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**April 1997**

# **Operations Desert Shield/ Desert Storm:**

**Results from the 1992 DoD Surveys  
of Officers and Enlisted Personnel and  
Military Spouses**

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**OPERATIONS DESERT SHIELD/  
DESERT STORM:**

**RESULTS FROM THE 1992 DOD SURVEYS OF OFFICERS AND  
ENLISTED PERSONNEL AND MILITARY SPOUSES**

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# Executive Summary

## Introduction

To maintain efficiency and effectiveness, the Department of Defense (DoD) must be a responsive employer. As the military becomes more gender-integrated and more family-oriented, DoD must understand and plan for the needs of the changing Service force. To provide input for policies that relate to military families, the Defense Manpower Data Center (DMDC) conducted the *1992 Department of Defense Surveys of Officers and Enlisted Personnel*. The surveys were designed to provide an analysis of issues such as the impact of changing family structures, to guide updates of current policies to accommodate changing needs, and to assist in the development of new policies.

The 1992 surveys included active-duty personnel in all four military Services. They were based on stratified samples of 40,812 officers and 56,015 enlisted personnel, for a total of 96,827 Service members. Responses were received from 59,930 Service members (27,684 officers and 32,246 enlisted personnel). Response rates, based on the number of completed survey returns and the number of eligible members, were 71.6 percent for officers, 62.3 percent for enlisted personnel, and 66.3 percent overall. The stratified samples were drawn from four different sources:

- A longitudinal database consisting of a subsample from the 1985 survey sample,
- A sample of recruiters,
- A sample of active-duty members, and
- A sample of Active Guard/Reserve or Training and Administration of the Reserve (AGR/TAR) members.

The survey questionnaire gathered information on demographics, military background and lifestyles, deployments, retention and career intentions, dependents and child care issues, military compensation, benefits and programs, and family resources.

This report is the third in a series of five analyses based on the 1992 survey results. The objective of the report is to analyze barriers to individual and unit readiness for troops deployed during Operations Desert Shield/Desert Storm (ODS/S). Unit readiness has typically been measured using the Status of Resources and Training System (SORTS), which assesses unit readiness but does not incorporate the influence of outside factors (e.g., the family) on individual readiness. The 1992 surveys were intended to supplement measures of unit readiness used by the Joint Chiefs of Staff and studies by groups such as the Presidential Commission on Assignment of Women to the Armed Forces. The work of Kelley (1994) and others gave some insight into the influence of stressors associated with deployments on individual readiness and family well-being. Still, the body of literature does not adequately address such issues as whether certain groups have more difficulty responding quickly to alerts in general (and deployments such as the Gulf War in particular) or how separations affect Service members and their families.

Central questions that remain unanswered by previous studies include whether some of the Service members deployed in ODS/S were more likely than others to experience difficulty in responding quickly to recalls, alerts, or changes in work schedule, and whether some of the ODS/S deployed Service members worried more than others about their families while they were away on assignment. Based on responses to the 1992 surveys, this report describes the kinds of barriers to readiness that ODS/S Service members reported, and presents findings that can guide policy changes to reduce such barriers for the changing Service force.

## Analysis Methodology

A systematic approach was used for the analysis of the 1992 survey results: developing questions, determining descriptive statistics to test interrelationships among the survey variables, and constructing a series of multivariate models based on relationships identified by the descriptive tests. The questions to be addressed in this report were as follows:

- Among those deployed in ODS/S, were some Service members more likely than others to experience difficulty in responding quickly to recalls, alerts, or changes in work schedule in general (not specifically related to ODS/S)?
- Among those deployed in ODS/S, were some Service members more likely than others to experience deployment difficulties with ODS/S *specifically*?
- Among those deployed in ODS/S, did some Service members worry more than others about their families while they were away on assignment?
- Among spouses of those deployed in ODS/S, were some more likely than others to experience problems dealing with changes caused by the deployment?

Explanatory variables (developed from the survey responses) included the following: 1) individual, military, and family demographics; 2) whether emergency provisions were in place; 3) satisfaction with military life; 4) whether the spouse was upset with the ODS/S mobilization; and 5) other attitudinal variables that measured satisfaction with various aspects of military life. Simple descriptive tests (e.g., frequency tables and Chi-square tests) were used to explore the interrelationships among the explanatory variables themselves and the relationships between explanatory variables and dependent measures. A series of more complex multivariate models (i.e., regressions) were used to examine directional interrelationships between the explanatory and dependent variables. The objective was to provide information for DoD deployment programs and policies and thereby make individual Service members, as well as their units, more combat-ready.

## Findings

The following are highlights of the findings:

- More than half of the enlisted (53.7 percent) and officer (59.3 percent) personnel who were deployed during ODS/S had dependents.
- For both enlisted and officer personnel, those with dependents experienced more problems responding quickly to recall/alert than those without dependents. The one exception was for single

enlisted Service members with dependents. These individuals were no more likely to report difficulties in responding quickly than were married Service members without dependents.

- Officers with dependents were more likely to report problems responding to ODS/S than were officers without dependents. For enlisted personnel, however, single personnel with dependents and married personnel with a military spouse and dependents were no more likely to report problems than were enlisted personnel who were married to a civilian and had no dependents.
- With the exception of dual-military couples, Service members with dependents tended to worry more about their families while separated than did married Service members without dependents.
- Males were less likely to report difficulties in responding quickly to recall or alert than were females.
- In general, males reported more concerns about their families when separated than did females.
- Among enlisted personnel and officers, those with more education and higher pay were less likely to report difficulties with quick response.
- Among officers, those with higher levels of education reported fewer concerns about their families while they were deployed/mobilized.
- Service members who were in families with higher total incomes tended to report fewer concerns about their families while they were away from home.
- More experienced personnel (enlisted and officers) had an easier time coping with the ODS/S deployment. Higher ranking personnel were also less likely to indicate that they experienced problems in responding to ODS/S.
- For enlisted personnel, those who had higher levels of satisfaction with military life reported fewer concerns about their families while separated.
- The longer the advance notice given regarding deployment, the less likely the spouses of deployed Service members were to indicate problems associated with ODS/S.
- Spouses (both officers' spouses and those married to enlisted personnel) who reported that they were upset by the ODS/S mobilization and experienced high levels of stress as a result of ODS/S were more likely to report problems dealing with the deployment than were those who did not.
- When the job of the non-mobilized spouse was unaffected by the ODS/S deployment, the spouse was less likely to report problems dealing with changes created by the deployment.

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# Introduction

## Background

To maintain efficiency and effectiveness, the Department of Defense (DoD) must be a responsive employer. Toward this end, DoD periodically assesses the characteristics, behaviors, attitudes, values, expectations, career intentions, and satisfaction of military Service members and their families and identifies potential areas for improvements in personnel policy. As the military work force becomes more gender-integrated and more family-oriented, DoD must understand and plan for the needs of the changing force. Yesteryear's troops were predominantly single men; in contrast, today's volunteers consist of married men and women, mothers and fathers, dual-military couples, and single parents, as well as single men and women.

Because the military is no longer primarily single individuals, personnel policies, services, and programs must be offered to enable the changing military personnel to manage the burdens of both family life and the bearing of arms. Such policies and programs can contribute to recruitment, morale, readiness, performance, and personnel retention.

A variety of research studies have provided input for structuring DoD policies and programs. Many of those studies, however, have focused on the combat readiness of military units rather than individual readiness. Also, issues such as the influence of outside factors (e.g., the family) on the ability of Service members to respond quickly to recalls or alerts have not been adequately addressed. In addition, the deployment problems experienced by Service members and their families, particularly during crises such as the Persian Gulf War, have not been fully explored.

To provide further input on family policies (e.g., child care), the Defense Manpower Data Center (DMDC) conducted the *1992 Department of Defense Surveys of Officers and Enlisted Personnel*, which focused extensively on military families. Development of the surveys was coordinated through the Office of the Under Secretary of Defense for Personnel and Readiness (Personnel Support, Families & Education, Office of Family Policy, Support & Services). The surveys were administered to active-duty personnel in all four military Services. They included items on demographics, military background and lifestyle, deployments, retention and career intentions, dependents, military compensation, benefits and programs, civilian labor force experience, and family resources.

To aid in the dissemination and utilization of findings from the 1992 surveys, DMDC has published five topical reports. Other reports in this series address background and characteristics of military families, individual and family readiness for separation and deployment, child care, and the military as a career. This report presents findings concerning separation and deployment for the Service members deployed in ODS/S. The remaining sections of this introduction are a literature review, which describes issues surrounding ODS/S and earlier studies related to deployment and combat readiness, and a survey methodology section, which describes the development of the 1992 surveys.

## Literature Review

Operations Desert Shield and Desert Storm together comprised the largest showing of American military power since the Vietnam conflict. In the face of the invasion of Kuwait by Iraqi forces, American and other allied troops began to be deployed to the Middle East in August 1990 under the

auspices of Operation Desert Shield. The buildup of personnel and equipment continued over the next several months, culminating in the launching of Operation Desert Storm in late February 1991. After a period of heavy air assaults, ground troops finally began their offensive movement into Kuwait and Iraq, an effort that took only 5 days before the enemy was considered defeated.

Over the seven months of Operations Desert Shield/Desert Storm (ODS/S), more than a half million American servicemen and servicewomen were sent to the theater of operations. Although projections of the number who would become casualties in the event of war were generally quite high, in the final analysis 375 Americans lost their lives in turning back the Iraqis. Although any loss of life is tragic, the small number of casualties surprised even some experts who feared that a far greater number of lives would be lost.

With the advent of 24-hour and international video news sources, ODS/S may have been the most visible military operation in history. Americans were bombarded with stories covering every aspect of the mobilization, efforts to avoid a direct confrontation, the devastating accuracy of the air assault, and the rapid advancement of troops that brought the whole stalemate to a close. With all the media coverage, it is not surprising that the American people became more familiar with the Service members who make up their military and, in the process, some of the issues that confront the military.

Several demographic trends that occurred within the military following the transfer to an All Volunteer Force (AVF) were quite evident during ODS/S. For instance, there was (and continues to be) more emphasis placed on retaining military personnel for a longer period of time, and thereby building upon the steady base of the career force. Thus, the personnel deployed in ODS/S tended to be older than those in past mobilizations, in which there was a greater reliance on 17- and 18-year-old draftees. Also, a concerted effort had been made to enlist more women, and to allow them to serve in a wider variety of roles than had typically been the case in the past. Although the percentage of women was still relatively small compared to the *total* population of soldiers during ODS/S, their visibility was high because they served in a range of nontraditional occupations.

Any type of deployment of military personnel has the potential of separating children from their parents. With the older ODS/S force, however, this problem became more prevalent because more Service members had children. This situation was exacerbated when it was the mother who was sent overseas, particularly in the cases of single-parent or dual-military households. As stated by the Presidential Commission on the Assignment of Women to the Armed Forces (1992), "The American public and military faced the problems of deploying large numbers of single and dual-service parents for the first time during the Persian Gulf War." Some 32,000 children were separated from single-parent households during ODS/S deployment.

Another reality that was evident during the Gulf War was that being away from the front lines was no guarantee of safety. ODS/S ushered in long-range missiles and other high-tech weapons that presented new challenges in military tactics and endangered support personnel operating behind the lines. In fact, 56 percent of the deaths in ODS/S occurred in support operations. Consequently, even women and/or single parents who were not assigned directly to combat positions remained very much in harm's way.

A survey commissioned by the President's Commission on the Assignment of Women in the Armed Forces indicated that there is a high degree of sensitivity to the potential problems associated with dual-military couples or single-parent Service members serving in combat. Among the civilian survey

respondents, 69 percent stated that they believed that single women with children should not be asked to serve under combat conditions, while 48 percent said that the same should be true for men in this situation. When asked about families where both the father and mother are in the military, 55 percent of civilians felt that the female should be exempt from combat duty. The responses of military members to the same questions were similar.

Virtually all of the factors cited above affect troop readiness. An older force with more women, single parents and dependents, and dual-military couples is more difficult to mobilize. Issues such as whether women and single parents should serve on the front lines further complicate the process, because the military must be sensitive to family considerations and public opinion. In addition, the blurring of traditional battle distinctions (front lines versus behind the lines) places far more military personnel in harm's way. Although past studies on the influence of the family on unit and individual readiness may be inadequate in the face of the new realities, they do provide some clues as to what those influences are and how military programs might be structured to accommodate them.

### **Families and Readiness**

Researchers have used a variety of methods to measure individual and unit readiness, but none has addressed all aspects of readiness. The most commonly cited measure of unit readiness (used by the Joint Chiefs of Staff) is the Status of Resources and Training System (SORTS). This index includes elements such as the amount and condition of equipment allotted to a unit, the number and type of personnel who make up the unit's ranks, and the amount of training that those personnel have undergone. The factors that influence SORTS account for unit-level readiness, but they give no indication of how outside factors, such as the family, influence individual readiness.

Several studies have examined the impact of families on individual readiness. More detail on those studies can be found in the second report of this series, *Individual and Family Readiness for Separation and Deployment* (Aldridge, Sturdivant, Smith & Lago, 1996). In summary, it has been found that soldiers' perception of how much support the unit leaders have provided their families and how confident they feel about how responsibilities are being handled at home tend to affect their combat readiness. Essentially, family status was found to have a significant impact on the combat readiness of individual Service members.

Deployments in response to crises such as the Persian Gulf War are unscheduled, and the number and type of units involved are determined by the situation. Typically, certain units are placed on standby so that they can respond rapidly if additional personnel are needed. In deployments for a continuing crisis, the Services must replace or rotate troops. For such arrangements, an attempt is made to provide notice of 2 weeks to 2 months in order to prepare for deployment. The ways in which the Services manage their deployments and the differences in predictability of the advance notice make it difficult to generalize findings across branches. In addition, the demands placed on Service members vary tremendously in terms of preparation, length of separation from the family, and degree of danger involved.

A key element in deployment readiness is the preparedness of the military *spouse* "to assume the role and duties of household head to ensure family functioning during deployment" (Campbell et al., 1991, p. 168). Segal and Harris (1993) reported that family problems at home are the primary reason for absent without leave (AWOL) soldiers and for soldiers' concerns while they are separated from their

families. These findings suggest that the level of family support that the unit leaders provide has an impact on the members' perceptions that their families are functioning well while they are away.

A spouse's level of readiness and self-sufficiency is affected by concerns about his/her ability to access legal documents and power of attorney. The spouse must also know how to access and use services such as child care, employment assistance, and financial counseling. She or he must be emotionally prepared to manage the family and to make independent decisions. These aspects of spousal readiness assume that the spouse is also physically able to handle the responsibilities effectively (Campbell et al., 1991). When a Service member perceives that his/her spouse is prepared to face these challenges and to function independently during the deployment or separation, the member's level of individual readiness improves.

Regardless of how well the individual is prepared for separation, there are likely to be problems and stresses encountered during his/her deployment. Even in situations in which the spouse effectively handles family matters, dealing with the separation tends to be difficult for all involved. For example, one primary problem with deployment involves the amount and accuracy of information received by a spouse or family, especially when the member is deployed to a hostile area. During ODS/S, families often were unable to speak to Service members and, at times, received inaccurate information about the combat situation. In turn, Service members were unable to provide input regarding problems with child care, finances, behavioral difficulties among children, and additional family responsibilities (Department of Defense, 1993, p. 7-4).

Studies of the actual effects of deployment have largely been confined to peacetime situations. Generally, such studies have shown a pattern of depression on the part of family members prior to and during the period of separation (Beckman, Marsella, & Finney, 1979). Various factors play a role in whether and to what extent such depression is experienced, including support from others with absent spouses (Rosen & Moghadam, 1990) and positive attitudes regarding deployment (Archer & Cauthorne, 1986).

As might be expected, the effects of deployment tend to be exacerbated when the separated spouse or parent is entering a potentially dangerous environment, such as ODS/S. Navy families separated by deployment prior to, during, and following ODS/S were the subject of a recent study (Kelley, 1994). Kelley noted that the wives and children of deployed sailors showed signs of stress that were exacerbated when the sailors were assigned to a location in or near the Persian Gulf. The behaviors of mothers and children followed slightly different patterns. Wives experienced more depressive symptoms before and during deployment, but such symptoms disappeared near the end of the separation. The deployed members' children showed behavioral problems before, during, and after the deployment. Anecdotal evidence suggested that the children were particularly sensitive to the separation because they did not understand all the information they received about activities in the Gulf. The high levels of stress reported in Kelley's study suggest the need for additional support services and, possibly, the availability of counseling services.

A similar study by Milgram and Bar (1993) examined the reactions of Israeli soldiers' wives to their husbands' hazardous duty deployments. Although the conditions of the Israeli soldiers' deployments varied considerably from those of U.S. soldiers, several useful recommendations for stress reduction were made that can be generalized for U.S. soldiers and their families. One recommendation was to provide reliable and frequent communication between the deployed soldier and his/her family. This process helps ease the family's concerns over the soldier's well-being and safety. In addition, the soldier can be

involved in problem-solving regarding minor crises at home. Another recommendation was to encourage the use of family support and assistance centers.

Financial problems associated with deployment often result from a spouse's lack of experience in dealing with budgets. This problem becomes more pronounced when additional expenses (e.g., telephone charges for calls to deployed Service members and increased child care costs) occur because one parent is absent.

## **Personnel Programs**

Recognizing that the demands of military life (e.g., frequent relocations, separations) are likely to place extra stress on families, each of the Services has implemented programs designed to support spouses, children, and Service members as they attempt to cope. For example, the increasing number of households with dependents has prompted the Services to provide child care through Child Development Services. Commanders and supervisors who testified before the Presidential Commission on the Assignment of Women in the Armed Forces indicated that the deployment of single parents and dual-military parents did not pose problems for those individuals. This evidence suggested that the programs may have served their purpose.

Around the time of ODS/S, however, some problems with the programs became apparent. For instance, guidelines concerning the assessment of the welfare of the children of military families were lacking, and no formal outreach programs were in place to offer assistance to care providers. It was not until 1992 (after ODS/S) that DoD began to require thorough documentation and verification of Family Care Plans, stipulating measures to be taken to ensure the continued viability of the Service member's family in his or her absence.

The importance of the influence of families—and programs to assist families—on military personnel cannot be overstated. ODS/S was unique, among other reasons, because of the policy challenges it presented. With a more mature cadre of Service members, family responsibilities (especially parenthood and single parenthood) made the impact of deployment more severe and more complicated to address. The experiences of military families during ODS/S provide information that could be crucial in the design and maintenance of support services to strengthen military families in the future and, thereby, increase the commitment and performance of the Service members themselves.

The DoD and the individual Services have added to the body of literature with the *1992 Surveys of Officers and Enlisted Personnel* and the associated reports. In so doing, they have extended efforts to prepare for deployment contingencies and to prepare troops for quick and smooth departures. The degree of readiness that actually exists, however, can be determined only in times of actual deployment, such as during ODS/S. Therefore, the data from the 1992 surveys should provide useful indications as to the types of problems military families experienced in a combat situation and, possibly, suggestions for mitigating such problems during future operations.

## **Survey Sample**

The 1992 surveys were based on a probability sample of military personnel on active duty as of December 1991. The sample included 40,812 officers and 56,015 enlisted personnel (a total of 96,827 members) and was stratified by Service, status (officer or enlisted), and gender. Responses were received from 27,684 officers and 32,246 enlisted personnel (59,930 total), which represented a 66

percent overall response rate (respondents as a percentage of eligible members). Surveys similar to the 1992 surveys were also conducted in 1978 and 1985.

The survey sample included four separate samples: (1) longitudinal, (2) recruiters, (3) members, and (4) Active Guard/Reserve or Training and Administration of the Reserve (AGR/TAR) members.

The stratification scheme, sample sizes, and sample selection approach for each of the four samples were similar. All four samples were selected using probability methods; that is, each eligible individual had a non-zero, known probability of selection. Probability sampling allowed for the projection of the survey results to the target population (Service members), using weights developed to reflect variable probabilities of selection and nonresponse bias. The database used in the analyses for this report included all four samples combined, and all analyses were conducted with the weighted data (see Appendix A for more detail on sampling, databases, and weighting).

The sampling frames, sample sizes, and stratification corresponding to each of the four samples selected for the 1992 surveys were as follows:

- The longitudinal sample consisted of a subsample of 11,999 from the personnel selected for the *1985 Department of Defense Survey of Officer and Enlisted Personnel* who were still in the military as of December 1991. The sample maintained the stratification of the 1985 survey (i.e., Service, officer/enlisted status, and gender).
- The recruiter sample consisted of 3,999 recruiters, approximately 1,000 per Service.
- The member sample consisted of members on active duty as of December 1991 who had been in the Service for 4 months or more and were neither recruiters nor included in the 1985 survey. The sample of 75,345 active military personnel was derived by selecting approximately 5,000 members from each of the 16 cells defined by Service, officer/enlisted status, and gender.
- The AGR/TAR sample included approximately 500 AGR/TAR from each of the 14 cells defined by seven levels of Reserve Component and officer/enlisted status. Some cells had fewer than 500 members. A total of 5,484 full-time, support AGR/TAR members were selected.

# Demographic Profile of the ODS/S Service Force

## Analysis Methodology

To compare the population of Service members deployed in ODS/S with the entire force and with those not deployed, a series of weighted cross-tabulations were first run to determine the proportions deployed and not deployed out of the totals for various demographic groups. Categorical variables representing the demographic groups were available in the data set provided by the DoD, so that no variable creation or combination was required. Chi-square tests were performed to identify significant differences between deployed Service members and those not deployed, by gender, race/ethnicity, age, education, pay grade, location of assignment, and family type at the time of the 1992 surveys.

## Results

The following are demographic profiles of enlisted personnel and officers who were deployed in ODS/S, as compared with those who were not deployed. The demographic characteristics examined include gender, race/ethnicity, age group, education, pay grade, location, and family type.

### Enlisted Personnel

Table 1 presents demographic profiles for enlisted personnel who were deployed in ODS/S, compared with those who were not deployed. All comparisons of those deployed with those not deployed, except by location of assignment (CONUS/OCONUS), were found to be statistically significant (P-value < 0.01), indicating that the distributions for the variables considered—gender, race/ethnicity, age, education, pay grade—differed for the ODS/S deployed and not deployed groups. It must be kept in mind, however, that the Chi-square statistic is very sensitive for large samples and will find statistical significance in small differences that have little practical significance. In this report, an attempt is made to highlight larger differences that would tend to exist regardless of the influence of the large sample size.

**Table 1. Demographic Characteristics of Enlisted Personnel by ODS/S Deployment Status**

Demographic Characteristic	Weighted Total	Deployment Status	
		Deployed	Not Deployed
		<i>Number</i>	
Total Enlisted Personnel	1,510,573	455,990	1,054,583
		<i>Percent of Column Total</i>	
<b>Gender</b>			
Male	88.9	94.2	86.8
Female	11.1	5.8	13.2
<b>Race/Ethnicity</b>			
White	67.2	65.6	67.9
Black	22.9	24.0	22.4
Hispanic	6.1	6.5	5.9
Asian/Pacific Islander	0.8	0.9	0.7
American Indian/Alaskan Native	1.8	1.8	1.9
Other	1.2	1.2	1.2



**Table 1. Demographic Characteristics of Enlisted Personnel by ODS/S Deployment Status (Continued)**

Demographic Characteristic	Weighted Total	Deployment Status	
		Deployed	Not Deployed
		<i>Number</i>	
<b>Total Enlisted Personnel</b>	<b>1,510,573</b>	<b>455,990</b>	<b>1,054,583</b>
		<i>Percent of Column Total</i>	
<b>Age Group</b>			
21 Years or Younger	18.6	19.4	18.3
22-25 Years	25.8	30.6	23.7
26-34 Years	36.5	35.0	37.2
35-44 Years	17.3	14.0	18.7
45-54 Years	1.7	1.0	2.0
55 Years or Older	0.1	0.0*	0.0*
<b>Education</b>			
Less Than 12 Years	0.3	0.4	0.3
GED or Other Equivalency Certificate	3.3	4.2	2.9
High School Diploma	38.6	45.7	35.5
Some College	42.5	38.3	44.3
Two-Year College Degree	10.0	7.9	10.9
Four-Year College Degree	3.5	2.4	4.0
Some Graduate School or Other Degree Not Listed	1.4	0.9	1.6
Masters Degree	0.4	0.2	0.5
Doctoral Degree	0.0*	0.0*	0.0*
<b>Pay Grade</b>			
E1 to E4	47.9	52.7	45.8
E5 to E6	39.1	36.9	40.1
E7 to E9	13.0	10.4	14.1
<b>Location</b>			
CONUS	70.4	72.8	69.4
OCONUS	29.6	27.2	30.6
<b>Family Type</b>			
Single, No Dependents	29.8	32.9	28.5
Single with Dependents	6.4	5.4	6.8
Dual-Military, No Dependents	3.1	2.5	3.3
Dual-Military with Dependents	5.1	3.9	5.7
Civilian Spouse, No Dependents	11.3	10.9	11.4
Civilian Spouse with Dependents	44.3	44.4	44.3

\*Less than 0.05 percent.

Notes: Weighted percentages were computed as the proportion of the estimated totals shown in the first data row. Totals may differ slightly across tables because of missing data and rounding.

**Gender.** As has been the case historically, women remain under-represented throughout the enlisted personnel ranks as compared with the total U.S. population. This result was even more evident within the ODS/S deployed forces. Although women represented 13.2 percent of enlisted personnel not deployed for ODS/S, they represented only 5.8 percent of those deployed. Perhaps this discrepancy is due in part to the military's reluctance to place women in situations where they could be in harm's way.

**Race/ethnicity.** The estimated proportion of Blacks among all enlisted personnel (22.9 percent) and among those deployed in ODS/S is notably high (24.0 percent) and consistent with a wealth of documentation on the over-representation of this minority group in the military. Hispanics are present in a slightly higher proportion among those deployed in ODS/S than among those not deployed (6.5 percent and 5.9 percent, respectively). In general, however, the percentages of different racial/ethnic groups among those deployed are similar to the percentages among those not deployed.

**Age.** The age distribution of enlisted personnel shown in Table 1 indicates that the most significant difference between deployed and not deployed personnel was that the deployed forces had a higher proportion of 22- to 25-year-olds (30.6 percent) and a lower proportion of 35- to 44-year-olds (14.0 percent) than those not deployed (23.7 percent and 18.7 percent, respectively).

**Education.** Nearly all enlisted personnel possess at least a high school diploma, which appears to reflect the military's commitment to education. However, those with education higher than a high school diploma were a smaller proportion of those deployed in ODS/S (49.7 percent) than of those not deployed (61.3 percent).

**Pay grade.** The majority (52.7 percent) of those deployed were in the lowest pay grades (E1 to E4)—significantly higher than the proportion of all enlisted personnel in those pay grades. In contrast, only 45.8 percent of those not deployed were in pay grades E1 to E4. This result is consistent with the results for education, since college graduates, who tended to be in the higher pay grades, were under-represented among those deployed.

**Location.** At the time of the 1992 surveys, the majority (about 70 percent) of all enlisted personnel were serving within the continental United States (CONUS). The percentages of CONUS personnel were similar for the deployed and not deployed forces (73 percent and 69 percent, respectively).

**Family type.** Among enlisted personnel who were not deployed in ODS/S, the most common family type was member married to civilian spouse with dependents (44.3 percent), followed by single member with no dependents (28.5 percent). Corresponding figures were about the same for those deployed in ODS/S, at 44.4 percent and 32.9 percent, respectively. An interesting result was that single Service members with dependents and Service members in dual-military families with dependents were under-represented (relative to the overall enlisted population) among the ODS/S deployed group. This result suggests that the military sought to protect these vulnerable and hard-to-mobilize groups by not sending them to the Persian Gulf in large numbers.

## Officers

Table 2 presents demographic profiles for officers<sup>1</sup> who were deployed in ODS/S, compared with those who were not deployed. Chi-square tests indicated statistically significant differences between those deployed and not deployed for all the variables shown in the table: gender, race/ethnicity, age, education, pay grade, location of assignment, and family type.

**Table 2. Demographic Characteristics of Officers by ODS/S Deployment Status**

Demographic Characteristic	Weighted Total	Deployment Status	
		Deployed	Not Deployed
		<i>Number</i>	
<b>Total Officers</b>	<b>278,307</b>	<b>63,817</b>	<b>214,489</b>
		<i>Percent of Column Total</i>	
<b>Gender</b>			
Male	88.6	93.3	87.2
Female	11.4	6.7	12.8
<b>Race/Ethnicity</b>			
White	87.3	88.1	87.0
Black	7.1	6.2	7.4
Hispanic	2.8	2.9	2.8
Asian/Pacific Islander	0.4	0.4	0.4
American Indian/Alaskan Native	1.6	1.3	1.7
Other	0.8	1.1	0.7
<b>Age Group</b>			
21 Years or Younger	0.0*	0.1	0.0*
22-25 Years	8.0	7.2	8.3
26-34 Years	41.6	51.6	38.6
35-44 Years	39.6	34.9	40.9
45-54 Years	10.2	5.8	11.5
55 Years or Older	0.6	0.4	0.7
<b>Education</b>			
Less Than 12 Years	0.0*	0.0*	0.0*
GED or Other Equivalency Certificate	0.2	0.3	0.1
High School Diploma	0.8	1.0	0.7
Some College	3.8	5.3	3.4
Two-Year College Degree	3.0	4.2	2.7
Four-Year College Degree	34.0	46.5	30.2
Some Graduate School or Other Degree Not Listed	17.2	15.4	17.8
Masters Degree	33.2	23.0	36.2
Doctoral Degree	7.8	4.3	8.9

<sup>1</sup>Officers are defined here to include warrant officers.

**Table 2. Demographic Characteristics of Officers by ODS/S Deployment Status (Continued)**

Demographic Characteristic	Weighted Total	Deployment Status	
		Deployed	Not Deployed
		<i>Number</i>	
<b>Total Officers</b>	<b>278,307</b>	<b>63,817</b>	<b>214,489</b>
		<i>Percent of Column Total</i>	
<b>Pay Grade</b>			
O1 to O3, W1 to W3	61.7	70.7	59.0
O4 to O7, W4 to W5	38.3	29.3	41.0
<b>Location</b>			
CONUS	78.4	77.9	78.6
OCONUS	21.6	22.1	21.4
<b>Family Type</b>			
Single, No Dependents	18.4	19.5	18.1
Single with Dependents	2.7	2.4	2.8
Dual-Military, No Dependents	3.6	3.8	3.6
Dual-Military with Dependents	4.0	2.6	4.5
Civilian Spouse, No Dependents	15.8	17.5	15.3
Civilian Spouse with Dependents	55.5	54.2	55.7

\*Less than 0.05 percent.

Notes: Weighted percentages were computed as the proportion of the estimated totals shown in the first data row. Totals may differ slightly across tables because of missing data and rounding.

**Gender.** Female officers were represented at a lower level in ODS/S than among the overall force. Among the officers deployed in ODS/S, there were substantially fewer women (less than 7 percent) than among those not deployed (12.8 percent).

**Race/ethnicity.** As with the overall officer force, Whites comprised the overwhelming majority of deployed (88.1 percent) and non-deployed (87 percent) officers. In contrast to the distribution in the enlisted ranks, Black officers were a *smaller* proportion of those deployed in ODS/S than in the entire group of officers (6.2 percent and 7.1 percent, respectively). The percentages of other race/ethnic groups (e.g., Hispanics, Asians) deployed were similar to their representation in the overall officer population.

**Age.** Officers generally are older than enlisted personnel. By age group, approximately 87 percent of the officers deployed in ODS/S were between the ages of 26 and 44 years, compared with approximately 80 percent of those who were not deployed. For the 26- to 34-year age group, the difference was even larger. More than half of those who were deployed were in this age group, compared with about 39 percent of those who were not deployed.

**Education.** The proportion of officers who held a four-year college degree (or higher) among those deployed in ODS/S was lower than for non-deployed officers (89.2 percent and 93.1 percent, respectively). The proportion of officers with a four-year degree and only some graduate school was significantly higher for those deployed in ODS/S than for those who were not deployed. This result may to some degree reflect the technological sophistication of the weapons and systems used in ODS/S—i.e.,

officers with a four-year degrees in technical fields were needed to man the complex array of missiles, telecommunications gear, and other high-technology equipment.

**Pay grade.** Almost three-quarters (approximately 71 percent) of deployed officers were in the lower pay grades (O1 through O3). In contrast, only 59 percent of those not deployed were in the lower pay grades.

**Location.** As with the enlisted force, the majority of officers were in CONUS locations in 1992. There were, however, no significant differences in CONUS/OCONUS assignment locations for officers who were deployed in ODS/S and those who were not deployed.

**Family type.** As seen for enlisted personnel, the most common family type among officers in 1992 was member with civilian spouse and dependents (55.5 percent), followed by single member with no dependents (18.4 percent). In the deployed group, the family types that included dependents were under-represented. Officers with dependents, particularly those who also had a military spouse, were sent in proportionately smaller numbers than those without dependents.

## Barriers to Readiness

Emergency military situations call for prompt action. Yet this need is seriously undermined when personnel cannot respond quickly to a recall or an alert. Critical to the military's ability to assess the readiness potential of its force is an evaluation of factors that detract from individual and family readiness. Toward that end, descriptive tests and multivariate analyses were conducted to address the following questions:

- Were some of the Service members who were deployed in ODS/S more likely than others to experience difficulties in responding quickly to recalls, alerts, or changes in work schedule in general?<sup>2</sup>
- Were some of the Service members who were deployed in ODS/S more likely than others to experience problems with their ODS/S deployments specifically?
- Did some of the Service members who were deployed in ODS/S worry more than others about their families while they were away on assignment?
- Were some of the spouses of Service members who were deployed in ODS/S more likely than others to have problems adjusting to changes caused by the deployment?

To explore these questions, certain variables were selected for use as independent measures in multivariate analyses. Table 3 lists the variables selected and the questionnaire items corresponding to the variables, and indicates how the variables were recoded, derived, or combined for use in the models.

**Table 3. Items Included in the Analyses**

Short Name	Questionnaire/Record Data Item	Scale	Definition of Explanatory Variable
<b>1) Individual Demographics:</b>			
Gender	Are you male or female?	—	Dichotomous numerical variable
Age	How old were you on your last birthday?	00-99 years	Continuous numerical variable for age of respondent
Race/Ethnicity	Are you: American Indian/Alaskan Native Black/Negro/African-American Oriental/Asian/Chinese/Japanese/Korean/ Filipino/Pacific Islander White/Caucasian Other (specify)?	—	Dichotomous variables for Black, White, Hispanic, and other (all other race/ethnicity categories). For example, when a respondent was Black, the variable BLACK was set to 1; otherwise, BLACK was set to 0.

<sup>2</sup>For ease of discussion in the remainder of the report, these are simply referred to as "difficulties in responding to recall/alert."

**Table 3. Items Included in the Analyses (Continued)**

Short Name	Questionnaire/Record Data Item	Scale	Definition of Explanatory Variable
<b>1) Individual Demographics (Continued):</b>			
Years of Education	AS OF TODAY, what is the <i>highest</i> school grade or academic degree that you have? Less than 12 years of school (no diploma) GED or other high school equivalency certificate High school diploma Some college, but did not graduate 2-year college degree 4-year college degree (BA/BS) Some graduate school Masters degree (MA/MS) Doctoral degree (PhD/MD/LLB) Other degree not listed	10 to 21 years of schooling: 10 years 11 years 12 years 13 years 14 years 16 years 17 years 18 years 21 years 17 years	Continuous numerical variable corresponding to years of schooling
<b>2) Military Demographics:</b>			
Pay Grade	What is your pay grade? Enlisted personnel: E1 to E9 Officers: O1 to O7 and W1 to W5	—	Dichotomous variable for E1 to E4, E5 to E6, and E7 to E9 (for enlisted personnel), O1 to O3, W1 to W3 and O4 to O7, W4 to W5 (for officers)
Military Branch	In what Service are you? Army Navy Marine Corps Air Force	—	Dichotomous variables for each Service
Tenure	Variable taken from the ADMM&L/RCCDDS file	Number of months	The active date was subtracted from the survey date to yield number of days. The result was divided by 30.4 to yield number of months.
ODS/S	Were you deployed for Operations Desert Shield/Desert Storm? Yes, for less than 3 months Yes, for 3 to less than 6 months Yes, for 6 to less than 9 months Yes, for 9 months or more No	—	Dichotomous variable, set to 1 if deployed, 0 if not deployed

**Table 3. Items Included in the Analyses (Continued)**

Short Name	Questionnaire/Record Data Item	Scale	Definition of Explanatory Variable
<b>2) Military Demographics (Continued):</b>			
Military Occupation	Occupation Enlisted personnel: Infantry Electronic Equipment Repair Comm/Intelligence Specialists Health Care Specialists Other Tech/Allied Specialists Function Support/Administration Elec/Mech Equipment Repair Craftsmen Service/Supply Handlers Non-occupational Officers: General Officers and Executives Tactical Operations Officers Intelligence Officers Engineering and Maintenance Scientists and Professionals Health Care Officers Administrators Supply, Procurement, Allied Officers Non-occupational	—	Dichotomous variable for each occupation
CONUS/OCONUS	Variable taken from the ADMM&L/RCCDDS file: CONUS OCONUS	—	Dichotomous variable, set to 1 if CONUS, 0 if OCONUS
Pay and Allowances	What is your estimate of the total annual value of your pay and allowances? Less than \$20,000 \$20,001 to \$30,000 \$30,001 to \$40,000 \$40,001 to \$50,000 \$50,001 to \$60,000 \$60,001 to \$70,000 More than \$70,000 Don't know	—	Continuous numerical variable, set to \$15,000 if less than \$20,000; midpoint of each range up to \$70,000; \$85,000 if more than \$70,000; or missing if don't know
<b>3) Family Demographics:</b>			
Family Type	What is your <i>current</i> marital status?  Is your spouse currently serving on active duty in the Armed Forces or in the Reserve/Guard?  How many dependents do you have in each age group?	Single, no dependents Single with dependents Military spouse, no dependents Military spouse with dependents Civilian spouse, no dependents Civilian spouse with dependents	Dichotomous variable for each family type



**Table 3. Items Included in the Analyses (Continued)**

Short Name	Questionnaire/Record Data Item	Scale	Definition of Explanatory Variable
<b>3) Family Demographics (Continued):</b>			
Spouse's Occupation	Is your spouse currently: a. Full time in the Armed Forces b. In Reserve or National Guard c. Working full-time in Federal civilian job d. Working full-time in other civilian job e. Working part-time in Federal civilian job f. Working part-time in other civilian job g. Self-employed in his or her own business h. With a job, but not at work because of temporary illness, vacation, strike, etc. i. Unpaid worker (volunteer or in family business) j. Unemployed, laid off or looking for work k. Not looking for work but would like to work l. In school m. Retired n. A homemaker o. Other	—	Defined five dichotomous variables: Full-time civilian (c, d) Part-time civilian (e, f) Full-time military (a) Reserve/ National Guard (b) Other (g-m, o)
<b>4) Emergency Arrangements in Place:</b>			
Power of Attorney	Does anyone currently hold your power of attorney? Yes, my spouse Yes, someone other than my spouse No Don't know	—	Dichotomous variable, set to 1 if anyone had power of attorney, 0 otherwise
Life Insurance	Do you have life insurance? Yes, SGLI Yes, SGLI and other policy or policies No Don't know	—	Dichotomous variable, set to 1 if yes, 0 otherwise
Will	Do you have a current written will? Yes No Don't know	—	Dichotomous variable, set to 1 if yes, 0 otherwise
<b>5) Spouse Survey Variables:</b>			
Feelings about Mobilization	How much do you agree with the following statement: "I was very upset with the mobilization."	5-point scale (1 = strongly agree . . . 5 = strongly disagree)	Discrete numerical variable
Length of Deployment	Was your spouse deployed for Operations Desert Shield/Desert Storm? No Yes, for less than 3 months Yes, for 3 months or more but less than 6 months Yes, for 6 months or more but less than 9 months Yes, for 9 months or more	0 to 12 months: 0 months 2 months 4.5 months 7.5 months 12 months	Continuous numerical variable corresponding to number of months deployed

**Table 3. Items Included in the Analyses (Continued)**

Short Name	Questionnaire/Record Data Item	Scale	Definition of Explanatory Variable
<b>5) Spouse Survey Variables (Continued):</b>			
Advance Notice	How much advance notice were you given regarding your spouse's deployment? 24 hours or less 25-48 hours 49-72 hours 73-120 hours More than 120 hours	18-144 hours  18 hours 36.5 hours 60.5 hours 96.5 hours 144 hours	Continuous numerical variable corresponding to the number of hours advance notice
ODS/S Affected Work	How has Operations Desert Shield/Desert Storm affected your paid work? a. No effect on my work life b. Lost/quit my job c. Reduced working hours d. Increased working hours e. Led to my taking a job f. Other (specify)	—	Dichotomous variable created, set to 1 if b, c, d, e, or f checked, 0 if a checked
Stress	Since you have been the spouse of a military member, how much stress has each of these factors caused you? - Operations Desert Shield/Desert Storm	5-point scale, reverse coded (1 = a great deal . . . 5 = none)	Discrete numerical variable
Financial Burdens	Were there any additional financial burdens on you as a consequence of Operations Desert Shield/Desert Storm? a. Yes, household and car repairs b. Yes, child care c. Yes, purchase of additional equipment d. Yes, other e. No	—	Dichotomous variable created, set to 1 if a, b, c, or d checked, 0 if e checked
Satisfaction with Services	How satisfied were you with: a. Mail delivery during ODS/S b. Faxed messages c. Access to information	5-point scale, reverse coded (1 = very dissatisfied . . . 5 = very satisfied)	Continuous numerical variable created by taking the mean of the three responses
Satisfaction with Spouse's Military Job	Please indicate your level of satisfaction or dissatisfaction as a spouse with each feature of military life listed below: b. Military pay and allowances c. Military job security d. Military retirement benefits e. Military promotion opportunities t. Overall economic status	5-point scale, reverse coded (1 = very dissatisfied . . . 5 = very satisfied)	Converted into a single variable based on factor analysis results. Variable defined as the mean of scores on the five items.
Satisfaction with Family Benefits	Please indicate your level of satisfaction or dissatisfaction as a spouse with each feature of military life listed below: a. Military housing j. Dental care k. Medical care l. Environment for families m. Opportunities for education/training for civilian spouses n. Service attitude toward families and family problems	5-point scale, reverse coded (1 = very dissatisfied . . . 5 = very satisfied)	Converted into a single variable based on factor analysis results. Variable defined as the mean of scores on the six items.

**Table 3. Items Included in the Analyses (Continued)**

Short Name	Questionnaire/Record Data Item	Scale	Definition of Explanatory Variable
<b>5) Spouse Survey Variables (Continued):</b>			
Feelings about Separations	Please indicate your level of satisfaction or dissatisfaction as a spouse with each feature of military life listed below: h. Family separations	5-point scale, reverse coded (1 = very dissatisfied . . . 5 = very satisfied)	Converted into a single variable based on factor analysis results. Variable defined as the mean of scores on the two items.
	How much stress has each of these factors caused you? h. Military separation	5-point scale (1 = great deal of stress . . . 5 = no stress)	
Satisfaction with Relationships	Please indicate your level of satisfaction or dissatisfaction as a spouse with each feature of military life listed below: u. Marital satisfaction v. Relationship between my spouse and his/her children/other dependents	5-point scale, reverse coded (1 = very dissatisfied . . . 5 = very satisfied)	Converted into a single variable based on factor analysis results. Variable defined as the mean of scores on the two items.
<b>6) Constructed Variables:</b>			
Confidence in Spouse's Ability	How well did or would your spouse take care of the following in your absence? Child care Family member's health Family finances Housing Emotional or parenting problems Evacuation of family members	5-point scale, reverse coded (1 = very poorly . . . 5 = very well)	Converted into a single variable, defined as the mean of scores on the six items
Satisfaction with the Military	Below is a list of issues associated with the military way of life. Please indicate your level of satisfaction/dissatisfaction with each issue: Personal freedom Opportunity to serve one's country Working conditions Co-workers Military job security Friendships Frequency of moves	5-point scale (1 = very dissatisfied . . . 5 = very satisfied)	Since the source variables are on different scales (i.e., 5-point vs. 7-point), the variables were standardized. The composite variable was then computed as the average of the standardized scores.
	How much do you agree with the following statement about military life: "Life in the military is about what I expected it to be."	5-point scale (1 = strongly disagree . . . 5 = strongly agree)	
	Now, taking all things together, how satisfied are you with the military way of life?	7-point scale (1 = very dissatisfied . . . 7 = very satisfied)	

## Difficulties in Responding to Recall/Alert

### Analysis Methodology

The dependent measure used to examine the factors affecting whether a Service member encountered difficulties in quick response to a recall or an alert was based on the following survey question:

*Listed below are some reasons why military members sometimes find it difficult to respond very quickly to a recall/alert or a change in work schedule. Have you experienced any of these within the past 12 months?*

*Does not apply, I have not had recall/alert or change in work schedule*

*Does not apply, have not had problems*

*Dependent care considerations*

*Personal health problems other than pregnancy*

*Pregnancy*

*Family health problem*

*Second job*

*Transportation arrangements*

*Difficult to reach by phone during off-duty hours*

*Distance to duty station*

*Attending school during off-duty hours*

*Other reason*

All respondents were asked this question, but two *Does Not Apply* options allowed the respondent to indicate no difficulty. One option was *Have Not Had a Recall/Alert in the Past 12 Months*, which acted as a screener that allowed respondents who had not experienced a recall or alert during the relevant time period to skip the question. The other option, *Have Not Had Problems*, indicated that the respondent had been recalled or called to alert in the past 12 months, but there had been no difficulty responding. In other words, these respondents were ready. Approximately 36 percent of respondents who had experienced a quick response in the 12 months prior to the 1992 surveys reported at least one difficulty.

Before undertaking a multivariate analysis of factors related to difficulties in quick response, descriptive statistics were examined to guide the development and fine tuning of the dependent measure. Because the instruction for the question was "check all that apply," respondents had the opportunity to cite any or all of the reasons for difficulty that were listed. To understand the likelihood of difficulty, a variable measuring the number of reasons given for having difficulty responding was developed. For each respondent, enlisted or officer, the number of reasons cited was tabulated. Then, weighted estimates for the number of military members citing each number of reasons were developed. However, of those who experienced difficulties, the vast majority (78 percent) cited only one or two reasons. Rather than using an arbitrary level of difficulty (e.g., more than three reasons cited), a dichotomous measure of individual and family readiness, called "DIFFICULTY," was defined, with a value of 1 if the Service member experienced any difficulties and a value of 0 if he or she did not.<sup>3</sup> This dependent

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<sup>3</sup>For a tabulation of the number of reasons given and more detail about the DIFFICULTY variable, see Aldridge et al. (1996).

measure was used to answer the research question, "Are some Service members more likely than others to experience difficulty in responding quickly to recalls, alerts, or changes in work schedule?", by examining the likelihood that DIFFICULTY = 1 for different groups of Service members.

The variables created for the analysis of difficulty responding to recall/alert were primarily demographic in nature. The types of variables constructed for this analysis represented simple categorical groupings (e.g., male/female) or ordinal responses that represented ranges of values (e.g., total value of pay). Key variables, such as gender and race/ethnicity, were converted to numeric, dichotomous variables that were appropriate for the model. For example, a variable HISPANIC was created that had the value 1 when the respondent was of Hispanic descent and 0 when the respondent was not. Ordinal responses representing ranges of values were converted to continuous variables. For example, a pay scale response of 2, which represented total pay value between \$20,000 and \$30,000, was converted to the number 25,000.

Once the appropriate variables had been developed, a series of tabulations was run to show the weighted numbers of survey respondents and the percentage who reported difficulties in responding to recall/alert (i.e., the number for whom DIFFICULTY = 1). The results are presented separately below for enlisted personnel and officers. The reason for tabulating enlisted personnel and officers separately is that they were expected to be demographically distinct groups. For example, most officers were expected to be college-educated. Therefore, the patterns for the two groups in statistical tests or models were expected to be different.

After the tabulations had been run, simple descriptive tests were performed to determine relationships among explanatory variables (e.g., female and Black) and between explanatory variables and the dependent measure (e.g., White and DIFFICULTY). The most frequently employed test was the Chi-square test of independence, which determines the degree of association between two categorical variables.

Although these simple tests were useful as a preliminary exploration of relationships among the variables, a more complex test was needed to determine which demographic groups were especially likely to experience difficulties. Unlike the picture obtained when each demographic factor is analyzed separately, multivariate analyses show the unique effects of each variable while holding other variables constant. Since the research questions for this report necessitated a measure of the impact of demographic variables upon the likelihood of an outcome, logistic regression was selected as the appropriate multivariate technique.<sup>4</sup> With logistic regression it was possible (a) to assess statistically the relative importance of each explanatory variable on the outcome measure (in this case, DIFFICULTY), and (b) to determine the applicability of the overall model.

The results of the logistic regression can be expressed in terms of the *relative odds* of experiencing difficulties in responding to recall/alert. Relative odds, expressed as percentages and computed from logistic regression Beta coefficients, indicate the increase or decrease in the likelihood of an event, as compared to a reference group. For example, relative odds of -39 percent for males compared to females (the reference group) indicate that males are 39 percent less likely to have difficulties than females. For a continuous variable, such as age, the relative odds refer to the impact of an increase of one unit (in this case, a year of age).

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<sup>4</sup>See Appendix B for a more detailed discussion of logistic regression and relative odds.

Results of the simple descriptive tests were useful to guide development of the logistic regression model. Chi-square analysis indicated that certain sets of demographic variables were related statistically and therefore could be grouped together for analysis purposes. These groupings provided for a systematic approach to building the model, rather than randomly picking explanatory variables for inclusion. The groupings had the additional benefit of being able to distinguish between individual factors related to readiness, which earlier studies had focused upon, and family factors, for which the 1992 surveys could offer more comprehensive analysis.

Three sets of explanatory (independent) demographic variables—individual, military, and family—were used to develop a sequential, or hierarchical, model. The following variables were used: individual demographics—gender, age, race/ethnicity, and years of education; military demographics—pay grade, military branch, tenure, deployment in Operations Desert Shield/Desert Storm (ODS/S), and military occupation;<sup>5</sup> and family demographics—family type (derived from marital status, spouse type [civilian/military], and dependents). Detailed definitions of the variables are provided in Table 3.

The sequential approach first involved regressing the set of individual demographic variables (independent variables) against DIFFICULTY (the dependent variable) and retaining in the model those that were statistically significant. Although the variables were added in sets, the regression results also permitted an analysis of the impact of single variables by examining the *t* statistics and their associated *P* (probability) values.<sup>6</sup> As each set of demographics was added to the model, the incremental strength of the new model in explaining variance in the DIFFICULTY measure was assessed, and insignificant variables were dropped. The goal was to determine the increase in the correlation between the predicted and observed values of the dependent measure (DIFFICULTY), using the weighted simple correlation between the observed and predicted values of the dependent variable, as additional demographic variables were included in the model. The logistic model generated a predicted value between 0 and 1 that could be compared with the actual 0 (no reported difficulties) or 1 (at least one reported difficulty) outcome. The higher the correlation between the two, the better the model was at explaining the factors causing difficulties in responding to recall/alert.

The explanatory power of the overall model was difficult to assess for two reasons. First, there is no global “goodness of fit” measure for logistic regression (such as  $R^2$  for an ordinary least squares regression). Second, because of the large number of observations in the sample, even a small increase in the correlation between observed and predicted values of the dependent variable could have been statistically significant. Therefore, a variant of the Chi-square test was used to test the true statistical significance of the increase in model fit (see Appendix B).

The methodology described above for the development of the DIFFICULTY model used in this analysis is identical to that used for a similar model described in the previous report in this series (Aldridge et al., 1996), except that in this case the model was run only for the subset of respondents who were deployed in ODS/S.

The DIFFICULTY variable was used as a measure of the extent to which soldiers experienced difficulties in responding quickly to recall/alert in general. Respondents were not asked about their responses to specific deployments or to any particular recall. By examining the responses of the

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<sup>5</sup>Military occupation was defined as the first digit of the DoD occupation code, as described in the *Occupational Conversion Manual*, 1991 (DoD 1312.1-M).

<sup>6</sup>These statistics are presented in Appendix B.

subgroups of enlisted personnel and officers who were deployed in ODS/S and comparing them with the overall survey population, it was anticipated that some insight could be gained into their general state of readiness. Another survey question, which was analyzed with the regression models for enlisted personnel and officers described in the next section of this report, was designed to examine problems specifically related to the ODS/S deployment.

## Results

The following sections present results from the analysis of overall difficulties in responding to recall/alert for enlisted personnel and officers who were deployed in ODS/S. Results of a similar analysis for the entire populations of enlisted personnel and officers are shown for comparison.

### *Enlisted Personnel*

Approximately 35 percent of the enlisted personnel who were deployed in ODS/S reported difficulties in responding to recall/alert (in the 12 months prior to the survey and prior to their ODS/S deployments). The comparable proportion for the entire enlisted population was similar, at approximately 38 percent (Aldridge et al., 1996). In view of the similarity of the proportions for demographic subgroups, a logistic regression model was used for the analysis.

Logistic regression provided information on the model's "goodness of fit," which served as a measure of the extent to which individual, military, and family demographics accounted for the difficulties experienced by enlisted personnel. Table 4 shows the correlations between the observed and predicted values of the dependent variable resulting from the inclusion of each set of variables.

As shown in Table 4, individual demographics accounted for only about 1 percent of the variability in DIFFICULTY, the dependent measure. The correlation increased slightly when military demographics were introduced into the model, and then increased again when family demographics were added. It must be noted, however, that all of these correlations indicate that the overall model accounted for only a small proportion of the variability in DIFFICULTY.

**Table 4. Correlation Between Observed and Predicted Values of the Dependent Variable (DIFFICULTY) in the Sequential Model for Enlisted Service Members Deployed in ODS/S**

Variable Set in the Sequential Model	Correlation
1. Individual Demographics	0.01
2. Set 1 + Military Demographics	0.02
3. Set 2 + Family Demographics	0.05

Note: A statistically significant increase in the correlation between observed and predicted values of the dependent variable was achieved with the addition of each set of explanatory variables.

Although the overall correlation is small, the directional impact of demographic characteristics on the dependent measure is important. Thus, the model can be used to answer such questions as: Did being unmarried and having dependents (e.g., children, grandparents) in the home result in an ODS/S deployed Service member's being more or less able to respond quickly to an alert (any alert, not necessarily related to ODS/S)?

The logistic regression procedure was used to answer such questions by determining which demographic variables were significantly related to DIFFICULTY. Variables in the final model that were significantly related to DIFFICULTY (at the 0.05 level of significance) were as follows: gender, pay grade, Service branch, military occupation, and family type. Interestingly, this list was somewhat different from that of the model for the entire enlisted population, which was: gender, age, years of education, pay grade, Service branch, and family type (Aldridge et al., 1996).

This model was also used to predict the relative odds (percentage likelihood) that certain categories of respondents (e.g., females as opposed to males) would have more or fewer difficulties in responding to recall/alert. Table 5 shows the relative odds of experiencing difficulties that are associated with each statistically significant variable in the final model.

**Table 5. Relative Odds of Experiencing Difficulties in Responding to Recall/Alert for Enlisted Personnel**

Significant Variables	Relative Odds of Experiencing Difficulties (Percent)	
	Enlisted Personnel Deployed in ODS/S	All Enlisted Personnel*
<b>Gender (Female)</b>		
Male	-29.5	-39.3
<b>Pay Grade (E1 to E4)</b>		
E5 to E6	-33.6	-18.9
E7 to E9	-53.2	-42.9
<b>Service Branch (Army)</b>		
Navy	32.3	37.7
<b>Military Occupation (Infantry)</b>		
Service/Supply Handler	43.3	NS
<b>Family Type (Civilian Spouse, No Dependents)</b>		
Single, No Dependents	-47.8	-36.9
Dual-Military with Dependents	84.0	143.5

\*Results from Aldridge et al. (1996).

NS = not significant.

Note: Reference groups for dichotomous and categorical variables are shown in parentheses. Groups that were not significantly different from the reference group for the ODS/S subset are not shown in the table; thus, the categories included for each variable may be different in different tables.

With respect to enlisted personnel deployed in ODS/S (as shown in Table 5), the odds of experiencing difficulties in responding to recall/alert are about 30 percent less for males than for females, **holding all other variables constant.**

For the ODS/S deployed subgroup of enlisted personnel, three military demographics—pay grade, Service branch, and military occupation—were significantly related to difficulties in responding to recall/alert. Better paid personnel reported fewer difficulties than those at lower pay grades: the odds of Service members in grades E5 to E6 and E7 to E9 reporting difficulties were, respectively, about 34 percent and 53 percent less than those for Service members in pay grades E1 to E4. The odds of experiencing difficulties were approximately 32 percent higher for Navy personnel, who are typically



away from home for longer periods than other Service members, than for Army Service members. There was no significant difference in the odds for Marine Corps, Air Force, and Army enlisted personnel in this regard. Service and supply handlers reported more difficulties than those in other military occupations; however, the reason for this result is unclear.

As anticipated, family factors were also related to difficulties experienced in responding to recall/alert. Specifically, the odds of experiencing difficulties were about 48 percent less for single enlisted personnel with no dependents than for those with civilian spouses and no dependents (the reference group). Enlisted personnel in dual-military marriages with dependents were 84 percent more likely to have difficulties than the reference group. Those who were married to civilians and had dependents were more likely to have difficulties, but this result was not statistically significant and, therefore, is not shown in Table 5. For all enlisted personnel, the effects seen for the same family types were similar in direction to those seen for the ODS/S subgroup, but stronger (higher relative odds). Perhaps the subset of personnel deployed in ODS/S were more accustomed to responding to recalls and alerts than were enlisted personnel overall.

**Officers**

The same analyses, using the same variables for the model, were conducted for officers.<sup>7</sup> Among those who were deployed in ODS/S, officers were less likely to report difficulties than were enlisted personnel. Approximately 22 percent of ODS/S deployed officers reported difficulties in responding to recall/alert, as compared with 24.4 percent of officers overall (Aldridge et al., 1996).

Results of the logistic regression model for officers were similar to those for enlisted personnel when identical sets of explanatory variables were added sequentially to the model. Table 6 shows the correlation between observed and predicted values of the dependent measure (the incremental goodness of fit indicator) for each step in the sequential model. As was the case with the results for enlisted personnel, variable sets had to be combined to increase the significance of the overall model. The following variables were significantly related to the likelihood that officers would experience difficulties in responding to recall/alert: gender, years of education, pay grade, Service branch, military occupation, and family type. Not surprisingly, many of the variables that were significant for enlisted personnel were also significant for officers. Education was an exception. Because the vast majority of officers are college graduates, there is much less variance in the level of education among officers than among enlisted personnel.

**Table 6. Correlation Between Observed and Predicted Values of the Dependent Variable (DIFFICULTY) in the Sequential Model for Officers**

Variable Set in the Sequential Model	Correlation
1. Individual Demographics	0.004
2. Set 1 + Military Demographics	0.02
3. Set 2 + Family Demographics	0.05

Note: A statistically significant increase in the correlation between observed and predicted values of the dependent variable was achieved with the addition of each set of explanatory variables.

<sup>7</sup>Officers are defined here to include warrant officers.

Table 7 shows the relative odds of experiencing difficulties that were associated with each statistically significant variable in the final model for officers. The odds of experiencing difficulties in responding to recall/alert were 45 percent lower for male officers than for female officers in the ODS/S subgroup, holding all other variables in the model constant. By pay grade, officers in the ODS/S subgroup in grades O4 through O7 were about 49 percent less likely to report difficulties than those in grades O1 through O3. In comparison, for the entire officer population, those in grades O4 through O7 were only about 17 percent less likely to report difficulties than those in grades O1 through O3. By Service branch, Marine Corps officers in the ODS/S subgroup were approximately 29 percent less likely to report difficulties than were officers in the Army, whereas Navy and Air Force officers were not significantly different from Army officers in this regard.

**Table 7. Relative Odds of Experiencing Difficulties in Responding to Recall/Alert for Officers**

Significant Variables	Relative Odds of Experiencing Difficulties (Percent)	
	Officers Deployed in ODS/S	All Officers*
<b>Gender (Female)</b>		
Male	-45.1	-46.2
<b>Pay Grade (O1 to O3)</b>		
O4 to O7	-48.8	-17.3
<b>Service Branch (Army)</b>		
Marines	-28.8	-18.1
<b>Military Occupation (Engineering and Maintenance)</b>		
Health Care Officers	61.6	53.7
<b>Family Type (Civilian Spouse, No Dependents)</b>		
Single with Dependents	281.9	242.1
Dual-Military, No Dependents	-56.0	-13.9
Dual-Military with Dependents	361.8	326.3
Civilian Spouse with Dependents	93.5	85.9

\*Results from Aldridge et al. (1996).

Note: Reference groups for dichotomous and categorical variables are shown in parentheses. Groups that were not significantly different from the reference group for the ODS/S subset are not shown in the table; thus, the categories included for each variable may be different in different tables.

Military occupation also emerged as a significant predictor of DIFFICULTY for officers in the ODS/S group. Health care officers were approximately 62 percent more likely to report difficulties in responding to recall/alert than were engineering and maintenance officers. With respect to the odds of experiencing difficulties, all other officer occupational groups were similar to engineering and maintenance officers.

As was seen for enlisted personnel, family demographics for officers in the ODS/S subgroup were related to the odds of experiencing difficulties in responding to recall/alert. Single officers with no dependents were similar to officers with civilian spouses and no dependents (unlike the results for enlisted personnel, where single personnel with no dependents were less likely to experience difficulties). The odds of officers in dual-military marriages with no dependents experiencing difficulties were about 14 percent less than those for officers with civilian spouses and no dependents. The odds for officers

with civilian spouses and dependents were about 86 percent greater than those for officers with civilian spouses and no dependents. Both single officers with dependents and officers in dual-military marriages with dependents were far more likely than the reference group to experience difficulties—approximately 4 and 4.5 times more likely, respectively.<sup>8</sup> These differences were even more pronounced than the corresponding odds ratios for the entire officer population. Ranked from highest to lowest odds, the family types for officers in the ODS/S subgroup most likely to experience difficulties in responding to recall/alert were (1) dual-military with dependents, (2) single with dependents, (3) civilian spouse with dependents, (4) civilian spouses, no dependents, (5) single, no dependents, and (6) dual-military, no dependents.

## Problems in Responding to the ODS/S Deployment

### Analysis Methodology

The dependent measure used to examine the factors affecting whether a Service member encountered problems responding to the ODS/S deployment was based on the following survey question:

*If you were deployed for Operation Desert Shield/Desert Storm, what kinds of problems did you have responding?*

- *Does not apply, I was not deployed*
- *Does not apply, did not have problems*
- *Dependent care considerations*
- *Personal health problems other than pregnancy*
- *Pregnancy*
- *Family health problem*
- *Second job*
- *Attending school during off-duty hours*
- *Other problem*

A dichotomous variable, PROBLEMS, was developed as the dependent measure in the model. Tabulations were produced to characterize demographic variables and their relationships with PROBLEMS, and Chi-square tests were used to guide development of the regression model. The same sets of explanatory variables were used in the PROBLEMS model as in the DIFFICULTY model.

The PROBLEMS variable was used to examine a different but related problem to that in the previous section: What groups of Service members were more likely to experience problems in responding specifically to the ODS/S deployment?

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<sup>8</sup>This estimate is derived as follows:  $[1 + (\text{relative odds} / 100)]$ . Zero percent relative odds would be equivalent to a value of 1, indicating equal likelihood or odds.

## Results

The following sections present results for enlisted personnel and officers who were deployed in ODS/S, based on the analysis of reports of problems in responding specifically to the ODS/S deployments.

### *Enlisted Personnel*

To explain variations in the PROBLEMS dependent measure for enlisted personnel, a sequential model was developed. For this measure of readiness, approximately 35 percent of enlisted personnel experienced at least one problem in responding to ODS/S deployment. The correlation between observed and predicted values of the dependent measure for each step in the sequential model for enlisted personnel is shown in Table 8.

**Table 8. Correlation Between Observed and Predicted Values of the Dependent Variable (PROBLEMS) In the Sequential Model for Enlisted Service Members**

Variable Set in the Sequential Model	Correlation
1. Individual Demographics	0.004
2. Set 1 + Military Demographics	0.02
3. Set 2 + Family Demographics	0.05

Note: A statistically significant increase in the correlation between observed and predicted values of the dependent variable was achieved with the addition of each set of explanatory variables.

As in the DIFFICULTY model, individual and military demographics variables were combined. The variables that were statistically related to whether enlisted personnel experienced problems responding to ODS/S deployment were as follows: years of education, pay grade, military occupation, tenure (years in the military), and family type. Table 9 shows the relative odds of experiencing problems with the ODS/S deployment that were associated with each statistically significant variable in the model for enlisted personnel.

In contrast to the DIFFICULTY model, gender was not a significant factor in the PROBLEMS model. In other words, males were not (statistically) more likely to report ODS/S deployment problems than females, and vice versa. Another difference between the two models for enlisted personnel was that ODS/S deployment problems were more likely to be reported by those with more years of education: each year of education increased the odds of having problems with the ODS/S deployment by almost 14 percent. Age was not a significant predictor of PROBLEMS, although several proxies for age (e.g., tenure and pay grade) were significant. With every 1-year increase in time of service, the probability of having problems with the ODS/S deployment decreased by about 0.3 percent. This suggests that, holding related variables such as age constant, more experienced enlisted personnel were less likely to report problems in responding to ODS/S deployment. Similarly, enlisted personnel in higher pay grades were less likely to report problems, by about 27 percent for grades E5 to E6 and about 51 percent for grades E7 to E9. This finding is related to experience, as the enlisted Service members in the lower pay grades are generally younger.

**Table 9. Relative Odds of Experiencing Problems in Responding to ODS/S Deployment for Enlisted Personnel**

Significant Variables	Relative Odds of Experiencing Problems (Percent)
<b>Years of Education</b>	13.9
<b>Pay Grade (E1 to E4)</b>	
E5 to E6	-26.7
E7 to E9	-50.8
<b>Tenure</b>	-0.3
<b>Military Occupation (Infantry)</b>	
Electronic Equipment Repair	80.4
Electronic/Mechanical Equipment Repair	47.7
<b>Family Type (Civilian Spouse, No Dependents)</b>	
Single, No Dependents	-56.8
Dual-Military, No Dependents	-44.0

Note: Reference groups for dichotomous and categorical variables are shown in parentheses. Groups that were not significantly different from the reference group are not shown in the table; thus, the categories included for each variable may be different in different tables.

Enlisted Service members in two military occupations—electronic equipment repair and electronic/mechanical equipment repair—were more likely to report ODS/S deployment problems than were infantry personnel (the reference group). The odds were approximately 80 percent and 48 percent higher for the two groups, respectively. The reason for this result is unclear, but the fact that both professions were in great demand during the Persian Gulf War may have increased the pressure that these personnel felt to respond quickly, which in turn may have encouraged them to *report* deployment problems. There were no significant differences among the Service branches in this regard.

Two family types were significantly different from the reference group (civilian spouse, no dependents) with respect to reported ODS/S deployment problems. Not surprisingly, single personnel with no dependents were 56.8 percent less likely to report problems, and personnel in dual-military marriages with no dependents were 44 percent less likely. What was somewhat counterintuitive, however, was that Service members (single or married) with dependents were not statistically different from those in the reference group. The results of the DIFFICULTY regression model and of previous studies suggested that enlisted personnel with dependents would have more problems with the ODS/S deployment than would those without dependents.

### **Officers**

Approximately 22 percent of the officers who were deployed in ODS/S (13,620 out of 63,282) reported at least one problem with the deployment—as compared with 35 percent of the enlisted personnel who were deployed. As shown in Table 10, the correlation between the observed and predicted values for the dependent variable was low, even after family demographics were added. Thus, the explanatory power of this regression was small. Evidently, as with enlisted personnel, many non-demographic factors influenced the incidence of officers reporting problems with ODS/S deployment. The variables that were statistically related to whether officers experienced problems responding to

ODS/S were as follows: gender, years of education, pay grade, Service branch, and family type (Table 11).

**Table 10. Correlation Between Observed and Predicted Values of the Dependent Variable (PROBLEMS) In the Sequential Model for Officers**

Variable Set in the Sequential Model	Correlation
1. Individual Demographics	0.005
2. Set 1 + Military Demographics	0.017
3. Set 2 + Family Demographics	0.024

Note: A statistically significant increase in the correlation between observed and predicted values of the dependent variable was achieved with the addition of each set of explanatory variables.

**Table 11. Relative Odds of Experiencing Problems in Responding to ODS/S Deployment for Officers**

Significant Variables	Relative Odds of Experiencing Problems (Percent)
<b>Gender (Female)</b>	
Male	-36.9
<b>Years of Education</b>	
	10.5
<b>Pay Grade (O1 to O3)</b>	
O4 to O7	-37.5
<b>Service Branch (Army)</b>	
Marine Corps	-25.9
<b>Family Type (Civilian Spouse, No Dependents)</b>	
Single with Dependents	101.4
Dual-Military with Dependents	124.8
Civilian Spouse with Dependents	40.5

Note: Reference groups for dichotomous and categorical variables are shown in parentheses. Groups that were not significantly different from the reference group are not shown in the table; thus, the categories included for each variable may be different in different tables.

The two individual demographics that were related to reported ODS/S deployment problems for officers were gender and years of education. Male officers were 37 percent less likely than female officers to experience difficulties. Each year of schooling, however, increased the likelihood of officers reporting difficulties by almost 11 percent.

Two military demographics, pay grade and Service branch, were significantly related to PROBLEMS. For officers in pay grades O4 through O7, the probability of reporting problems was about 38 percent lower than for officers in pay grades O1 through O3. By Service branch, Marine Corps officers were about 26 percent less likely than their Army counterparts to report ODS/S deployment problems. Air Force and Navy officers were not statistically different (at the 0.05 level of significance) from Army officers in this regard, although the difference for Air Force officers was just below statistical significance ( $P = 0.06$ ).

As seen for enlisted personnel, family demographics for officers were related to the likelihood of experiencing problems in responding to ODS/S deployment. Single officers with dependents and officers in dual-military marriages with dependents were about 101 and 125 percent more likely, respectively, to experience problems than were officers married to civilians with no dependents. Officers with civilian spouses and dependents were about 41 percent more likely to report ODS/S deployment problems than were those in the reference group. Evidently, in contrast to the results for enlisted personnel, the presence of dependents did make a difference for officers in terms of reports of experiencing deployment problems.

## **Family Concerns While Separated**

Barriers to individual and family readiness may occur when a Service member is concerned about his/her family (defined as spouses, children, and/or parents) while he or she is away on assignment or deployment. Concerns about family may impair a Service member's ability to perform his or her job effectively.

### **Analysis Methodology**

The 1992 surveys addressed family concerns that Service members might experience while away from home. Specifically, the following question was asked:

*Here is a list of feelings or worries some military members have about their family (spouse, children, parents) when they are away on assignment, TDY or deployment. How often did or would you worry about each of the following when you are away?*

- Family's safety in their community*
- Family's ability to get car or household repairs done*
- Family having enough money to meet expenses, pay bills, etc.*
- Child(ren)'s health and well-being*
- Family's safety in the event of war.*

On a five-point scale from *Very Seldom or Never* (5) to *Very Often or Always* (1), respondents were asked to indicate how often they did or would worry about each issue while away from home. A composite variable for satisfaction and confidence was also created, using factor analysis. Factor analysis identifies a reduced number of underlying dimensions or factors present in a group of variables. It gives the analyst a systematic approach to understanding the interrelationships among items and uncovers groups of items that measure the same concept or issue (see Appendix B for more details).

For two of the independent variables—SATISFACTION and CONFIDENCE—composite variables were constructed across items from questions on different scales (see Table 3, page 18). The ordinally scaled responses from several questions were standardized (with a mean of 0 and standard deviation of 1), and the mean of the standardized scores was used as the value of the composite variable (see Appendix B for more details). The number of independent variables was dramatically reduced by constructing conceptually similar and statistically reliable composites for survey questions concerning satisfaction with military life and confidence in spouse's abilities to handle matters while the Service member was absent. Factor analyses for both variables were conducted using responses for Service members deployed during ODS/S.

The constructed variable **SATISFACTION WITH MILITARY LIFE** combined nine survey items: a) whether life in the military was as the respondent expected; b) whether the respondent was satisfied with 1) personal freedom, 2) the opportunity to serve one's country, 3) working/environmental conditions, 4) work group/coworkers, 5) military assignment stability, 6) friendships, and 7) frequency of moves; and c) overall satisfaction with military life. At least five of the nine items had to be answered for a respondent (case) to be included in the factor scoring. More details about the results of factor scoring for this and other constructed variables are provided in Appendix B.

For this analysis, a subset of data—for respondents who were deployed in ODS/S—was used. No effort was made to explain differences in the **CONCERN** dependent variable for nontraditional and traditional families, since an earlier analysis (Aldridge et al., 1996) indicated that the reported levels of concern for the two groups were often indistinguishable.

Four sets of explanatory (independent) demographic variables—individual demographics, military demographics, family demographics, and emergency provisions in place—were used to develop a sequential, or hierarchical, multiple regression model. The following variables were used: (a) **individual demographics**—gender, age, race/ethnicity, and years of education; (b) **military demographics**—pay grade, military branch, tenure, military occupation,<sup>9</sup> CONUS/OCONUS location, total value of pay and allowances, and time separated from family; (c) **family demographics**—family type (derived from marital status, spouse type [civilian/military], and dependents) and spouse's occupation (married members only); and (d) **emergency provisions in place**—power of attorney, life insurance, and will. In addition, a fifth set consisting of two constructed variables, **satisfaction with military life** and **confidence in spouse's ability** (married members only), was also used. Detailed definitions of the variables are provided in Table 3 on page 13.

Instead of the logistic regression used to model **DIFFICULTY** and **PROBLEMS**, multiple regression was used to model **CONCERN** because it was a continuous rather than a dichotomous variable. Multiple regression is used to examine the relationship of a set of independent variables to a dependent variable, but the model also predicts a level of the dependent variable (as opposed to a 1/0 outcome), and the influence of the independent variables is expressed in terms of a Beta coefficient rather than as relative odds. The multiple regression procedure is applied in analyzing survey data when the dependent variable is continuous or consists of ordinal levels—e.g., *Very Dissatisfied* (1), *Dissatisfied* (2), *Neither* (3), *Satisfied* (4), *Very Satisfied* (5). The value of the *t* statistic is used to determine which variables should be kept in the model (i.e., the significance of the coefficients associated with the explanatory variables). The Wald Chi square (see discussion in Appendix B) is used to assess the overall quality of the model. As in the **DIFFICULTY** and **PROBLEMS** models, groups of related variables were added into the **CONCERN** model. A similar sequential approach was followed, and the final model was determined by elimination of variables with coefficients that were not statistically significant at the 0.05 level.

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<sup>9</sup>Military occupation was defined as the first digit of the DoD occupation code, as described in the *Occupational Conversion Manual*, 1991 (DoD 1312.1-M).



## Results

The following sections present the results of the multiple regression analysis of factors affecting the CONCERN variable for enlisted personnel and for officers.

### *Enlisted Personnel*

The variable CONCERN was measured on a five-point scale, where 1 equaled *Very Often or Always Worry* about a given item, and 5 equaled *Very Seldom or Never Worry*. Table 12 shows the progression in the overall explanatory power of the regression model. Because this is a multiple regression model (as opposed to a logistic model), the percent of variance explained ( $R^2$ ) is used instead of the correlation between the observed and predicted values of the dependent variable. Although the family demographics set did not cause a significant increase in the model's power, the variable family type was significant. In practice, although the variables were entered in sets, variables that were significant were kept, according to standard stepwise regression procedure. The final model explained approximately 15 percent of the variation in CONCERN.

**Table 12. Variance in the Dependent Variable (CONCERN) in the Sequential Model for Enlisted Service Members**

Variable Set in the Sequential Model	Percentage of Variance in CONCERN Explained by the Model
1. Individual Demographics	0.01
2. Set 1 + Military Demographics	0.02
3. Set 2 + Family Demographics	0.13
4. Set 3 + Emergency Provisions in Place	0.14
5. Set 4 + Satisfaction with Military Life	0.15

Note: The statistical significance of the overall model was determined by calculating the *F* statistic and its associated probability (see discussion in Appendix B).

The relationship between CONCERN and the independent variables can be expressed as the change (increase or decrease) in family concern attributable to a unit of change in one independent variable, **holding all other variables constant**. For example, the relationship between CONCERN and gender can be expressed in terms of how much more or less males experience family concerns as compared with females (the reference group). For continuous variables such as age, the relationship can be expressed as the change in CONCERN for each incremental increase in an independent variable (e.g., an additional year of age).

The results of the multivariate analyses are shown in Table 13, which presents the Beta coefficients associated with each independent variable. The Beta coefficients show the direction of the relationship between CONCERN and each of the independent variables with which it was found to be significantly related. The direction of each relationship is indicated as CONCERN relative to the reference group (shown in parentheses in Table 13) for dichotomous variables or as an increase of one unit for continuous variables. For example, the Beta coefficient of -0.18 for married males in the ODS/S deployed group in Table 13 means that males who had family and were deployed in ODS/S were *more* likely than females with family who were deployed to report family concerns as a result of separation (i.e., the value of CONCERN was lower for married males than for married females). It is interesting

that males showed more concern than did females, despite the fact that males generally reported fewer problems in responding to recall/alert.

**Table 13. Relative Effects of Independent Variables on Family Concerns While Separated for Enlisted Personnel**

Significant Variables	Beta Coefficient	
	All Members with Family*	ODS/S Deployed Members with Family
<b>Gender (Female)</b>		
Male	-0.11	-0.18
<b>Race/Ethnicity (White)</b>		
Other	-0.22	-0.36
<b>Value of Pay and Allowances</b>	<0.01	<0.01
<b>Family Type (Civilian Spouse, No Dependents)</b>		
Single, No Dependents	0.92	1.07
<b>Satisfaction with Military Life</b>	2.30	2.18

\*Results from Aldridge et al. (1996).

Note: Reference groups for dichotomous and categorical variables are shown in parentheses. Groups that were not significantly different from the reference group are not shown in the table; thus, the categories included for each variable may be different in different tables.

By race/ethnicity, the results for Blacks and Hispanics were not statistically different from those for Whites, but enlisted personnel in the other race/ethnicity groups (non-Black and non-Hispanic) were more likely to be concerned about their families while away from home, whether the separation was due to ODS/S deployment or some other assignment.

As expected, single enlisted personnel with no dependents were less likely to report concern than were enlisted personnel with a civilian spouse and no dependents (the reference group). On the other hand, those with dependents were no more likely to be concerned than the reference group. Perhaps parents (children made up the bulk of dependents) who were deployed in ODS/S were confident about the support mechanisms for their families at home. It should be noted, however, that those with a civilian spouse and dependents were more likely to report concern, although the result was not significant at the 0.05 level ( $P = .07$ ).

The higher the value of total family income, the less likely enlisted Service members were to have concerns while away. Previous studies have indicated that financial concerns tend to be key stressors for Service members separated from their families. Presumably, Service members in families with higher total incomes would be less bothered by financial concerns.

The variable SATISFACTION WITH MILITARY LIFE had the strongest effect on CONCERN. Enlisted personnel who were less satisfied with military life overall had higher levels of concern about their families while separated than did those who were more satisfied with military life. This result is not unexpected, since satisfaction with military services such as child care would presumably constitute an appreciable part of satisfaction with military life overall.

## Officers

The results of the analysis for officers were similar to those for enlisted personnel, and the response patterns were similar for the same variables. Table 14 shows the progression in the overall explanatory power of the regression model for officers with family. The final  $R^2$  for the model was approximately 14 percent.

**Table 14. Variance In the Dependent Variable (CONCERN) in the Sequential Model for Officers**

Variable Set in the Sequential Model	Percentage of Variance in CONCERN Explained by the Model
1. Individual Demographics	0.03
2. Set 1 + Military Demographics	0.04
3. Set 2 + Family Demographics	0.08
4. Set 3 + Emergency Provisions in Place	0.09
5. Set 4 + Satisfaction with Military Life	0.14

Note: The statistical significance of the overall model was determined by calculating the  $F$  statistic and its associated probability (see discussion in Appendix B).

Variables in the final model that were significantly related to CONCERN<sup>10</sup> are as follows: gender, age, race/ethnicity, years of education, family type, total value of pay and allowances, and satisfaction with military life. The variable SATISFACTION WITH MILITARY LIFE resulted in the highest increase in the model's fit.

The Beta coefficients from the regression model for officers are shown in Table 15, which reports the direction of the relationship between CONCERN and the significant explanatory variables as well as the magnitude of their effects. Again, for the CONCERN variable, a positive value for the Beta indicates less concern, and a negative value indicates more concern, since the variable was reverse coded.

For officers, the effects of demographic characteristics on concern about family can be summarized as follows:

- Males reported more concern than females.
- Blacks and Whites were indistinguishable with respect to the reported level of concern.
- Hispanics and those in other non-Black, non-White racial groups (i.e, American Indian/Alaskan Native, Oriental/Asian/Chinese/Japanese/Korean/Filipino/Pacific Islander, or other) reported more concern than Whites or Blacks.
- There were no significant differences in reported level of concern among officers in the different Service branches.

<sup>10</sup>The .05 level of statistical significance was used.

**Table 15. Relative Effects of Independent Variables on Family Concerns While Separated for Officers**

Significant Variables	Beta Coefficient	
	All Members with Family*	ODS/S Deployed Members with Family
<b>Gender (Female)</b>		
Male	-0.19	-0.19
<b>Age</b>		
	-0.01	-0.01
<b>Race/Ethnicity (White)</b>		
Hispanic	-0.16	-0.26
Other	-0.18	-0.28
<b>Value of Pay and Allowances</b>		
	<0.01	<0.01
<b>Family Type (Civilian Spouse, No Dependents)</b>		
Single, No Dependents	0.58	0.72
Dual-Military, No Dependents	0.27	0.28
Civilian Spouse with Dependents	-0.13	-0.14
<b>Power of Attorney (No Power of Attorney)</b>		
Power of Attorney in Place	-0.08	-0.09
<b>Satisfaction with Military Life</b>		
	1.14	1.29

\*Results from Aldridge et al. (1996).

Note: Reference groups for dichotomous and categorical variables are shown in parentheses. Groups that were not significantly different from the reference group are not shown in the table; thus, the categories included for each variable may be different in different tables.

- Officers with dependents worried more than those without dependents, except for those in dual-military marriages with dependents (as with enlisted personnel, these officers may have been more confident about military support mechanisms). Officers with no dependents who were either single or married to a military spouse reported less concern than officers who had no dependents and were married to a civilian spouse (the reference group).
- Higher levels of total pay and allowances were associated with lower levels of concern (as was also the case for enlisted personnel).
- Officers with power of attorney in place reported slightly *more* concern than those with no power of attorney in place.
- Officers satisfied with military life in general reported less concern than those who were less satisfied (as was also found for enlisted personnel).

## Spouse's Perception of Problems Due to Changes Created by ODS/S

For married personnel, spouses' perceptions of the magnitude of problems created by the ODS/S deployment are likely to have affected the members' own perceptions of the impact of the deployment on their families' well-being. Maintaining the morale of spouses during a military conflict is important in enhancing the ability of Service members to perform their jobs effectively.

### Analysis Methodology

The 1992 survey of spouses (administered at the time of the surveys of officers and enlisted personnel) addressed spouses' perceptions about problems related to changes created by ODS/S with the following question:

*Because of the changes created by Operation Desert Shield/Desert Storm, how much of a problem did you have with each of the following?*

*Communicating with your spouse*

*Sending packages/parcels to your spouse*

*Having enough money to meet expenses, pay bills, etc.*

*Being able to get car or household repairs done*

*Your belongings/property being safe*

*Your family's safety in your community*

*Your personal safety*

*Your child(ren)'s health*

*Your child(ren)'s emotional well-being*

*Getting child care*

*Getting housework done*

*Taking care of emergency needs, such as an illness*

*Having time to spend with your family*

*Your own physical health*

*Your own emotional well-being*

*Your family's safety in the event of war*

*Overall, the changes created by Operation Desert Shield/Desert Storm for you (and your family members).*

Rather than constructing a general measure—for example, by taking the average of the ratings given for each category above—the dependent measure SPOUSE PROBLEMS was taken directly from the answers to the last item in the survey question—i.e., *Overall, the changes created by Operation Desert Shield/Desert Storm for you (and your family members)*. Respondents were asked to rate the impact of problems on a four-point scale of *Very Great Problem* (1) to *Not a Problem* (4).

The independent variables used in this model were very different from those used in the other models described in this report. Preliminary analysis involving demographic characteristics of the spouse as explanatory variables were not statistically significant and explained only a small percentage of the variance in the dependent measure. Consequently, those variables were dropped from the model. Instead, the model used the *spouses'* (as opposed to the Service members') ratings of specific problems related to ODS/S (e.g., whether the spouse was upset with the ODS/S mobilization process) as explanatory variables. The reasoning behind structuring the model in this fashion was that it was

important to understand which specific problems tended to contribute most to the spouses' perceptions of problems overall. Explanatory variables were entered into the model in two sets.

Variable set 1 consisted of the following factors specifically related to the ODS/S Deployment:

- Upset with mobilization
- Length of ODS/S deployment
- Advance notice of member deployment
- Effect of ODS/S deployment on spouse's job
- Satisfaction with information access during ODS/S
- Financial burdens of ODS/S
- Stress caused by ODS/S.

Variable set 2 consisted of the following composite indices of satisfaction with aspects of military life:

- Satisfaction with member's military job
- Satisfaction with military benefits and family services
- Separation from member
- Job demands of member
- Satisfaction with family relationships
- Satisfaction with spouse's own job.

Some of the variables required factor analysis (see Table 3 on page 13 for a description of variable creation).

## Results

The following sections present results of the analysis of military spouses' perceptions of problems due to changes created by ODS/S deployment, for the spouses of enlisted personnel and officers.

### *Enlisted Personnel*

For enlisted personnel, Table 16 shows the percentage of the variance in the dependent variable, SPOUSE PROBLEMS, that was explained by variable set 1 and by variables sets 1 and 2 in combination. The final  $R^2$  (approximately 31 percent) was the best fit obtained for any of the models described in this report. Much of the variance was explained by the spouse's perception of factors specifically related to the ODS/S deployment (variable set 1). An additional 4 percent was explained with the addition of variables that measured the spouse's impression of military life overall (variable set 2).

**Table 16. Variance in the Dependent Variable (SPOUSE PROBLEMS) in the Sequential Model for Spouses of Enlisted Service Members**

Variable Set in the Sequential Model	Percentage of Variance in SPOUSE PROBLEMS Explained by the Model
1. Factors Specifically Related to the ODS/S Deployment	0.27
2. Set 1 + Composite Indices of Satisfaction with Aspects of Military Life	0.31

Note: The statistical significance of the overall model was determined by calculating the *F* statistic and its associated probability (see discussion in Appendix B).

Table 17 presents the Beta coefficients associated with each significant independent variable in the analysis. Because the demographic explanatory variables were not significantly related to SPOUSE PROBLEMS, the Beta coefficients listed in Table 17 are just for attitudinal variables.

**Table 17. Relative Effects of Independent Variables on Problems Experienced Because of Changes Created by ODS/S for Spouses of Enlisted Personnel**

Significant Variables	Beta Coefficient
Upset with Mobilization	0.11
Effect on Spouse's Job (Does Not Affect Spouse's Job)	
Affects Spouse's Job	-0.28
Stress Caused by ODS/S	0.17
Satisfaction with Family Relationships	0.10

Note: Reference groups for dichotomous and categorical variables are shown in parentheses. Groups that were not significantly different from the reference group are not shown in the table; thus, the categories included for each variable may be different in different tables.

Enlisted Service members' spouses who were upset with the ODS/S mobilization were more likely to report problems associated with ODS/S. This result is not surprising, since frustrations with the mobilization process are logically related to perceived problems with the deployment.

If the ODS/S deployment of the enlisted Service member affected the spouse's job, the spouse tended to report more severe problems with changes that occurred as a result of ODS/S deployment. Evidently, the prevalence of multiple-income families caused problems when one (or more) of the wage earners was deployed in ODS/S. This effect has probably increased in today's force due to the large proportion of working spouses and the increased importance of their jobs.

Spouses who reported less stress caused by ODS/S (a positive Beta coefficient) tended to report fewer problems. This is consistent with results of earlier studies that suggested stress as a cause of dissatisfaction and problems for spouses of soldiers on hazardous duty assignments.

The higher the spouse's satisfaction with the "family relationships" aspect of military life, the less likely she or he was to report problems. Presumably, if the family situation was more stable, ODS/S deployment caused fewer problems for the spouse.

### **Officers**

For officers' spouses, the model results were similar (Table 18). Three of the significant variables—upset with mobilization, stress caused by ODS/S, and satisfaction with family relationships—were the same for officers' spouses as for spouses of enlisted personnel (Tables 17 and 19). The one variable that was different (i.e., dissatisfaction with separation from member) had the expected impact—the more dissatisfied the officer's spouse was over the separation, the more severely he or she rated the problems associated with ODS/S.

**Table 18. Variance in the Dependent Variable (SPOUSE PROBLEMS) In the Sequential Model for Spouses of Officers**

Variable Set in the Sequential Model	Percentage of Variance in SPOUSE PROBLEMS Explained by the Model
1. Factors Specifically Related to the ODS/S Deployment	28
2. Set 1 + Composite Indices of Satisfaction with Aspects of Military Life	32

Note: The statistical significance of the overall model was determined by calculating the *F* statistic and its associated probability (see discussion in Appendix B).

**Table 19. Relative Effects of Independent Variables on Problems Experienced Because of Changes Created by ODS/S for Spouses of Officers**

Significant Variables	Beta Coefficient
Upset with Mobilization	0.10
Stress Caused by ODS/S	0.18
Dissatisfaction with Separation from Spouse	0.53
Satisfaction with Family Relationships	0.12

Note: Reference groups for dichotomous and categorical variables are shown in parentheses. Groups that were not significantly different from the reference group are not shown in the table; thus, the categories included for each variable may be different in different tables.

In summary, the results shown in Table 19 indicate the following:

- Officers' spouses who were upset with the ODS/S mobilization were also more likely to report problems associated with ODS/S.
- The greater the degree of stress caused by ODS/S, the more likely the spouse was to report problems associated with ODS/S.
- The higher the dissatisfaction with separation from the Service member, the more likely the officer's spouse was to report problems associated with ODS/S.
- The higher the spouse's dissatisfaction with family relationships, the more likely she or he was to report problems.

Unlike the results for enlisted personnel, the perceptions of officers' spouses about problems associated with ODS/S were not significantly affected when the deployment affected the spouse's job. Possibly, for enlisted personnel, second wage earners are more important to the financial stability of the family than they are for officers' families.



## Summary and Conclusions

The goal of the analyses described in this report was to characterize the combat readiness of Service members who were deployed in ODS/S. Specifically, the report focused on subjects for which ODS/S deployed Service members were more likely to experience difficulties in responding to recall/alert; which Service members had problems with the ODS/S deployment; which Service members were more likely to be concerned about family members during separations; and which spouses of Service members were more likely to report problems related to the changes caused by ODS/S.

The report focuses on the impacts of family demographics and the attitudes of individual Service members (and their spouses) on the Service members' combat readiness. In addition to providing a comparison of members of the ODS/S deployed force with those who were not deployed, the report identifies certain groups that tended to report having more readiness difficulties and concerns than others. Thus, the results provide an indication of who may need additional support in the event of future hazardous deployments.

### Profile of the ODS/S Deployed Force

Statistical analysis showed significant differences in the demographic profiles for the force deployed in ODS/S, those not deployed, and the military force overall, in terms of gender (Figure 1), race/ethnicity (Figure 2), age (Figure 3), education (Figure 4), pay grade (Figure 5), and family type (Figure 6). There were no significant differences among the three groups in terms of location of assignment (Figure 7). For enlisted personnel in the deployed force, the following groups were under-represented (relative to their proportions of the force overall): women, college graduates, and Service members with dependents. On the other hand, the following groups were *over*-represented for enlisted personnel in the deployed force: Blacks, personnel in the 22 to 25 age category, and those in lower pay grades. For officers in the deployed force, the following groups were under-represented: women, Blacks, and Service members in families with dependents. The following groups were *over*-represented for officers in the deployed force: personnel in the 26 to 44 age categories, college graduates and those with some graduate school, and those in lower pay grades.

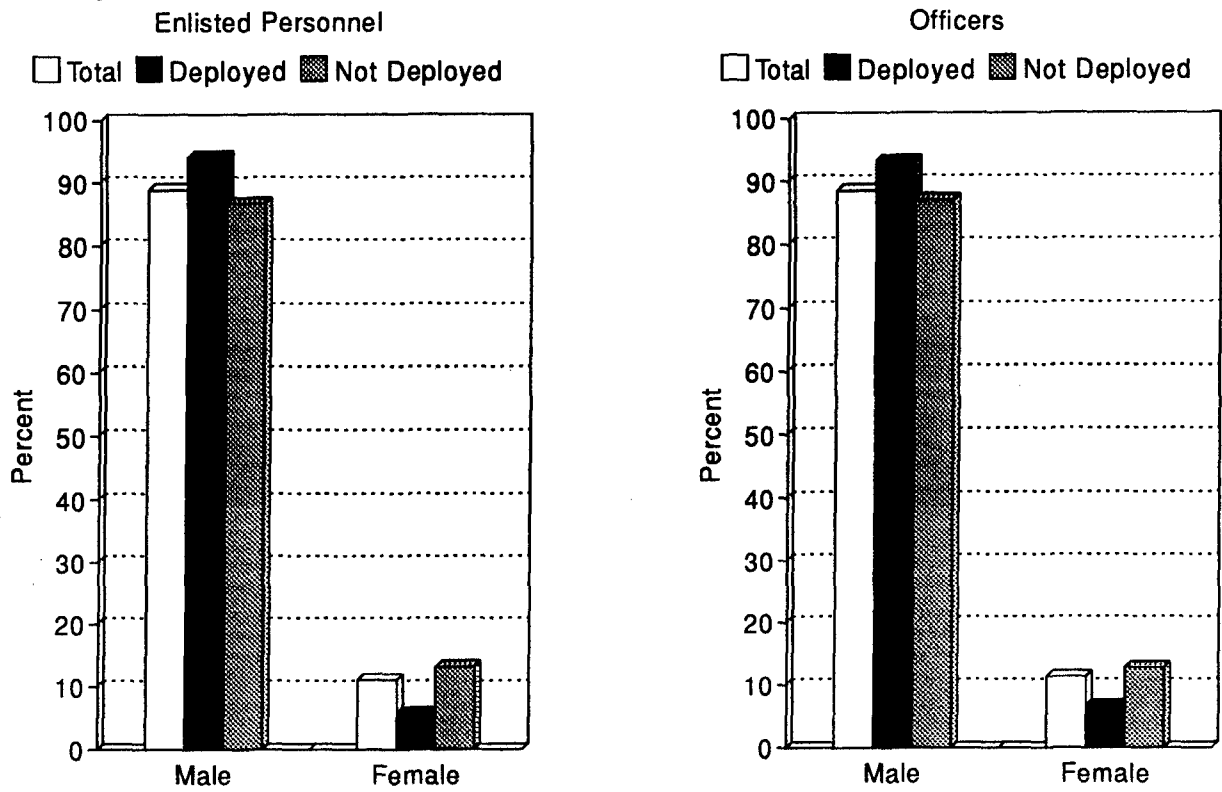
### Barriers to Readiness

#### Difficulties in Responding to Recall/Alert

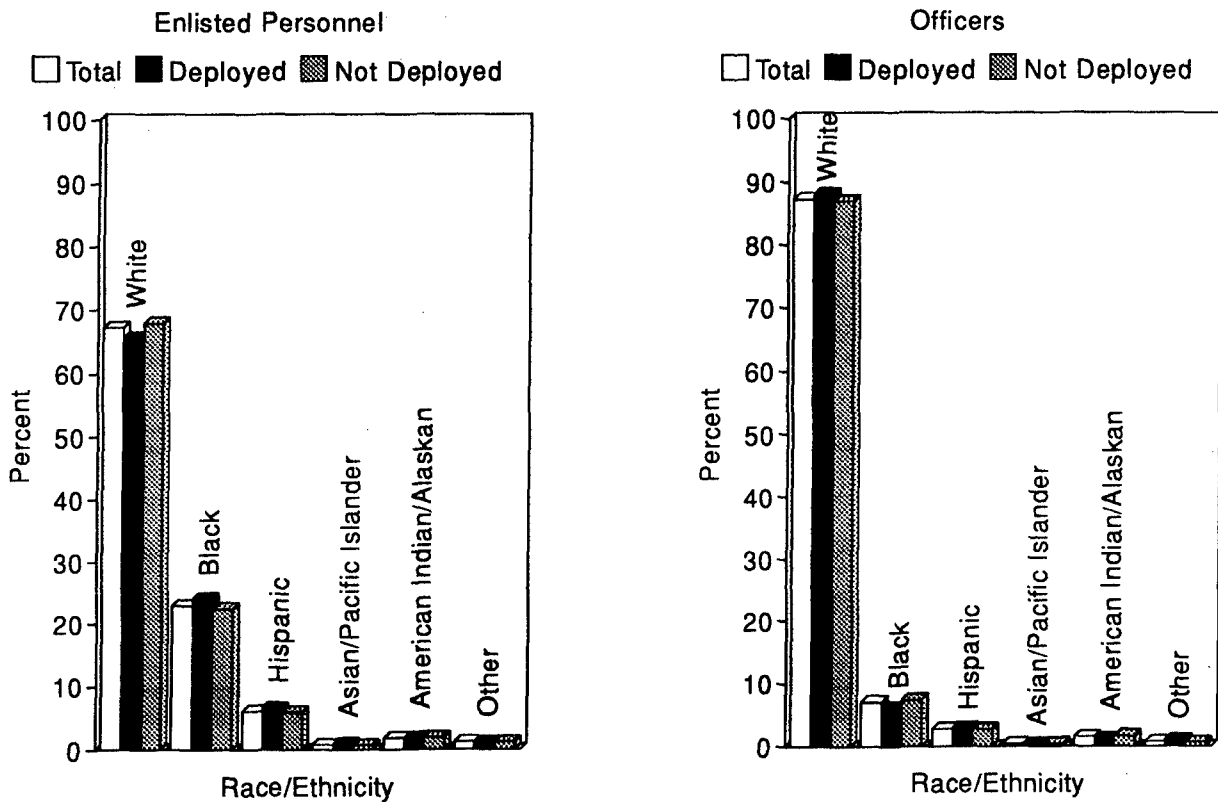
Approximately 35 percent of enlisted personnel and 22 percent of officers who were given short-notice job demands in the year prior to completing the survey indicated that they had experienced difficulty in responding to such demands.

Males deployed in ODS/S were significantly less likely to report difficulties with non-routine work demands than were females. This finding probably reflects the fact that females remain primarily responsible for child care and maintaining the home; thus, when the male is called away, the day-to-day activities of the household continue in a relatively stable fashion. In addition, a much higher percentage of women than men in the military are single parents—12.5 percent of women, compared with 2.9 percent of men (Defense Manpower Data Center, 1992). If a woman is also a single parent, difficulties in responding to recall/alert could be exacerbated.

**Figure 1. Percentage of Service Members Deployed In Operations Desert Shield/Desert Storm by Gender**



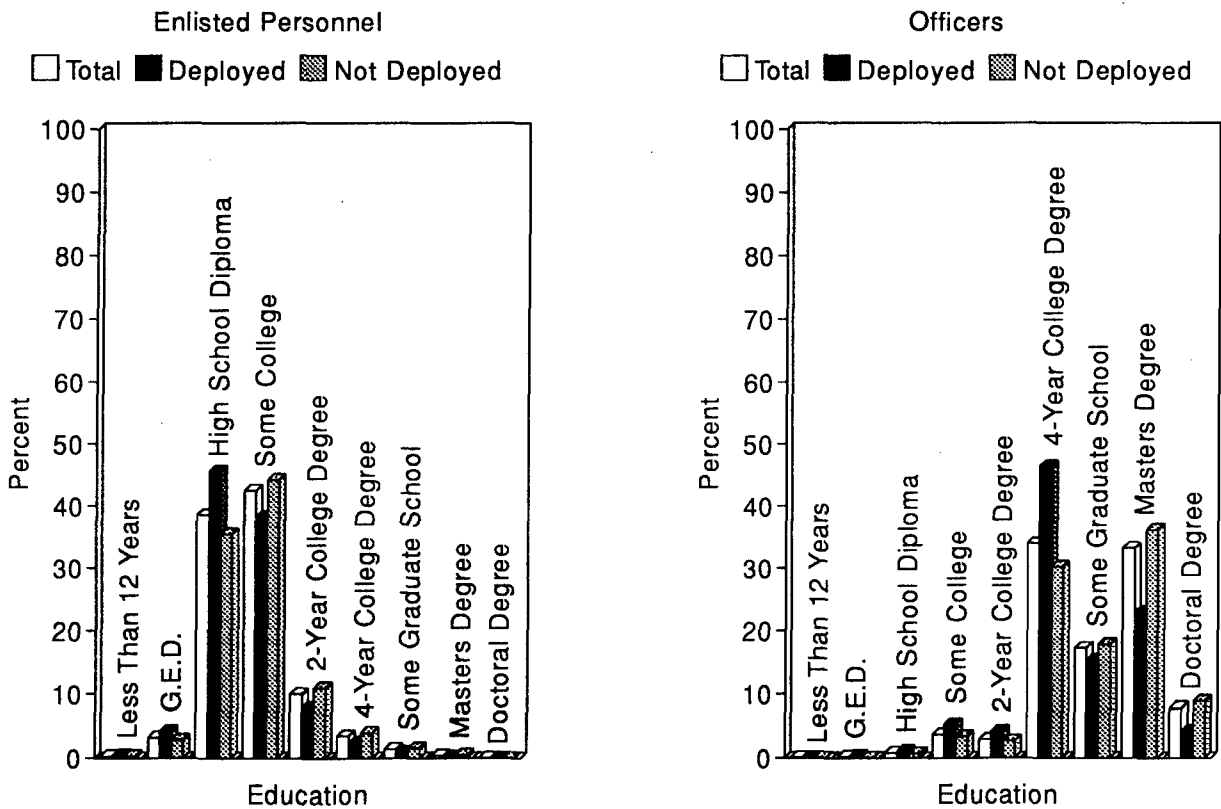
**Figure 2. Percentage of Service Members Deployed In Operations Desert Shield/Desert Storm by Race/Ethnicity**



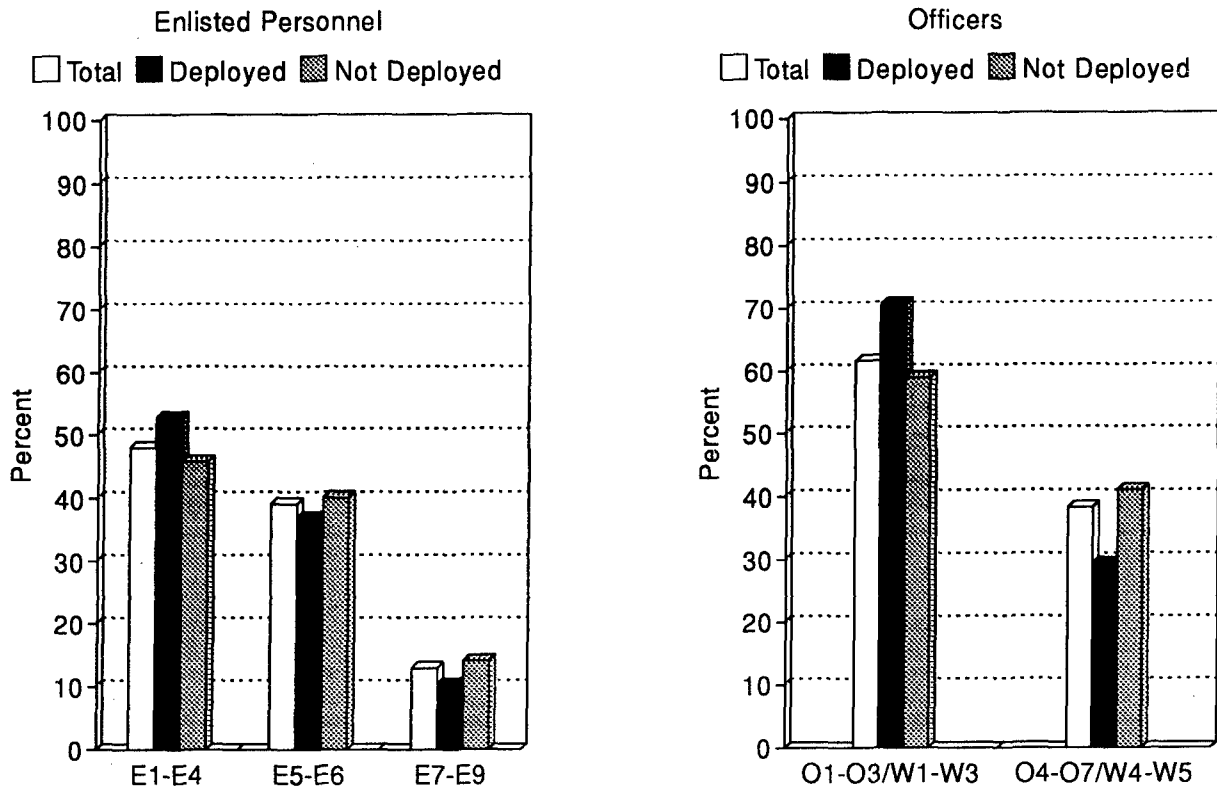
**Figure 3. Percentage of Service Members Deployed in Operations Desert Shield/Desert Storm by Age Group**



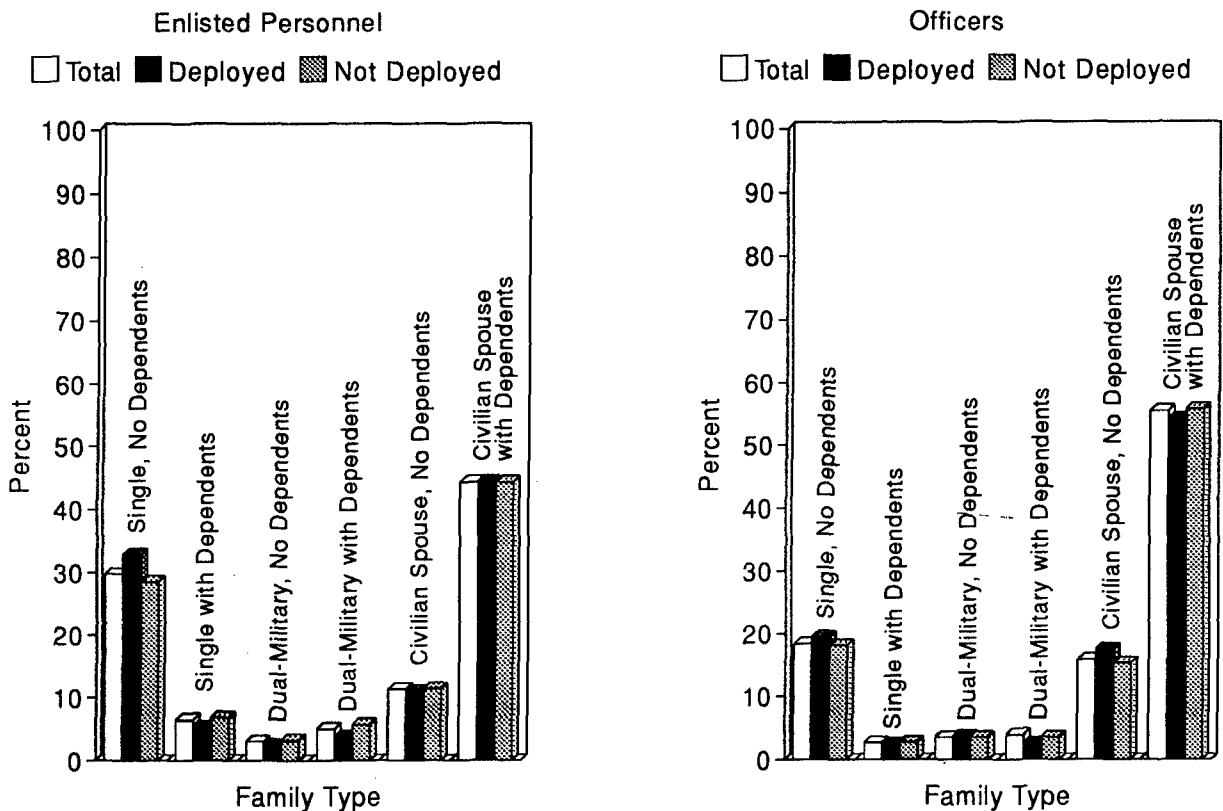
**Figure 4. Percentage of Service Members Deployed in Operations Desert Shield/Desert Storm by Years of Education**



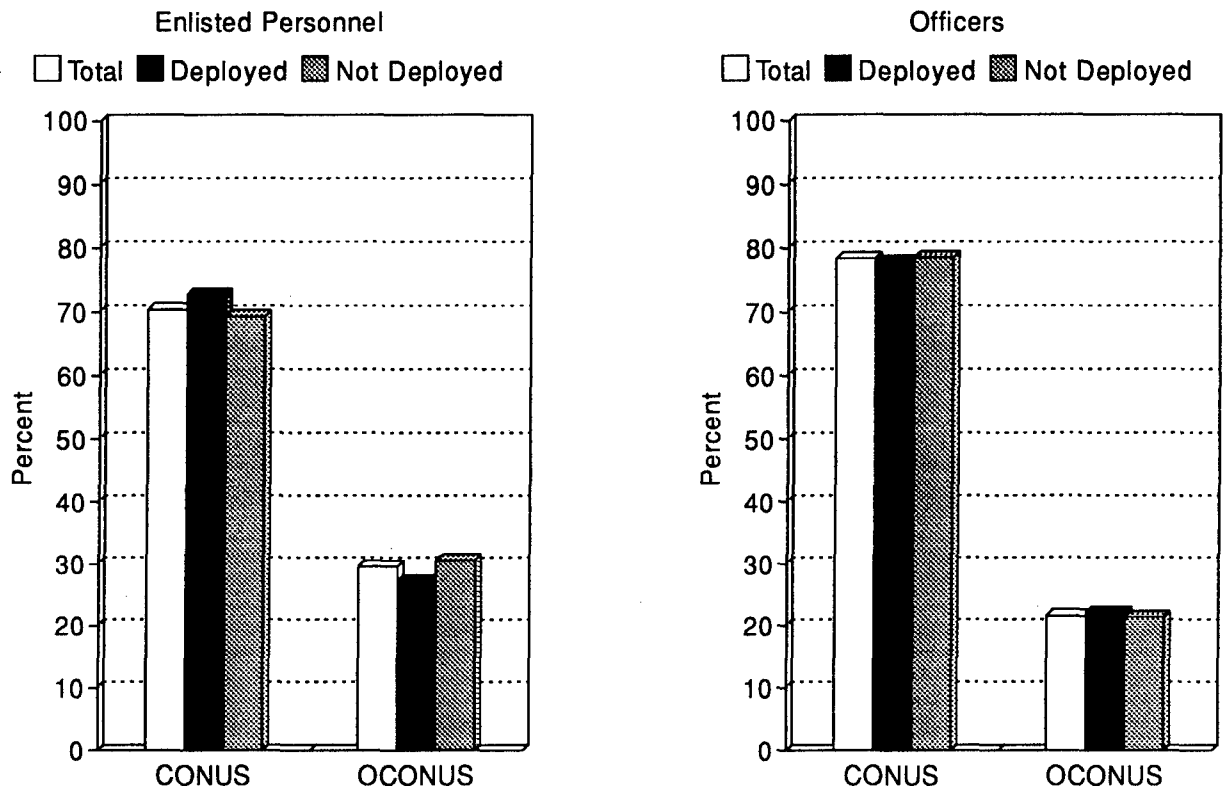
**Figure 5. Percentage of Service Members Deployed in Operations Desert Shield/Desert Storm by Pay Grade**



**Figure 6. Percentage of Service Members Deployed in Operations Desert Shield/Desert Storm by Family Type**



**Figure 7. Percentage of Service Members Deployed In Operations Desert Shield/Desert Storm by Location of Assignment**



For the ODS/S deployed force, age was not significantly related to reports of difficulties. This result is inconsistent with the previous finding that, in the military force overall, older Service members were less likely to report difficulties in responding to recall/alert (Aldridge et al., 1996). Although previous research has shown higher levels of coping skills among older Service members and their spouses (Kelley, 1994), the experience of Service members deployed in ODS/S does not appear to support this claim.

For enlisted personnel deployed in ODS/S, the relationship between education and the percentage reporting difficulties was not significant. For officers, however, additional years of education were positively related to the likelihood of experiencing difficulties. This result suggests that more highly educated officers either experience more difficulties or are more likely to report the difficulties that they do experience.

For both enlisted personnel and officers, pay grade was inversely related to reports of quick-response difficulties; as grade increased, problems with quick response decreased. It is likely that the relationship between pay grade and response difficulties is mediated by tenure and rank. Those of higher rank have experienced more quick-response situations and are better able to deal with the contingencies presented.

For enlisted personnel, those in the Navy appeared to be more likely to experience difficulties in responding to recall/alert than did those in other Service branches. This difference may be a function of several factors, including longer times away from home on the part of Navy personnel with (typically) fewer opportunities to interact with those left behind. Research has demonstrated that an inability to communicate with loved ones increases the stress associated with separations for those who remain at

home (Kelley, 1994; Milgram & Bar, 1993). Interestingly, however, Navy *officers* were no more likely to report difficulties than were officers in other Service branches. Also, Marine officers were *less* likely (by approximately 29 percent) to report difficulties than those in any of the other branches.

As compared with the reference group (Service members with civilian spouses and no dependents), Service members with military spouses and dependents were more likely to have quick-response problems. Clearly, the presence of children (i.e., the majority of dependents) presents complications that make it harder to respond quickly to abrupt changes at work. This finding supports the conclusion reached in post-ODS/S studies—that dual-military marriages present special challenges requiring more in-depth attention (see, for example, Presidential Commission on the Assignment of Women in the Armed Forces, 1992). Curiously, though, single Service members with dependents (i.e., primarily single parents) were no more likely to report quick response problems than were married Service members with no dependents. It is possible that single parents are more likely to have contingency care plans in place at all times, so that changes in work schedules or duties present no more challenge than do other aspects of daily life.

### **Problems Responding to ODS/S Deployment**

Gender was not a significant factor for enlisted personnel in the PROBLEMS model, which focused on problems specifically related to ODS/S deployment. For officers, however, males were less likely to report deployment problems than were females. More highly educated Service members, both enlisted personnel and officers, were more likely to report problems.

Several military demographics—pay grade, military occupation (for enlisted personnel), and Service branch (for officers)—were related to the likelihood of reporting ODS/S deployment problems. More highly paid Service members, both enlisted personnel and officers, were less likely to report problems. Enlisted personnel involved in electronic equipment repair or electronic/mechanical equipment repair were, on average, more likely to report problems than were those in other occupations. The high demand for electronics technicians to man the high-tech weapons used in ODS/S may have contributed to their perceptions of problems responding to the deployment, especially those personnel who were heavily committed elsewhere.

The influence of family factors was predictable for officers. Those officers in families with dependents were more likely to report problems. For enlisted personnel, however, single Service members and those in dual-military families were not significantly different from those with civilian spouses and no dependents.

### **Family Concerns While Separated**

Although males deployed in ODS/S reported fewer difficulties in responding to recall/alert than did females, they reported more concerns about the safety of their families during periods of separation. This result may be attributable in part to the fact that many men feel responsible for the role of family protector and, therefore, feel frustrated when they are separated from their families. In addition, women may be more familiar with and more confident in the support mechanisms available through the military (e.g., child care).

Hispanic officers and those in other non-Black, non-White race/ethnic groups (i.e., American Indian/Alaskan Native, Oriental/Asian/Chinese/Japanese/Korean/Filipino/Pacific Islander, or other)

reported significantly higher levels of concern about their families while they were away from home than did Whites or Blacks. For enlisted personnel, only the "Other" race/ethnic category was significantly different from Whites, showing a greater likelihood than Whites to have higher levels of concern about their families while they were away from home. Enlisted personnel in the Navy and the Marine Corps were more likely to report concern than those in the Army and Air Force. For officers, there were no significant differences by Service branch. As expected, officers with dependents (with the exception of those in dual-military families) reported more concern about their families when they were deployed than did those with civilian spouses and no dependents (the reference group). Interestingly, enlisted Service members with dependents were no more likely to report concern than were those with civilian spouses and no dependents (the reference group).

For both enlisted personnel and officers, the variable with the strongest impact on concerns about family during separations was *satisfaction with military life*. Those who were more satisfied with their military careers reported fewer concerns when separated from their families. The question arises whether having fewer concerns leads to higher levels of career satisfaction or whether being satisfied with one's career serves to decrease family-related concerns. The former would seem to be the more likely relationship, in that stress over family situations could have a negative influence on an individual member's satisfaction, whereas that individual's satisfaction with his/her military career in general would be unlikely to quell family concerns.

### **Spouse's Perception of Problems Due to Changes Created by ODS/S**

In the PROBLEMS model, demographic characteristics were not significantly related to military spouses' perceptions of problems created by the ODS/S deployment. The results for this model suggested that the spouses most likely to report problems with changes created by ODS/S were those who were upset with the mobilization process, more dissatisfied with separation from the Service member, under greater stress, and less satisfied with family relationships in general. These results held for the spouses of both enlisted personnel and officers. Unlike the spouses of enlisted personnel, however, officers' spouses did not perceive more problems when their own jobs were affected by the ODS/S deployment. Possibly, second jobs are less important financially in officers' households than in those of enlisted personnel.

### **Conclusions**

In conclusion, analysis of the survey results suggests the following:

- Service members who appear to require more attention and support as they attempt to cope with short-notice job demands and hazardous deployments such as ODS/S include females, young Service members, and those with families and/or dependents.
- Although characteristics of Navy life seem to contribute to greater difficulties in responding to changing job demands and increased concerns while deployed, the differences across Services are not apparent for the ODS/S deployed group. The survey results suggest that, in preparation for a major deployment such as ODS/S, personnel in all Service branches tend to have similar problems and concerns.
- Although older, more experienced personnel seem to be able to respond to quick recall/alerts with less difficulty, age was not a significant factor in predicting problems related to the ODS/S

deployment. Instead, other characteristics, such as more years of education and more technical occupations, were associated with a higher incidence of problems.

- Satisfaction with one's career is related to the ability to respond to the demands of military life and the degree to which such demands result in concerns about family.
- Spouses' perceptions of problems with the ODS/S deployment were unaffected by demographics. Spouses' disappointments with the mobilization process, dissatisfaction with separations, dissatisfaction with family relationships, frustration over impediments to their careers, and other attitudinal factors contributed to a heightened awareness of problems related to ODS/S.



## References

- Aldridge, D.M., Sturdivant, T.T., Smith, C.L., & Lago, J.L. (1996). *Individual and family readiness for separation and deployment*. Bethesda, MD: Washington Consulting Group, Inc.
- Archer, R.P., & Cauthorne, C.V. (1986). *A final report on an investigation of the effects of deployment-related factors on performance and psychosocial adjustment* (Technical Report No. ONR N00014-84-C-0666). Arlington, VA: Office of Naval Research.
- Beckman, K., Marsella, A.J., & Finney, R. (1979). Depression in wives of nuclear submarine personnel. *American Journal of Psychiatry*, 136, 524-526.
- Campbell, C.H., Campbell, R.C., Ramsberger, P., Schultz, S., Stawarski, C. & Styles, M. (1991). *A model of family factors and individual and unit readiness: Literature review*. Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.
- Department of Defense. (1991). *Occupational conversion manual* (DoD 1312.1-M). Washington, DC: Office of the Assistant Secretary of Defense (Personnel and Readiness).
- Department of Defense. (1993). *Family status and initial term of service, Vol. II - Trends and indicators*. Washington, DC: Office of the Assistant Secretary of Defense (Personnel and Readiness).
- Defense Manpower Data Center. (1992). *Fact sheet: Women in the military*. Arlington, VA.
- Kelley, M.L. (1994). Military-induced separation in relation to maternal adjustment and children's behaviors. *Military Psychology*, 6, 163-176.
- Mardia, K.V., Kent, J.T., & Bibby, J.M. (1979). *Multivariate analysis*. London, UK: Academic Press.
- Milgram, N.A., & Bar, K. (1993). Stress on wives due to husbands' hazardous duty or absence. *Military Psychology*, 5, 21-40.
- Presidential Commission on the Assignment of Women in the Armed Forces. (1992). *Report to the President*. Washington, DC: U.S. Government Printing Office.
- Rosen, L.N., & Moghadam, L.Z. (1990). Matching the support to the stressor: Implications for the buffering hypothesis. *Military Psychology* 2, 193-204.
- Segal, M.W., & Harris, J.J. (1993). *What we know about Army families*. (Special Report 21). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

## Appendix A. Study Design

The 1992 *Department of Defense Surveys of Officer and Enlisted Personnel* comprised four separate samples: longitudinal, recruiters, members, and Active Guard/Reserve or Training and Administration of the Reserve (AGR/TAR) members. The sample design for this survey was a stratified sample selected from active duty personnel as of December 1991. The database used in the analysis for this report included all four samples combined.

### Sample Design

The samples were selected by probability methods. That is, each eligible individual had a non-zero, known probability of selection. This procedure allowed for the projection of the survey results to the target population. Sampling design for the 1992 surveys proceeded as follows: identify sampling frames, devise stratification scheme, select sampling methodology, decide sampling sizes, select sample, and develop weights. These steps are described in the following sections.

**Target population and sampling frames.** The target population is the group being estimated by the sample. For example, the target population for the recruiter sample was all recruiters. A sampling frame is a database that represents the target population from which a sample is drawn.

**Stratification.** Stratification is a sample design feature that seeks to reduce the variance of sample estimates by defining homogeneous subgroups of sampling units and selecting the samples independently within each stratum. In addition, stratification may be used to control subgroup sample sizes. For the 1992 surveys, the stratification variables were identifiers present in the Active Duty Military Master and Loss (M&L) File and in the Reserve Component Common Personnel Data System (RCCPDS). The longitudinal sample was not stratified, but it reflected the stratification carried out in the selection of the 1985 sample. The definitions of the stratification cells for the other three samples are identified below.

The target populations, sampling frames, stratification schemes, and sample sizes corresponding to each of the four samples selected for the 1992 surveys were as follows:

- The longitudinal sample consisted of a subsample of 11,999 from the personnel selected for the 1985 *Department of Defense Survey of Officers and Enlisted Personnel* who were still in the military as of December 1991. The sampling frame was based on the file of the 1985 sample and the 1992 M&L File.
- The recruiter sample consisted of 3,999 recruiters, approximately 1,000 per Service. The sampling frame was extracted from the 1992 M&L File.
- The member sample consisted of members on active duty as of December 1991 who were in the Service for 4 or more months and were neither recruiters nor included in the 1985 survey. The sample of 75,345 active military personnel was derived by selecting approximately 5,000 members from each of the 16 cells defined by Service, officer/enlisted status, and gender. The sampling frame was constructed from the M&L File.
- The AGR/TAR sample consisted of members included in the RCCPDS. The sample included approximately 500 AGR/TAR from each of the 14 cells defined by seven levels of Reserve

Component and officer/enlisted status (some cells had fewer than 500 members). A total of 5,484 full-time, support AGR/TAR members were selected.

**Sample selection.** The longitudinal sample was selected using simple random (equal probability) sampling of eligible from the 1985 survey. The recruiter sample was selected with simple random sampling from within each of the four Services. The member sample was selected with simple random sampling within each of the 16 previously cited strata. If there were fewer than 5,000 Service members in a member-sample stratum, all members were included in the sample. The AGR/TAR sample was selected by simple random sampling from within each of 14 sampling strata defined by Reserve Component and enlisted/officer status.

**Weighting.** Weights were developed to reflect the variable probabilities of selection and nonresponse adjustments. Weighting in sample surveys has several objectives: (a) to reflect varying probabilities of selection; (b) to adjust for sample losses due to nonresponse; and (c) to adjust for deficiencies in the sampling frame that may introduce bias.

Each sample selected for the 1992 surveys consisted of only a subset of its respective target population. Therefore, to represent the entire population, it was necessary to derive base weights that projected the sample to the populations covered by the sampling frames. The base weight is the reciprocal of the probability of selection. For the longitudinal sample, which did not involve stratification, the base weight (*BWT*) was computed as:

$$BWT = (\text{number in population in 1992}) / (\text{sample size})$$

For the other three samples that were stratified, the base weight was computed within stratum as:

$$BWT_S = (\text{number in the stratum}) / (\text{stratum sample size})$$

To account for nonresponse, the base weight was adjusted by a nonresponse factor. Nonresponse adjustment through weighting implies that, within adjustment cells, nonrespondents are similar to respondents with respect to the characteristics being measured by the survey. To develop the nonresponse adjustment, respondents and nonrespondents were partitioned into adjustment cells based on Service, status, and gender. For each of the four samples, the nonresponse adjustment was developed as all eligible (respondents and nonrespondents) divided by all respondents. The nonresponse adjustment cells corresponded to the sampling strata. That is, for sampling stratum *S*, the nonresponse adjustment factor,  $F_S$ , is:

$$F_S = (\text{eligible})_S / (\text{respondents})_S$$

Multiplying the base weight by the corresponding nonresponse adjustment factor (i.e.,  $BWT_S \times F_S$ ) made the respondents represent not only the segment of the population they were sampled to represent but also nonrespondents in adjustment cell *S*.

The last phase of the weighting process involved raking to known population totals for various key characteristics. (Raking is a computational procedure that adjusts the final weight so that the weighted estimate from the sample corresponds to known totals for the groups defined by the raking variables.) Three levels of raking were performed. The first level of raking was indexed by Service, enlisted/officer status, and gender. Status was not used in raking the recruiters sample. The second level was indexed

by pay grade and race/ethnicity, and the third level by marital status. This process adjusted the weights so that the sum of the weights for respondents over the raking variables corresponded to the known counts of eligible respondents in the respective cells.

## Data Collection

**Questionnaire development.** Each of the 1992 survey instruments was constructed around a core set of questions comparable to those used in previous personnel surveys, particularly the *1985 Surveys of Officers and Enlisted Personnel*. The questionnaire content focused on information about personal and military background, family composition, economic status, preparedness, career plans, satisfaction with various aspects of military life, and assessment of military programs and services. In addition, the 1992 surveys included questions regarding Operations Desert Shield/Desert Storm. Separate instruments were administered to enlisted personnel and officers. The enlisted and officer questionnaires were nearly identical, except on questions relating to enlistment intentions and promotions.

**Administration.** The data collection for the 1992 surveys was conducted by the Defense Manpower Data Center (DMDC) from May to October 1992. First, the total sample was aggregated by unit. Any unit with more than one member selected for the survey was sent a pre-notification letter, advising the unit commander of the survey and requesting that a point-of-contact (POC) be appointed to receive and distribute the surveys. A total of 10,973 pre-notification letters were mailed to units in April 1992. Address correction was required for 667 (6 percent) of the units.

The first questionnaires were mailed to units for distribution to members beginning in late April and continuing through May 1992. If only one member from a unit was selected to participate in the survey, that member was sent the survey package directly (approximately 7 percent of the sample).

Although nonresponse is present in all voluntary surveys, the potential bias caused by nonresponse can be reduced by thorough nonresponse follow-up. In the 1992 study, nonresponse at the unit level was handled by sending three follow-up letters. The first letter notified the POCs of the units from which DMDC had not received the survey check lists; the second letter informed the POC that the roster of survey participants had not been received; and the third letter was a notification that the completed surveys had not been returned to DMDC. Follow-up questionnaires were mailed 1 to 2 months later to nonrespondents directly at their units.

**Response rates.** The initial 1992 sample consisted of 40,812 officers and 56,015 enlisted personnel, for a total of 96,827 members. According to POC-provided information, 6,557 individuals in the sample had separated from the military by the time the survey was administered. Ultimately, the number of eligible members was 90,270.

At the close of the data collection in October 1992, a total of 59,930 completed surveys (27,684 officers and 32,246 enlisted) had been received. The level of nonresponse varied by Service, pay grade, and gender. Response rates were calculated based on the number of completed returns and the number of eligible members. The adjusted response rates were 72 percent for officers, 62 percent for enlisted personnel, and 66 percent overall. Response rates by gender were 67 percent for males and 66 percent for females. Response rates for the Services were 72 percent for the Air Force, 71 percent for the Navy, 62 percent for the Marine Corps, and 59 percent for the Army.

Although the overall level of participation was quite high, response rates differed by subgroups (Table A1). In general, officers in the Navy and male officers in the Air Force had the highest response rates, while enlisted members in the Army had the lowest response rate.

**Table A1. Questionnaire Completion and Response Rates by Status, Gender, and Service Branch**

Status and Gender	Service Branch				
	Army	Navy	Marine Corps	Air Force	Total
<b>Total Complete (Number)</b>					
<b>Officers</b>	<b>7,349</b>	<b>8,160</b>	<b>4,189</b>	<b>7,986</b>	<b>27,684</b>
Male	4,178	4,343	3,910	4,420	16,851
Female	3,171	3,817	279	3,566	10,833
<b>Enlisted Personnel</b>	<b>7,237</b>	<b>8,517</b>	<b>6,995</b>	<b>9,497</b>	<b>32,246</b>
Male	4,236	4,899	4,254	5,257	18,646
Female	3,001	3,618	2,741	4,240	13,600
<b>Total</b>	<b>14,586</b>	<b>16,677</b>	<b>11,184</b>	<b>17,483</b>	<b>59,930</b>
Male	8,414	9,242	8,164	9,677	35,497
Female	6,172	7,435	3,020	7,806	24,433
<b>Response Rate (Percent)</b>					
<b>Officers</b>	<b>65.7</b>	<b>76.5</b>	<b>70.6</b>	<b>73.5</b>	<b>71.6</b>
Male	67.3	76.8	70.7	74.3	72.2
Female	63.6	76.3	68.6	72.5	70.7
<b>Enlisted Personnel</b>	<b>53.3</b>	<b>66.4</b>	<b>58.4</b>	<b>71.1</b>	<b>62.3</b>
Male	53.8	66.4	58.6	70.2	62.2
Female	52.6	66.4	58.1	72.2	62.6
<b>Total</b>	<b>58.9</b>	<b>71.0</b>	<b>62.4</b>	<b>72.2</b>	<b>66.3</b>
Male	59.8	70.9	63.8	72.0	66.6
Female	57.7	71.1	58.9	72.4	65.9

## Appendix B. Analysis Methodology

### Analysis Database

The initial database used for the series of reports on the 1992 *Department of Defense Surveys of Officer and Enlisted Personnel* was prepared using Statistical Analysis System (SAS) software for DoD use and served as the basis for a public-use tape. In the preparation of this file, the survey data were thoroughly edited, and analysis was carried out for key variables such as gender and race/ethnicity. In addition, constructed variables were developed from survey answers (e.g., total number of dependents), and from RCCPDS extracted information (e.g., location of current assignment—CONUS/OCONUS). Additional recodings and composite variables created during the course of this analysis are discussed in the next two sections.

**Extracting and recoding.** The first step in the construction of the analysis database was to extract from the original DoD file a SAS file that included only the variables identified in the analysis plan. During this extraction step, all SAS character variables were converted to numeric variables so that they could be used in SAS procedures. Several variable types need to be defined in order to explain the conversion. A categorical variable (e.g., race/ethnicity) has character values (e.g., 1 = *White*, 2 = *Black*) that represent possible categories or items. These variables were converted to numeric dichotomous (1 = *Yes*, 0 = *No*) variables, one for each category. To use the race/ethnicity example, dichotomous variables were created for *White* (1 = *White*, 0 = *Non-white*), *Black* (1 = *Black*, 0 = *Non-black*), and so on. An ordinal variable contains characters (e.g., 1 = *Very Well*, 2 = *Well*) that represent levels on a scale. These variables were simply made numeric in the analysis data set; some were used as is and some were subject to further recoding. A continuous variable is a numeric variable that has significant digits to the right of the decimal point; in other words, a continuous variable can have non-whole-number values. In contrast to categorical variables, continuous variables in the analysis data set were appropriate for models without modification.

The extracted data set was split into data sets for enlisted personnel and officers. Since the analysis was to be performed separately for these two groups, these restricted data sets were more manageable and facilitated processing. In addition to the general character to numeric conversions described above, a series of recodes had to be performed to prepare variables for use in tabulations or models, and to facilitate interpretation of the results. The following types of recodes were done:

- Valid skips were originally coded as SAS “special” missing values (.S). Following this convention, all “not applicable” responses were also recoded to the same special missing code (.S). This conversion differentiates these types of respondents from respondents who did not answer the question. A regular missing value is coded “.”.
- For multiple-response categories measured with an ordinal scale, codes were reverse-scored when the highest code indicated a negative response. For example, one question asked how well a spouse would take care of family finances in the member’s absence. It was answered using a scale that varied from *Very Well* (1) to *Very Poorly* (5). After recoding, *Very Well* was scored a 5, *Very Poorly* was scored a 1, and intermediate values were adjusted accordingly. This recoding facilitated interpretation of the results by making responses uniform in their direction.
- Dichotomous variables were created for variables that had a *No* response and several options for the *Yes* response. For example, in the Operations Desert Shield/Desert Storm (ODS/S) deployment

question, the four *Yes* responses (i.e., fewer than 3 months, 3 but fewer than 6 months, 6 but fewer than 9 months, and 9 months or more) to the ODS/S deployment question were collapsed into a single *Yes* category.

- Response categories that had one-character codes representing ranges of values were assigned a numerical value corresponding to the midpoint of the range. This conversion captured the different widths of the ranges. For example, one pre-specified response option for “Total Value of Pay” ranged from \$20,000 to \$30,000. The original code of 2 was changed to a value of \$25,000.

**Constructed variables.** New variables were developed using combinations of possible responses to a single question or of multiple questions (composite variables). One type of new variable consisted of combining categorical responses to several parts of a question. For example, respondents were asked how many dependents they had in each of several age groups (e.g., under 1 year, 1 to under 2 years). A continuous variable for youngest dependent was constructed by identifying the lowest non-missing answer (e.g., 2 dependents in the 1 to under 2 category) and entering the midpoint of the range (1.5 in this case) as the value of the new variable.

Composite variables were created in order to capture the information from several multiple-item questions with response categories consisting of ordinal scales, thereby reducing the number of variables to analyze. Factor analysis, a statistical technique that is used to identify a reduced number of dimensions or “factors” present in a group of variables, was used for this purpose. Factor analysis gives the analyst a systematic approach to understanding the interrelationships among items and uncovers groups of items that measure the same concept or issue.

The factor identification was performed with the SAS procedure PROC FACTOR, using the principal component approach to factor extraction (Mardia, Kent, & Bibby, 1979) and incorporating the final weight. Each principal component calculated is a linear combination of the original variables and has an eigenvalue which indicates how much variance is explained by that component or factor. “Factor loadings” describe the correlation of each original variable with the factor and indicate how much weight is assigned to each factor.

The initial matrix of factor loadings is difficult to interpret because many of the variables have moderate-size correlations with several factors. Through a process of rotation, the matrix is transformed by applying a nonsingular linear transformation which groups the coefficients more closely around 0, 1 or -1. Rotation makes assigning names to the common factors, which is always a subjective process, more objective by highlighting patterns. We used an orthogonal rotation, which maintains the axes of the matrix at a right angle. A variety of algorithms are used for orthogonal rotation. The most commonly used is the varimax method, which maximizes the variance of squared loadings and attempts to minimize the number of variables that have high loadings on a factor. We used the varimax method to enhance the interpretability of the factors. A statistic called Cronbach’s coefficient Alpha was used to assess the reliability of the factors identified through interpretation of the rotated matrix. High coefficient Alphas (0.7 and above) indicated a reliable composite variable.

The construction of the variable PROBLEMS ENCOUNTERED WITH PCS MOVES is an example of using factor analysis to develop composite variables. Each of 18 different potential problems was rated by the respondent on a scale of *Very Serious Problem* to *Not a Problem*. A preliminary factor analysis reduced the 18 items to five dimensions, as shown in Table B1. Based on a member’s response to each of the 18 items, a “factor score” for each of the five dimensions was computed. The factor score

consisted of the mean of the codes associated with the individual items in a particular factor. The mean score was a continuous variable that could be used as a dependent or independent variable in the analysis.

**Table B1. Factors Identified as Problems Associated with Members' Most Recent PCS Moves**

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**Factor 1: Spouse/Dependent Considerations**

Item

- N Finding dependent medical care
- M Finding dependent dental care
- R Spouse adjusting to new environment
- Q Children adjusting to new environment
- G Finding civilian employment for spouse and dependents
- O Finding child care

**Factor 2: Financial**

Item

- C Costs of setting up new residence
- B Temporary lodging expense
- E Transportation costs incurred during move
- D Costs of selling/moving from old residence
- K Finding permanent housing
- A Adjusting to higher cost of living

**Factor 3: Career/Education**

Item

- H Continuing your education
- J Transferring college credits
- F Finding off-duty employment for yourself

**Factor 4: Personal Adjustment**

Item

- S Adjusting yourself to new environment
- L Finding shopping, recreational facilities

**Factor 5: Dual-Service Couple**

Item

- P Military treatment of dual-service couples
- 

In some cases a composite variable was constructed across items from questions on different scales. In these situations, the scales were standardized (with a mean of 0 and a standard deviation of 1) using the SAS procedure PROC STANDARD before doing factor analysis. The variable SATISFACTION WITH MILITARY LIFE was constructed in this fashion. It combined nine survey items: whether life in the military was as the respondent expected (5-point scale); whether the respondent was satisfied with personal freedom, the opportunity to serve one's country, working conditions, coworkers, military job stability, friendships, and frequency of moves (5-point scales); and satisfaction with overall military life (7-point scale). After standardization, factor analysis yielded factor loadings of 0.4 and above, which were significant enough to allow identification of common factors. Cronbach's coefficient Alpha was 0.81 for enlisted personnel, 0.79 for officers, and 0.81 for enlisted personnel and officers combined, which indicated reliable composite variables for all three data sets. The final composite was calculated



based on the mean of these standardized items for cases with at least five of the nine survey items present.

## Statistical Procedures

The choice of statistical procedures used for the analyses conducted for this report was determined by the nature of the variables and the research questions. In general, the analysis began with descriptive tabs, proceeded to simple descriptive tests (i.e., Chi-square), and then concluded with a complex model (either logistic or multiple regression).

A *Chi-square test* of independence, which is a test for the degree of association between two categorical variables, was used as a first step in the analysis to identify statistically significant relationships between pairs of categorical variables.

*Logistic regression* was used to determine the relative importance of particular sets of dichotomous or continuous independent variables on whether an event (e.g., experiencing difficulty responding to recall or alert) occurred or not. In developing the model, the dependent variable was represented by a dichotomous variable. With this procedure it was possible: (a) to statistically assess the relative importance of each explanatory (independent) variable on the outcome measure (i.e., the dependent variable); and (b) to test the applicability of the overall model. Relative odds, expressed as percentages, were computed from the Beta coefficients  $[(e^{\beta} - 1) \times 100]$  to indicate the increase or decrease in the likelihood of an outcome compared to a reference group. For example, relative odds of -39 percent for males compared to females (the reference group) indicate that males are 39 percent less likely to have difficulties than females. For a continuous variable, such as age, the relative odds refer to the impact of an increase of one unit (in this case, a year of age).

*Multiple regression* was used to examine the relationship of a set of independent variables with the expected level of a dependent variable. This statistical procedure was applied when the dependent variable was continuous or ordinal. The value of the *t*-statistic was used to determine which variables should be kept in the model by examining the significance of the coefficients associated with the explanatory variables. The significance of the overall model was measured using the *F* statistic, which was based on the Wald Chi-square statistic, and an additional *F* test was used to assess the significance of the *increases* in the overall quality of the model when new sets of variables were entered. Variables were entered in related groups; that is, a systematic, hierarchical modeling approach was used. The final model was determined by eliminating variables with coefficients that were not statistically significant at the 5 percent level.

## Computing Software

The SAS<sup>®</sup> software was used to extract data from the initial database provided by the DoD, construct variables, and run descriptive tabulations. When the analysis graduated to descriptive tests and models, however, SAS was not appropriate. The sample design and estimation procedure for the 1992 surveys had to be incorporated into the estimation of test statistics. Since survey data sets were based on a complex sample design and estimation approach, the SURvey DATA ANalysis (SUDAAN) software was used to perform the modeling and compute test statistics used in the analyses.

SUDAAN calculates model parameters, sampling errors, and test statistics for a variety of statistical procedures, including coefficients of linear regressions and loglinear models. The software uses Taylor

series linearization to approximate functions of linear statistics (e.g., means and linear regression coefficients) estimated from the sample data. It also accommodates weights that reflect varying probabilities of selection and other adjustments.

Three SUDAAN procedures—CROSSTAB, REGRESS, and LOGISTIC—were used in the analysis for this report. These procedures allow for specification of the levels of stratification and the incorporation of the final weight associated with each observation when doing estimation and variance calculations. CROSSTAB produces estimates of population totals and proportions, and a test of independence for each two-way table. The test statistic is based on the Wald statistic, which is distributed as Chi-square with  $(R - 1)(C - 1)$  degrees of freedom, where  $R$  = row and  $C$  = column. The REGRESS procedure fits multiple regression models to survey data. The statistical approach consists of estimating the regression coefficients by first forming the Horvitz-Thomson estimators of the population sums of squares and cross product matrices, and then using the Taylor series method to estimate the variance-covariance matrix of the coefficients. The LOGISTIC procedure fits logistic regression models to sample survey data so that the model parameter estimates and their variance-covariance matrix accurately accounts for the survey design. The Beta coefficients can be interpreted as linear regression coefficients and expressed as relative odds by  $(e^B - 1) \times 100$ .

### **Statistical Backup**

Tables B2 through B9 show the regression coefficients (estimated Betas) and associated  $P$  values for the test of the hypothesis that the Beta coefficient is zero for each of the four dependent variables presented in the report. The results for enlisted personnel and officers are presented separately.

**Table B2. Logistic Regression Results for Difficulties in Quick Response  
(Dependent Variable = DIFFICULTY): Enlisted Personnel**

Explanatory Variable	Beta Coefficient		P Value for H:B = 0	Relative Odds		
	Value	S.E.		Percent	Upper Bound	Lower Bound
<b>Gender (Female)</b>						
Male	-0.35	0.11	<0.01	-29.5	-12.6	-43.2
<b>Pay Grade (E1 to E4)</b>						
E5 to E6	-0.41	0.14	<0.01	-33.6	-12.7	-49.6
E7 to E9	-0.76	0.25	<0.01	-53.2	-23.7	-71.3
<b>Service Branch (Army)</b>						
Navy	0.28	0.13	0.03	32.3	70.7	2.6
Air Force	-0.03	0.13	0.81	-3.0	25.2	-24.8
Marines	0.01	0.12	0.96	1.0	27.8	-20.2
<b>Military Occupation (Infantry)</b>						
Electronic Equipment Repair	0.26	0.19	0.16	29.7	88.2	-10.6
Comm/Intelligence Specialist	0.16	0.18	0.39	17.4	67.0	-17.5
Health Care Specialist	-0.07	0.23	0.77	-6.8	46.3	-40.6
Other Tech/Allied Specialist	0.03	0.33	0.92	3.0	96.8	-46.0
Functional Support/Administration	-0.17	0.18	0.34	-15.6	20.1	-40.7
Elec/Mech Equipment Repair	0.14	0.14	0.32	15.0	51.3	-12.6
Craftsman	0.17	0.24	0.48	18.5	89.7	-25.9
Service/Supply Handler	0.36	0.18	0.04	43.3	104.0	0.7
Non-Occupational	-0.88	0.62	0.15	-58.5	39.8	-87.7
<b>Family Type (Civilian Spouse, No Dependents)</b>						
Single, No Dependents	-0.65	0.16	<0.01	-47.8	-28.6	-61.8
Single with Dependents	0.05	0.24	0.83	5.1	68.3	-34.3
Dual-Military, No Dependents	-0.13	0.30	0.67	-12.2	58.1	-51.2
Dual-Military with Dependents	0.61	0.24	0.01	84.0	194.6	15.0
Civilian Spouse with Dependents	0.29	0.16	0.06	33.6	82.9	-2.3

Note: Reference groups for dichotomous and categorical variables are shown in parentheses.

**Table B3. Logistic Regression Results for Difficulties in Quick Response  
(Dependent Variable = DIFFICULTY): Officers**

Explanatory Variable	Beta Coefficient		P Value for H:B = 0	Relative Odds		
	Value	S.E.		Percent	Upper Bound	Lower Bound
<b>Gender (Female)</b>						
Male	-0.60	0.15	<0.01	-45.1	-26.4	-59.1
<b>Pay Grade (O1 to O3)</b>						
O4 to O7	-0.67	0.17	<0.01	-48.8	-28.6	-63.3
<b>Service Branch (Army)</b>						
Navy	0.08	0.14	0.56	8.3	42.5	-17.7
Air Force	-0.02	0.14	0.89	-2.0	29.0	-25.5
Marines	-0.34	0.13	0.01	-28.8	-8.2	-44.8
<b>Military Occupation (Engineering/Maintenance)</b>						
General Officer/Executive	-0.07	0.52	0.90	-6.8	158.4	-66.4
Tactical Operations Officer	0.32	0.17	0.06	37.7	92.2	-1.3
Intelligence Officer	-0.14	0.29	0.64	-13.1	53.5	-50.8
Scientist/Professional	-0.05	0.38	0.90	-4.9	100.3	-54.8
Health Care Officer	0.48	0.23	0.04	61.6	153.7	3.0
Administrator	0.01	0.26	0.98	1.0	68.1	-39.3
Supply, Procurement, Allied Officer	0.24	0.23	0.30	27.1	99.5	-19.0
Non-Occupational	-0.04	0.31	0.90	-3.9	76.4	-47.7
<b>Family Type (Civilian Spouse, No Dependents)</b>						
Single, No Dependents	-0.15	0.19	0.44	-13.9	24.9	-40.7
Single with Dependents	1.34	0.30	<0.01	281.9	587.6	112.1
Dual-Military, No Dependents	-0.82	0.32	0.01	-56.0	-17.5	-76.5
Dual-Military with Dependents	1.53	0.27	<0.01	361.8	684.0	172.0
Civilian Spouse with Dependents	0.66	0.17	<0.01	93.5	170.0	38.7

Note: Reference groups for dichotomous and categorical variables are shown in parentheses.

**Table B4. Logistic Regression Results for Problems In Responding to ODS/S Deployment  
(Dependent Variable = PROBLEMS): Enlisted Personnel**

Explanatory Variable	Beta Coefficient		P Value for H:B = 0	Relative Odds		
	Value	S.E.		Percent	Upper Bound	Lower Bound
<b>Years of Education</b>	0.13	0.04	<0.01	13.9	23.2	5.3
<b>Pay Grade (E1 to E4)</b>						
E5 to E6	-0.31	0.12	0.01	-26.7	-7.2	-42.0
E7 to E9	-0.71	0.21	<0.01	-50.8	-25.8	-67.4
<b>Military Occupation (Infantry)</b>						
Electronic Equipment Repair	0.59	0.16	<0.01	80.4	146.8	31.8
Comm/Intelligence Specialist	0.25	0.16	0.12	28.4	75.7	-6.2
Health Care Specialist	0.34	0.22	0.11	18.5	82.4	-23.0
Other Tech/Allied Specialist	0.25	0.28	0.39	47.7	155.7	-14.7
Functional Support/Administration	0.17	0.15	0.26	19.7	60.6	-10.8
Elec/Mech Equipment Repair	0.39	0.13	<0.01	35.0	74.2	4.6
Craftsman	0.18	0.22	0.40	55.3	139.0	0.9
Service/Supply Handler	0.30	0.16	0.07	-0.3	36.4	-27.1
Non-Occupational	0.44	0.46	0.34	-56.8	6.4	-82.5
<b>Tenure</b>	-0.003	0.001	0.01	-5.8	-5.6	-6.0
<b>Family Type (Civilian Spouse, No Dependents)</b>						
Single, No Dependents	-0.84	0.14	<0.01	-56.8	-43.2	-67.2
Single with Dependents	-0.06	0.21	0.79	-5.8	42.1	-37.6
Dual-Military, No Dependents	-0.58	0.28	0.04	-44.0	-3.1	-67.7
Dual-Military with Dependents	0.27	0.22	0.22	31.0	101.6	-14.9
Civilian Spouse with Dependents	0.18	0.14	0.19	19.7	57.5	-9.0

Note: Reference groups for dichotomous and categorical variables are shown in parentheses.

**Table B5. Logistic Regression Results for Problems In Responding to ODS/S Deployment  
(Dependent Variable = PROBLEMS): Officers**

Explanatory Variable	Beta Coefficient		P Value for H:B = 0	Relative Odds		
	Value	S.E.		Percent	Upper Bound	Lower Bound
<b>Gender (Female)</b>						
Male	-0.46	0.12	<0.01	-36.9	-20.1	-50.1
<b>Years of Education</b>	0.10	0.03	<0.01	10.5	17.2	4.2
<b>Pay Grade (O1 to O3)</b>						
O4 to O7	-0.47	0.11	<0.01	-37.5	-22.5	-49.6
<b>Service Branch (Army)</b>						
Navy	-0.07	0.12	0.54	-6.8	18.0	-26.3
Air Force	0.24	0.12	0.06	27.1	60.8	0.5
Marines	-0.30	0.12	0.01	-25.9	-6.3	-41.4
<b>Family Type (Civilian Spouse, No Dependents)</b>						
Single, No Dependents	-0.13	0.16	0.44	-12.2	20.2	-35.8
Single with Dependents	0.70	0.27	0.01	101.4	241.8	18.6
Dual-Military, No Dependents	-0.43	0.30	0.15	-34.9	17.1	-63.9
Dual-Military with Dependents	0.81	0.27	<0.01	124.8	281.6	32.4
Civilian Spouse with Dependents	0.34	0.14	0.01	40.5	84.9	6.8

Note: Reference groups for dichotomous and categorical variables are shown in parentheses.

**Table B6. Multiple Regression Results for Family Concerns While Separated  
(Dependent Variable = CONCERN): Enlisted Personnel**

Explanatory Variable	Beta Coefficient		P Value for H:B = 0
	Value	S.E.	
<b>Gender (Female)</b>			
Male	-0.18	0.06	<0.01
<b>Race/Ethnicity (White)</b>			
Black	-0.09	0.07	0.17
Hispanic	-0.08	0.09	0.35
Other	-0.36	0.10	<0.01
<b>Value of Pay and Allowances</b>	0.00	0.00	<0.01
<b>Family Type (Civilian Spouse, No Dependents)</b>			
Single, No Dependents	1.07	0.09	<0.01
Single with Dependents	-0.01	0.12	0.91
Dual-Military, No Dependents	0.09	0.15	0.54
Dual-Military with Dependents	0.02	0.12	0.88
Civilian Spouse with Dependents	-0.13	0.07	0.07
<b>Satisfaction with Military Life</b>	2.18	0.30	<0.01

Note: Reference groups for dichotomous and categorical variables are shown in parentheses.

**Table B7. Multiple Regression Results for Family Concerns While Separated  
(Dependent Variable = CONCERN): Officers**

Explanatory Variable	Beta Coefficient		P Value for H:B = 0
	Value	S.E.	
<b>Gender (Female)</b>			
Male	-0.19	0.05	<0.01
<b>Age</b>	-0.01	0.00	0.01
<b>Race/Ethnicity (White)</b>			
Black	0.02	0.09	0.81
Hispanic	-0.26	0.11	0.01
Other	-0.28	0.10	<0.01
<b>Years of Education</b>	0.04	0.01	<0.01
<b>Value of Pay and Allowances</b>	0.00	0.00	<0.01
<b>Family Type (Civilian Spouse, No Dependents)</b>			
Single, No Dependents	0.72	0.08	<0.01
Single with Dependents	-0.25	0.13	0.06
Dual-Military, No Dependents	0.28	0.09	<0.01
Dual-Military with Dependents	-0.07	0.09	0.42
Civilian Spouse with Dependents	-0.14	0.05	<0.01
<b>Power of Attorney (No Power of Attorney)</b>			
Power of Attorney in Place	-0.09	0.04	0.01
<b>Satisfaction with Military Life</b>	2.18	0.30	<0.01

Note: Reference groups for dichotomous and categorical variables are shown in parentheses.

**Table B8. Multiple Regression Results for Spouse's Perception of Problems Due to Changes Created by ODS/S (Dependent Variable = SPOUSE PROBLEMS): Enlisted Personnel**

Explanatory Variable	Beta Coefficient		P Value for H:B = 0
	Value	S.E.	
Upset with Mobilization	0.11	0.04	<0.01
<b>Effect on Spouse's Job (Does Not Affect Spouse's Job)</b>			
Affects Spouse's Job	-0.28	0.09	<0.01
Stress Caused by ODS/S	0.17	0.03	<0.01
Satisfaction with Family Relationships	0.10	0.05	0.04

Note: Reference groups for dichotomous and categorical variables are shown in parentheses.

**Table B9. Multiple Regression Results for Spouse's Perception of Problems Due to Changes Created by ODS/S (Dependent Variable = SPOUSE PROBLEMS): Officers**

Explanatory Variable	Beta Coefficient		P Value for H:B = 0
	Value	S.E.	
Upset with Mobilization	0.10	0.03	<0.01
Stress Caused by ODS/S	0.18	0.03	<0.01
Dissatisfaction with Separation from Spouse	0.53	0.19	0.01
Satisfaction with Family Relationships	0.12	0.04	<0.01