224)	5.08 (251)	5.28 (156)	5.17 (76)
Graduate	5.13 (50)	5.24 (222)	5.33 (449)	5.43 (310)

Analysis of Variance

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	10.207	4	2.552	3.593	0.006
Degree	5.572	1	5.572	7.846	0.005
PME	1.892	3	0.631	0.888	0.447
2-WAY INTERACTIONS					
Degree PME	2.239	3	0.746	1.051	0.369
Covariate					
Time In Service	51.862	1	51.862	73.026	0.000

Table 14

Z811 Pride

Analysis of Means

Mean (Count)	NONE	SOS	ACSC	AWC
Bachelors	5.08 (238)	5.21 (257)	5.42 (160)	5.19 (76)
Graduate	5.05 (55)	5.17 (229)	5.35 (458)	5.41 (313)

Analysis of Variance

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
MAIN EFFECTS	4.632	4	1.158	1.131	0.340
Degree	0.152	1	0.152	0.149	0.700
PME	4.597	3	1.532	1.497	0.214
2-WAY INTERACTIONS					
Degree PME	4.524	3	1.508	1.473	0.220
Covariate					
Time In Service	32.056	1	32.056	31.317	0.000

APPENDIX C

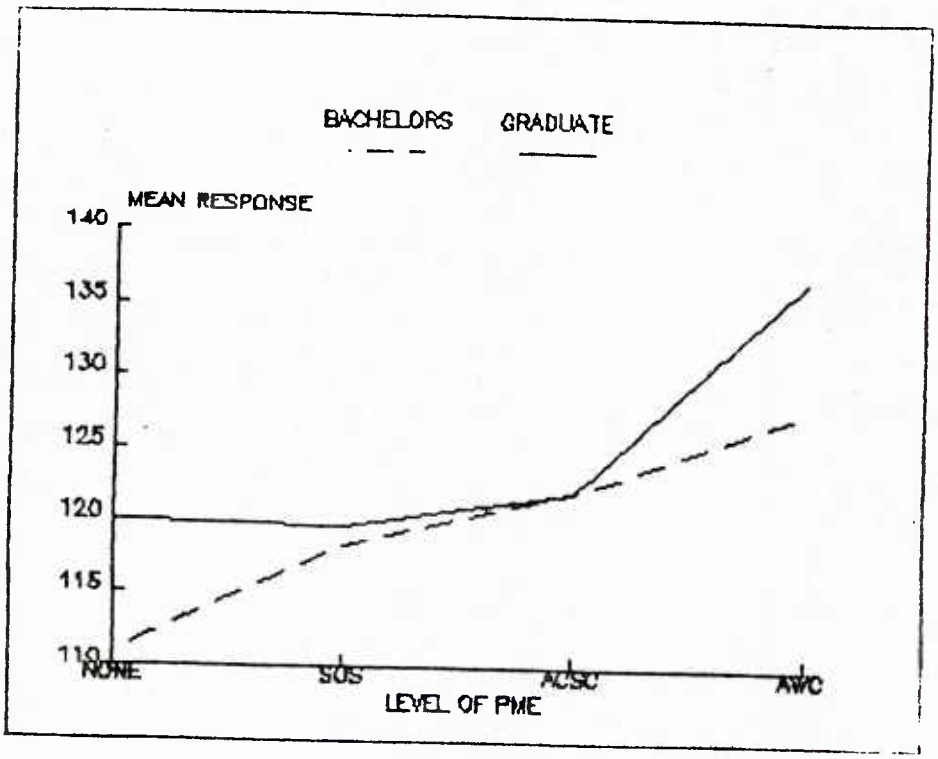

Figure 1. Comparison of the perceptions of subordinates of officers on Job Motivation.

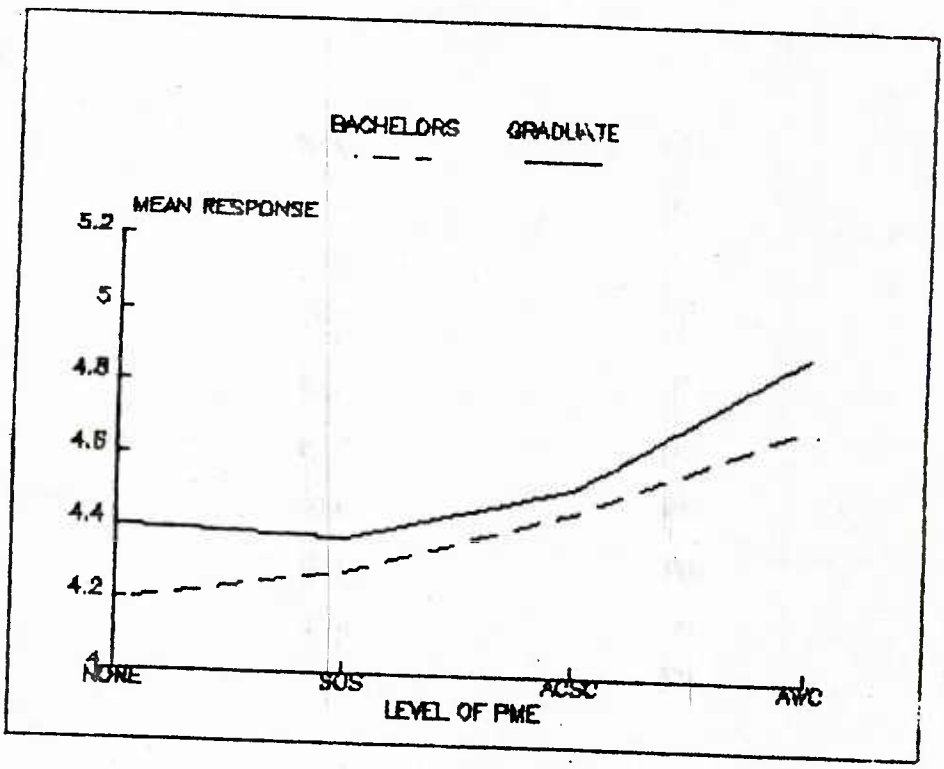

Figure 2. Comparison of the perceptions of subordinates of officers on Task Autonomy.

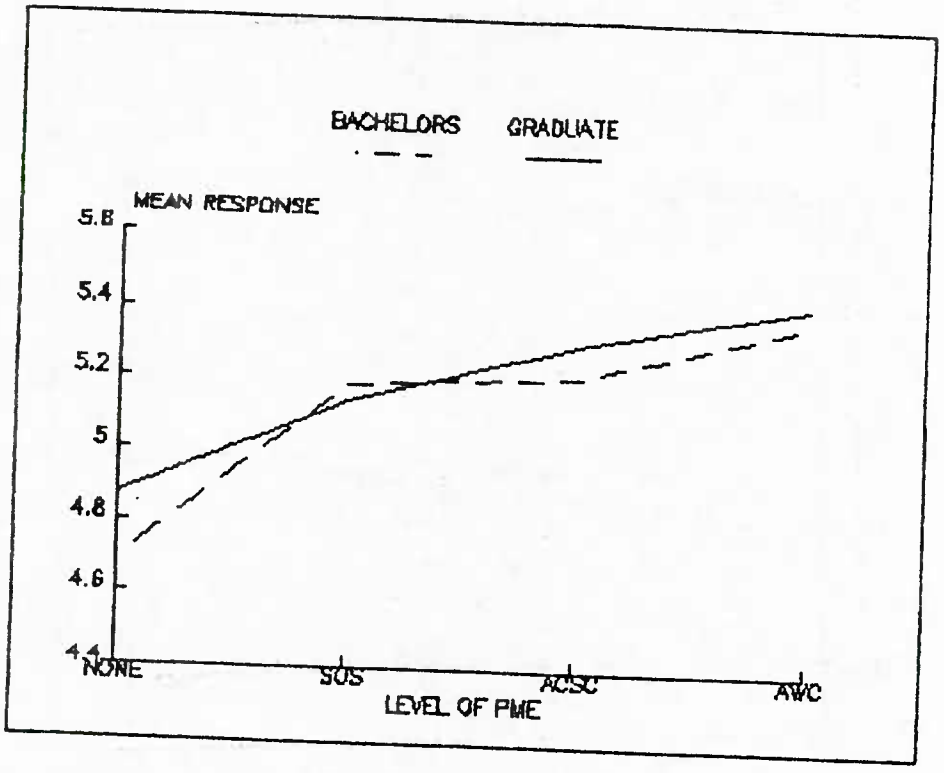

Figure 3. Comparison of the perceptions of subordinates of officers on Management and Supervision.

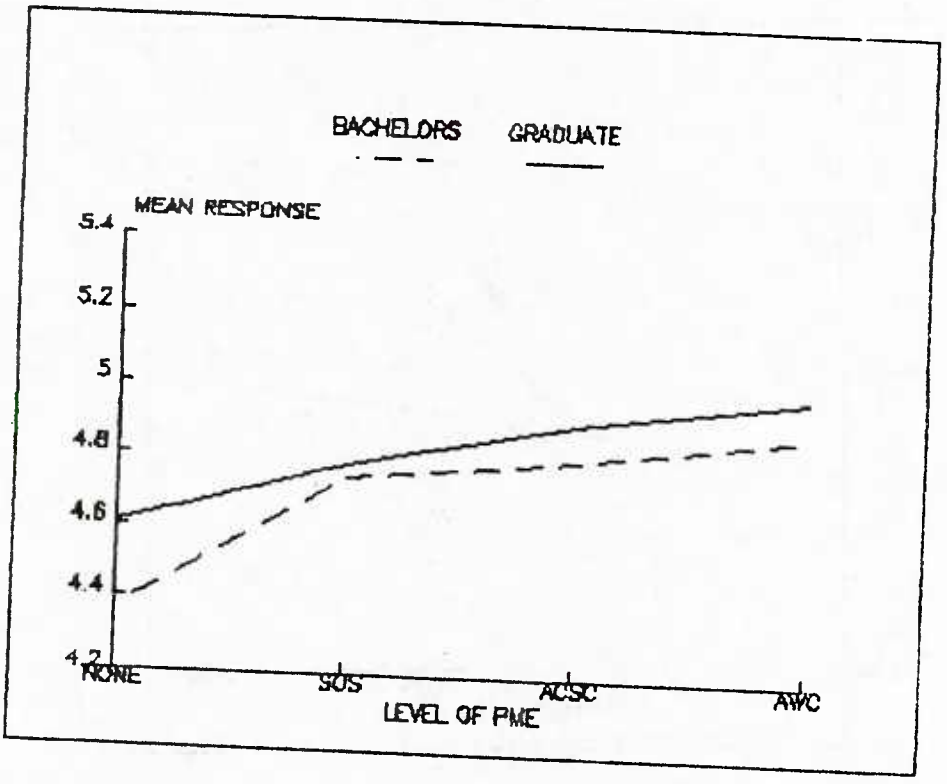

Figure 4. Comparison of the perceptions of subordinates of officers on Supervisory Communications Climate.

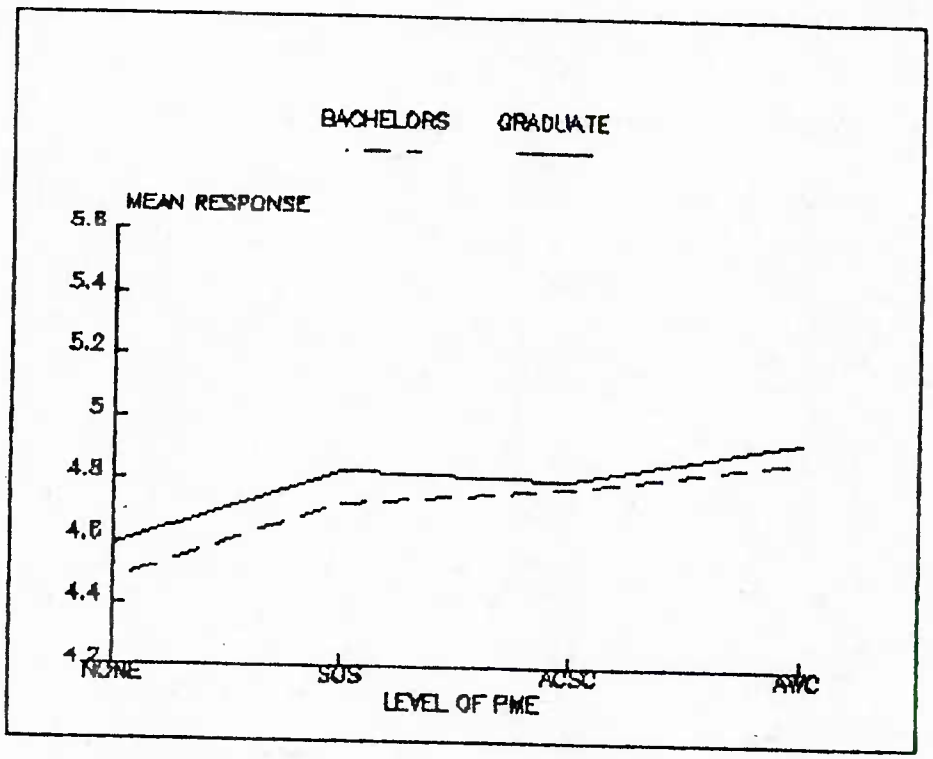

Figure 5. Comparison of the perceptions of subordinates of officers on Organizational Communications Climate.

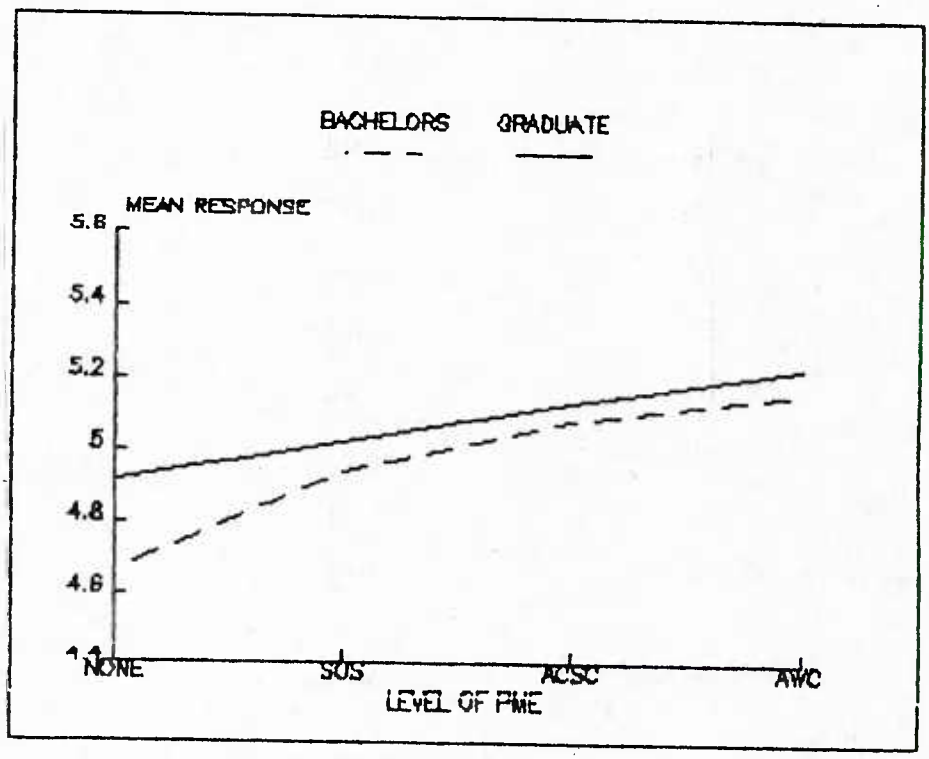

Figure 6. Comparison of the perceptions of subordinates of officers on General Organizational Climate.

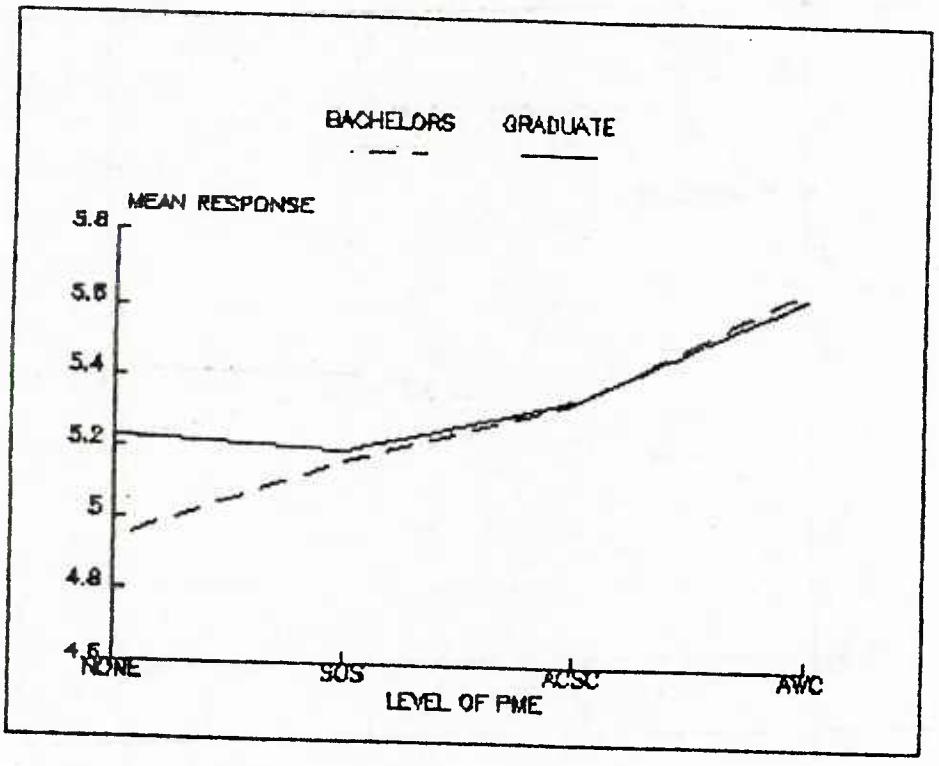

Figure 7. Comparison of the perceptions of subordinates of officers on Accountability To Supervisor.

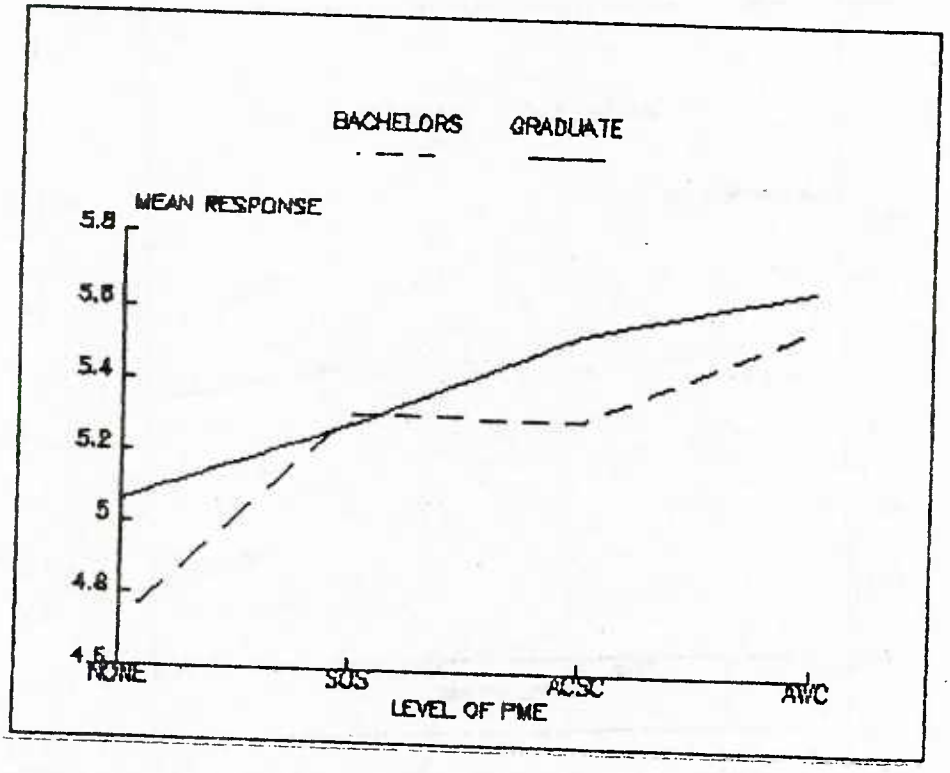

Figure 8. Comparison of the perceptions of subordinates of officers on My Supervisor Performs Well Under Pressure.

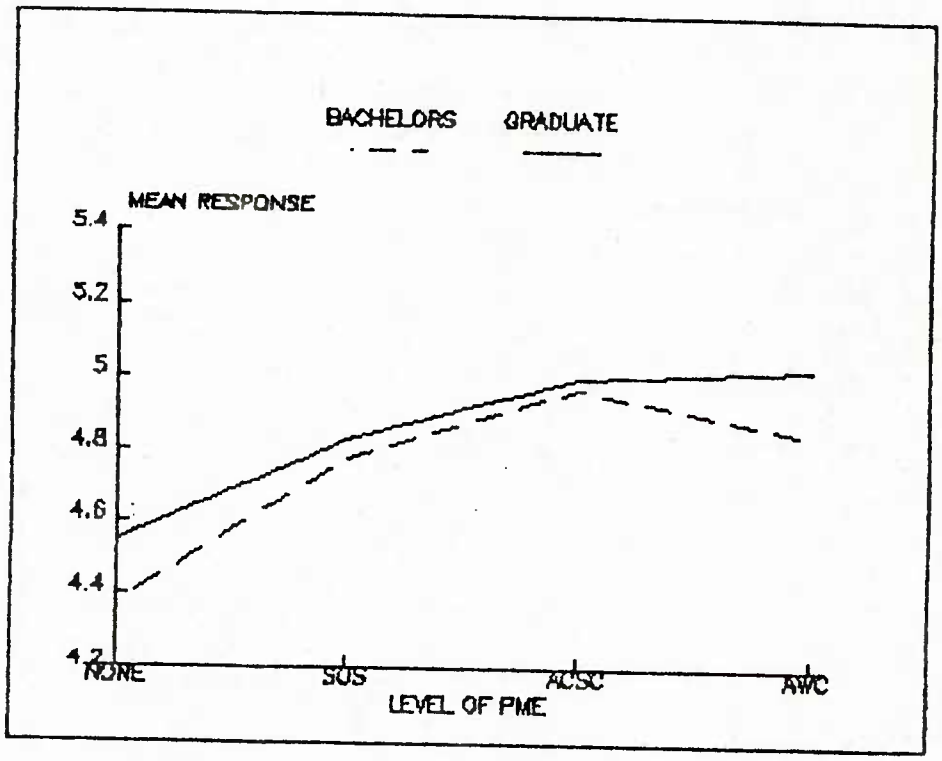

Figure 9. Comparison of the perceptions of subordinates of officers on My Supervisor Explains How My Job Contributes to the Overall Mission.

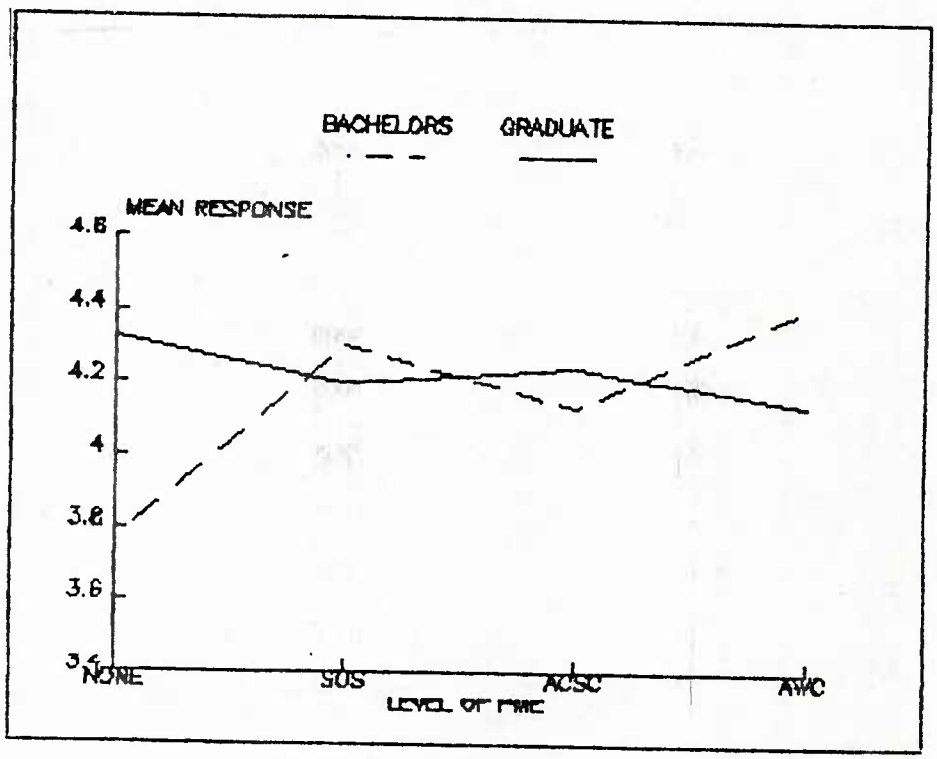

Figure 10. Comparison of the perceptions of subordinates of officers on When I Need Technical Advice, I Usually Go To My Supervisor.

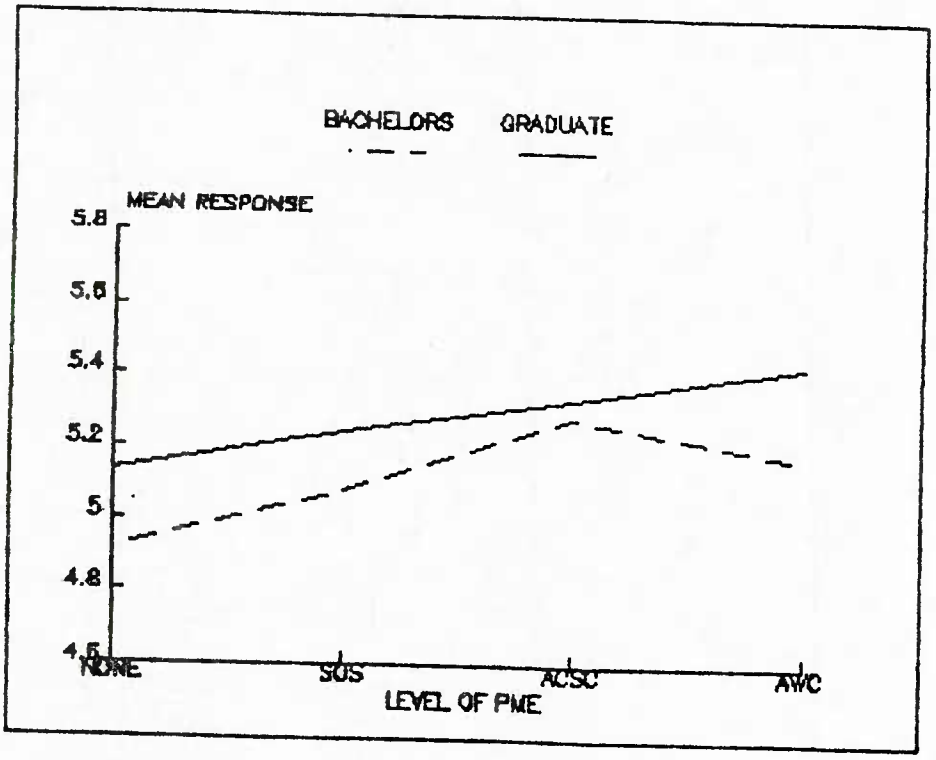

Figure 11. Comparison of the perceptions of subordinates of officers on Job Related Satisfaction.

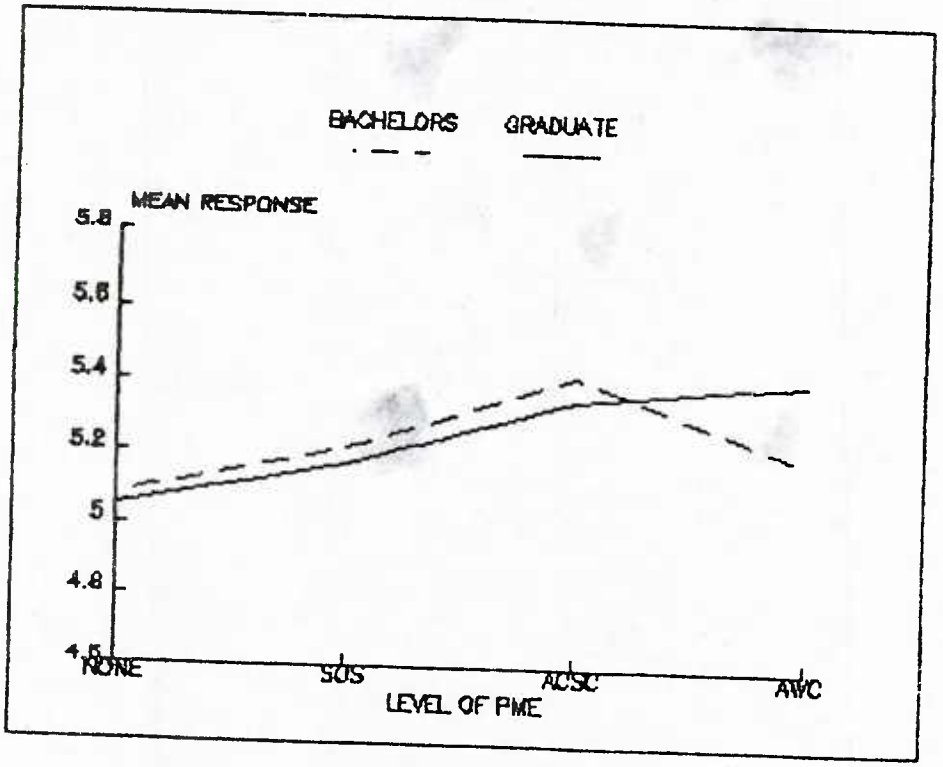

Figure 12. Comparison of the perceptions of subordinates of officers on Pride.