

# EFFECTS OF WORK-RELATED ABSENCES ON FAMILIES: EVIDENCE FROM THE GULF WAR

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The Gulf War provides an opportunity to estimate the effect of work-related separations on military families. Using data from the 1992 Survey of Officers and Enlisted Personnel, the authors estimate the effect of Gulf War deployment on divorce rates, spousal employment, and children's disability rates. Deployment of male soldiers had no effect on marital dissolution, though it did lead soldiers' wives to work less. In contrast, deployment of female soldiers led to a large and statistically significant increase in divorce rates, suggesting deployment of women placed a marked strain on marriages. Deployment of female soldiers did not affect husbands' labor supply. Finally, the results show no statistically significant increase in disability rates among the children of deployed personnel.

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**C**oncern about the effect of work schedules on workers' families helped mobilize support for the Family and Medical Leave Act of 1993 (FMLA), and has been a factor in the development of human resource policies such as employer-provided day care and flextime. Work schedules that

involve unusual hours or extended business-related travel seem especially likely to put stress on family relationships and to create disagreements between spouses over child care and housework (see, for example, Hochschild 1989; Parcel and Menaghan 1994). These factors may ultimately increase the rate of marital dissolution, with possibly negative consequences for children. Parental absences may also be bad for children even in the absence of an effect on marital stability. For example, work-related parental absences might have temporary effects, such as disappointment and depression, or more permanent effects, such as lower achievement in school. On the other hand, research on single

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Data and computer programs used to generate the results presented are available from the authors, who can be contacted by e-mail at [jhjohnsn@uiuc.edu](mailto:jhjohnsn@uiuc.edu).

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*Industrial and Labor Relations Review*, Vol. 54, No. 1 (October 2000). © by Cornell University.  
0019-7939/00/5401 \$01.00

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parenting suggests that the negative consequences of single parenting for children may derive in large part from a loss of income (McLanahan and Sandefur 1994). If income loss is the main problem created by a parent's absence, then demanding work schedules, at least those associated with high earnings, may not hurt children after all.

Families that experience parental absences differ from other families along many dimensions, so simple cross-family comparisons are unlikely to be good indicators of the impact of a parent's time away from home. Work-related absences due to sudden reassignments are more likely to be exogenous, at least after conditioning on industry and occupation. This paper presents a case study of one plausibly exogenous work-related absence that affected many soldiers and their families: deployment for military service in the Persian Gulf in 1990 and 1991. This episode probably comes closer than other comparisons to providing evidence on the causal effects of a parent's absence on spouses and children.

The deployment episode is especially useful for studying the impact of parental absences on children because, as we show below using military pay records, the earnings of deployed personnel actually increased slightly as a consequence of deployment. So any effects of parental absence in this case do not reflect a change in income. Another unusual feature of Gulf War deployment is that the resulting absences involved mothers as well as fathers. The question of how mothers' time at work affects children has long been of interest to labor economists (see, for example, Blau and Grossberg 1992). Of course, the military is an unusual employer in many other respects, so lessons from our study may not generalize. But the military is not entirely unique, since other jobs involve extended parental absences. In fact, Hiew (1992) drew an analogy between time spent away from home by Canadian military personnel and Japanese workers who are routinely relocated and expected to live apart from their families. Other industries and occu-

pations with jobs involving extended absences include fishing and work on offshore oil rigs (Vormbrock 1993).<sup>1</sup>

The empirical analysis begins with reduced-form estimates of the effect of Persian Gulf deployment on time away from home, spouse's employment status, and divorce rates. We then use two-stage least squares (2SLS) to interpret the reduced-form effects of deployment as the impact of time spent away from home. Following the analysis of effects on couples, we turn to an analysis of effects on disabilities among the children of deployed personnel. The estimation for all outcome variables uses data from the Department of Defense 1992 Survey of Officers and Enlisted Personnel (SOEP), linked with administrative data on the income of service personnel from 1990–92 and on marital status before deployment. The SOEP contains information on soldiers and family members for a large sample of military personnel with at least four months of service in 1991. The link to administrative data allows us to document the effect of deployment on military pay and to control for key pre-deployment characteristics, making it more likely that the estimated deployment effects have a causal interpretation.

### Background

The military is the largest employer in the United States besides the federal government, with 1.58 million active duty service members and 984,000 reservists in 1995. In a dramatic change from the bachelor military of conscription days, the majority of soldiers today—about 57% of enlisted personnel and 73% of active duty officers—are married. Moreover, about half of soldiers have children.<sup>2</sup> On the other hand,

<sup>1</sup>Repeated short-term separations are common for night-shift workers and airline pilots, a fact used by Landy, Rosenberg, and Sutton-Smith (1969) and Rigg and Cosgrove (1994) to study the effect of intermittent work-related absences on workers' families.

<sup>2</sup>These statistics are from Office of the Assistant Secretary of Defense (1995:2–1, 4–12).

while soldiers in the volunteer armed forces are very likely to marry and have children, military careers clearly place special demands on families. For example, military families move frequently, and soldiers are often separated from their families for extended periods of time. The nature of duty assignments varies considerably, and families have little control over the timing of moves or the location of the next job. On the plus side, many families live on military bases that provide a range of free services, such as child care, counseling, and medical care.<sup>3</sup>

An important and perhaps unusual feature of military careers is the pay system. In addition to a soldier's rank, experience, training, and duty assignment, family structure and living circumstances are also taken into account. All soldiers receive base pay, basic allowance for quarters, and basic allowance for subsistence (Department of Defense 1996). Base pay is determined by length of service and rank. Basic allowance for quarters compensates people who do not live in government housing, and a variable housing allowance supplements these payments for cost of living differences in different regions. The basic allowance for subsistence is supposed to pay for food. Allowances also exist for special duty and work situations. For example, someone deployed to a combat area might be eligible for hazardous duty pay. Personnel deployed to the Gulf stopped receiving a basic allowance for subsistence because they received rations, but this was typically offset by special pay allowances for soldiers who were separated from their families.<sup>4</sup>

### The 1992 Survey of Officers and Enlisted Personnel

The Department of Defense conducted the 1992 SOEP to gather information on military life and experiences. The SOEP was a mail survey with approximately 140 questions. Data were collected between May and October 1992 using a sampling frame that included service personnel with at least four months of service in 1991. Pre-1991 enlistees were less likely to have anticipated the Gulf War episode, suggesting the intervention is more exogenous for this group. The SOEP sample was stratified by sex, officer status, and branch of service. Sample weights allow the calculation of population statistics, and partially correct for non-response. The overall response rate was 62%. The sample size including all strata is 59,930, which corresponds to a population of 1,952,793 active-duty soldiers and mobilized reservists.<sup>5</sup>

The SOEP collected extensive information about military job experiences, including branch of service, rank, years of service, and income from military and nonmilitary jobs. Of particular interest is the information on the number of months military personnel spent away from family due to military assignments. Time away is reported for calendar year 1991 and as a total over the course of soldiers' military career. In addition, information was collected on deployment and months of service in the Persian Gulf as part of Operation Desert Storm/Desert Shield.

Other parts of the survey elicited information on family background and family characteristics. Each respondent reported

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<sup>3</sup>Recent papers on the consequences of deployment and changing duty assignments for military families include Jensen, Martin, and Watanabe (1996), Kelley (1994), Kelley et al. (1994), Payne, Warner, and Little (1992), and Segal (1986).

<sup>4</sup>Information on military compensation is drawn from Department of Defense (1996). Thanks also to Major Tracy Urman at the Military Compensation Office for explaining some details.

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<sup>5</sup>In addition to the stratification variables mentioned in the text, the survey involved four subsamples: active duty personnel, a longitudinal follow-up of personnel interviewed in a 1985 survey who were still in the military in 1991, a reservist sample, and an enlisted recruiter sample. The same branch-of-service, officer, and sex stratification variables were used in all cases. The sample design is documented in Westat, Inc. (1993).

Table 1. Descriptive Statistics: 1992 D.O.D. Survey of Officers and Enlisted Personnel.  
(Standard Deviations in Parentheses)

Variable	Full Sample (1)	Men (2)	Women (3)	Male Parents (4)	Female Parents (5)
<b>Demographic Variables</b>					
Male	.888 (.315)	—	—	—	—
Age	28.8 (7.35)	28.9 (7.44)	28.2 (6.53)	32.5 (6.88)	30.7 (5.93)
High School Graduate	.611 (.487)	.621 (.484)	.532 (.498)	.601 (.489)	.561 (.496)
Some College	.191 (.393)	.183 (.387)	.255 (.436)	.179 (.384)	.260 (.439)
College Degree (2 or 4 years)	.159 (.366)	.153 (.360)	.203 (.402)	.163 (.370)	.168 (.374)
Married in 1992	.613 (.487)	.629 (.483)	.487 (.500)	.877 (.329)	.633 (.482)
Any Dependents	.491 (.499)	.504 (.499)	.389 (.487)	—	—
Non-White	.279 (.448)	.267 (.442)	.377 (.485)	.296 (.457)	.438 (.496)
<b>Outcomes</b>					
Spouse's Employment Status	.618 (.486)	.592 (.492)	.885 (.319)	.559 (.496)	.876 (.329)
Divorced or Separated in 1992	.090 (.286)	.079 (.270)	.173 (.378)	.099 (.299)	.254 (.435)
Child Has Temporary Handicap	—	—	—	.052 (.221)	.059 (.236)
Child Has Permanent Handicap	—	—	—	.036 (.187)	.036 (.187)
<b>Service Variables</b>					
Army	.361 (.480)	.360 (.480)	.372 (.483)	.384 (.486)	.396 (.489)

Continued

on his or her family, including dependents and spouse. Variables include age, marital status, educational background, and the primary activity of the spouse (for example, employment status). Spouses' employment status and the respondent's marital status are the first two outcome variables studied here. The second set of outcomes is drawn from a survey module that asked about the number and ages of dependents, child care arrangements, and dependents' disability status. Respondents were asked to distinguish between conditions that are temporary and permanent. We use the response

to this question to measure the impact of deployment on children. Negative effects of parental separation might appear as temporary disabilities, since these include emotional and behavioral problems. Permanent disabilities seem less likely to be affected by parent absence.<sup>6</sup>

<sup>6</sup>Angrist and Lavy (1996) used Current Population Survey data to study the effect of teen and out-of-wedlock parenting on the incidence of childhood disabilities. They found that children of single mothers were more likely to have disabilities, even after controlling for family background and family income.

Table 1. Continued.

Variable	Full Sample (1)	Men (2)	Women (3)	Male Parents (4)	Female Parents (5)
Navy	.289 (.453)	.292 (.455)	.261 (.439)	.267 (.442)	.239 (.426)
Air Force	.255 (.436)	.246 (.431)	.326 (.469)	.271 (.445)	.331 (.471)
Marines	.095 (.293)	.102 (.302)	.040 (.196)	.077 (.267)	.034 (.182)
Officer	.152 (.359)	.152 (.359)	.159 (.366)	.179 (.383)	.131 (.337)
Deployed	.278 (.448)	.295 (.456)	.147 (.354)	.286 (.452)	.118 (.323)
Time Away (months)	18.1 (16.8)	19.0 (17.1)	10.7 (12.3)	21.6 (17.6)	11.7 (12.4)
Service Time (months)	96.6 (77.1)	98.7 (78.6)	80.2 (62.2)	136 (76.0)	107 (60.4)
<b>Subsamples</b>					
Enlisted Recruiter	.008 (.090)	.009 (.094)	.003 (.058)	.014 (.117)	.004 (.064)
Regular Member Sample	.926 (.262)	.933 (.250)	.869 (.337)	.899 (.302)	.803 (.398)
Full-Time Reserve Component	.037 (.188)	.035 (.184)	.049 (.217)	.051 (.219)	.071 (.257)
Longitudinal Sample	.029 (.169)	.023 (.151)	.078 (.268)	.037 (.188)	.122 (.328)
Sample Size	59,896	35,473	24,423	21,693	8,919
<b>1990 Service Sample</b>					
Married in 1990	.638 (.481)	.654 (.476)	.508 (.500)	.892 (.310)	.719 (.449)
Divorced or Separated in 1990	.027 (.161)	.022 (.146)	.067 (.253)	.027 (.161)	.090 (.287)
Sample Size	52,064	31,865	20,199	20,964	8,310

Notes: Statistics are weighted by survey final sampling weights. Education variables refer to schooling at the time of entry into military service.

Table 1 shows descriptive statistics for the full sample and for subsamples of men, women, male parents, and female parents. The statistics in Table 1 and elsewhere are weighted by survey sampling weights. Most of the people in the military are male (89%) and, as noted earlier, married (61%). The average age is 29 in the full sample, and

about half the full sample has one or more legal dependents aged 1–22 (excluding spouses, but possibly including stepchildren). In what follows, we refer to dependents aged 1–22 as children and to soldiers with dependents aged 1–22 as parents.<sup>7</sup> The education variables in the tables refer

The effects were largest for learning disabilities and emotional problems, which in some cases would fall into the temporary handicap category in the SOEP.

<sup>7</sup>The age 22 cutoff for the definition of children reflects the brackets in the relevant survey question. Children under one are excluded from the definition of parents because we are interested in identifying soldiers who were parents before they were deployed.

to schooling at the time of entry into the military.

Statistics tabulated separately by sex show that female soldiers were less likely than male soldiers to be married (49%, versus 63%) and more likely to be divorced or separated (17%, versus 8%). About 41% of military women had children, compared with about 53% of the men. The table also shows that 3.6% of parents reported having a dependent with some kind of permanent disability, while 5–6% of parents reported having a dependent with some kind of temporary disability.

Following the demographic and outcome variables, the table describes military jobs. The Army is the largest branch of service (36% of the full sample) and the Marine Corps is the smallest (9.5%). About 15% of service personnel are officers, and the overall average length of service is about eight years, though female soldiers served for less than seven years on average. About 30% of men were deployed in the Gulf War, compared to about 15% of women. On average, soldiers spent about 18 months away from home for job-related reasons while serving in the military.

As noted earlier, the SOEP draws stratified samples from the populations of regular active duty personnel (including a longitudinal follow-up sample), reservists, and recruiters. Because sample weights are used to calculate means, Table 1 correctly shows that the vast majority of soldiers were in the regular active-duty forces. Unweighted statistics, reported in the appendix, have higher proportions in the reserves and recruiter categories. Finally, the table reports the proportion married and divorced for survey respondents who were in the military as of March 1990. These data come from our match to administrative records. We also have administrative data on monthly pay for January 1989 through December 1992. Both administrative sources are described in the appendix.

### Gulf War Deployment

The Persian Gulf crisis began on August 2, 1990, when Iraq invaded Kuwait. By the

end of Operation Desert Storm in June 1991, 697,000 U.S. troops had participated in the Gulf War. The war itself lasted only 43 days, but many soldiers spent considerably longer in the Gulf region or were deployed somewhere else (for example, at sea or in Europe).<sup>8</sup> Table 2 reports mean characteristics by deployment status. The table reflects the fact that deployment primarily affected more junior enlisted personnel in the ground-combat arms of the military and the Navy. Deployed servicemen were therefore younger and less educated than their non-deployed counterparts, though the age and schooling gaps by deployment status were smaller for women. Deployed men and women were less likely to be white. These differences suggest that it may be important to control for the demographic and military characteristics of soldiers when making comparisons by deployment status.

A descriptive question of particular interest in this context is whether deployment is associated with a change in income, since the possibility of negative effects from lost income has been a major theme in the literature on single parenting. Loss of income while deployed was also an issue raised by some Gulf War veterans. We explored the relationship between income and deployment by linking longitudinal data on military pay to survey responses and then comparing the time series of earnings by deployment status. The pay data came from the military's administrative records described in the data appendix. Of course, a deployed soldier's earnings do not necessarily accrue to family members back home. Still, families that were intact on the eve of deployment must, for all practical purposes, have remained so at least until the soldier returned. Also, deployed soldiers had little need for cash, and reports prepared for the Marines and Air Force (Caliber Associates 1992 and 1993) suggest that soldiers'

<sup>8</sup>For an overview of Gulf War events, see Department of Defense (1992:xiii-xxx).

Table 2. Comparison of Means by Deployment Status:  
1992 D.O.D. Survey of Officers and Enlisted Personnel.  
(Standard Errors in Parentheses)

Variable	Men			Women		
	Deployed (1)	Non-Deployed (2)	Difference (3)	Deployed (4)	Non-Deployed (5)	Difference (6)
<b>Demographic Variables</b>						
Age	28.0 (.071)	29.4 (.048)	-1.35 (.087)	27.7 (.110)	28.3 (.046)	-.568 (.119)
High School Graduate	.668 (.005)	.602 (.003)	.066 (.006)	.565 (.009)	.526 (.003)	.039 (.009)
Some College	.160 (.004)	.193 (.002)	-.034 (.005)	.243 (.008)	.258 (.003)	-.015 (.008)
College Degree (2 or 4 year)	.126 (.004)	.165 (.002)	-.038 (.004)	.182 (.007)	.207 (.003)	-.025 (.007)
Any Dependents	.502 (.005)	.524 (.003)	-.022 (.006)	.319 (.008)	.410 (.003)	-.090 (.009)
Non-White	.293 (.005)	.256 (.003)	.037 (.005)	.437 (.009)	.366 (.003)	.071 (.009)
<b>Service Variables</b>						
Army	.369 (.005)	.352 (.003)	.018 (.006)	.530 (.009)	.340 (.003)	.190 (.009)
Navy	.319 (.005)	.285 (.003)	.034 (.005)	.208 (.007)	.274 (.003)	-.066 (.008)
Air Force	.174 (.004)	.278 (.003)	-.104 (.005)	.227 (.008)	.346 (.003)	-.119 (.009)
Marines	.137 (.004)	.085 (.002)	.052 (.004)	.035 (.003)	.041 (.001)	-.006 (.004)
Officer	.123 (.003)	.166 (.002)	-.044 (.004)	.139 (.006)	.164 (.003)	-.025 (.007)
Time Away	22.7 (.204)	17.5 (.115)	5.17 (.221)	13.9 (.282)	10.2 (.102)	3.65 (.278)
Service Time	91.0 (.738)	103 (.520)	-12.1 (.936)	74.8 (1.01)	81.6 (.442)	-6.77 (1.14)
Sample Size	8,915	25,893		3,118	20,856	

Notes: Statistics are weighted by survey final sampling weights. Education variables refer to schooling at the time of entry into military service.

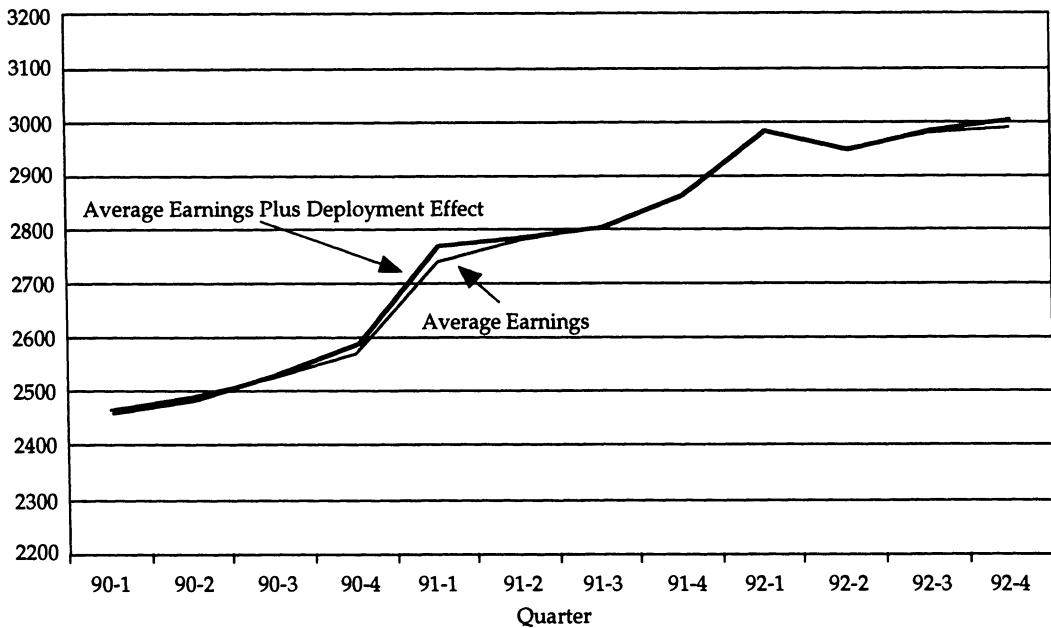
spouses were expected to manage finances during the deployment. For example, spouses were asked to obtain power of attorney and to open joint checking accounts with service members before deployment if they had not already done so.

In addition to the differences documented in Table 2, deployed personnel had lower pay than the non-deployed before deployment. On the other hand, almost all of the difference in pay can be accounted for by differences in branch of service, length of service, age, race, and

marital status in 1990. This can be seen in Figure 1, which plots the time series of military pay by deployment status, after regression-adjusting for these characteristics.<sup>9</sup> The figure shows pay from the first

<sup>9</sup>The covariates in the regression are age, age-squared, three marital status dummies for 1990, a dummy for officer status, a sex dummy, a race dummy, nine education dummies, dummies for branch of service, and length of service in months. The figure plots average earnings each quarter and the average plus the coefficient on a deployment dummy. Regressions were run separately for each quarter.

Figure 1. Regression-Adjusted Earnings by Deployment Status for Military Personnel.



Source: Tabulations from the Joint Uniform Military Pay Files. See Appendix for details.

quarter of 1990 through the last quarter of 1992. In addition to the small difference in levels, the evolution of soldiers' pay through the deployment period is of interest. The two series generally move together, but between the last quarter of 1990 and the first quarter of 1991 (the Gulf War quarter), the pay of deployed personnel increased more steeply than the pay of non-deployed personnel.

Figure 1 suggests that deployment was associated with a small increase in average earnings. A potential problem with this interpretation is that family income has components besides military pay. A report on family issues prepared for the Air Force (Caliber Associates 1992) notes that deployed families may have lost income from civilian jobs while deployed. Also, spouses may have given up jobs or reduced work hours to look after children. The question of lost spouse earnings is a point we return to below. On the other hand, the loss of civilian earnings was probably not impor-

tant for the vast majority of deployed soldiers. Only 10% of our sample had income from a civilian job, and the amounts were generally small. The bulk of compensation received by all soldiers except reservists was from military sources. And while reservists may have experienced a decline in civilian earnings, this lost income is supposed to have been replaced by military pay while on active duty. In fact, almost half of the Marine Corps reservists who were deployed reported that their income actually went up while deployed (Caliber Associates 1993:III-29). Of course, it is still possible that the loss of civilian labor market experience caused by Gulf War mobilization generated a later earnings penalty.

#### **Deployment Effects on Time Away, Spouse Employment, and Divorce Rates**

Estimates of the relationship between deployment and time away from home are reported in Table 3. The results from



Table 3. Reduced Form Estimates of the Effect of Deployment.  
(Heteroskedasticity-Consistent Standard Errors in Parentheses)

Sex	Dependent Variable	Deployment			Deployment		
		Mean (1)	Effect (2)	Effect with Covariates (3)	Mean (4)	Effect (5)	Effect with Covariates (6)
		<i>Currently Married</i>			<i>Currently Married, First Year of Service before 1990</i>		
Men	Time Away	18.9	5.10 (.404)	5.30 (.339)	19.9	4.52 (.419)	5.36 (.353)
	Spouse's Employment Status	.583	-.041 (.013)	-.031 (.013)	.587	-.046 (.013)	-.033 (.013)
Women	Time Away	10.1	3.55 (.436)	3.18 (.389)	10.7	3.36 (.460)	3.44 (.415)
	Spouse's Employment Status	.881	-.013 (.014)	-.008 (.014)	.882	-.018 (.014)	-.015 (.014)
		<i>Ever Married</i>			<i>Ever Married, First Year of Service before 1990</i>		
Men	Time Away	19.1	5.17 (.387)	5.40 (.330)	20.0	4.66 (.402)	5.53 (.345)
	Divorced	.105	.018 (.008)	.014 (.008)	.106	.015 (.008)	.012 (.008)
Women	Time Away	10.6	3.60 (.377)	3.10 (.347)	11.2	3.39 (.396)	3.33 (.366)
	Divorced	.239	.056 (.015)	.042 (.015)	.243	.060 (.016)	.054 (.016)

Notes: Regressions with covariates include age, age-squared, three service dummies, nine dummies for education level, dummies for race and officer status, service time, number of dependents between age 1 and 22, and three dummies for sampling strata. The regressions conditional on service before 1990 also include a dummy for receipt of hazardous duty pay in the first two quarters of 1990, three dummies for marital status in 1990, and military compensation in the first quarter and the second quarter of 1990.

models with covariates were computed by ordinary least squares (OLS) estimation of

$$(1) \quad T_i = X_i' \beta_0 + \beta_1 D_i + \eta_i,$$

where  $T_i$  is career time away (measured in months),  $D_i$  is a dummy variable indicating Gulf War deployment, and  $X_i$  is the vector of covariates. The covariates are age, age-squared, three dummies for branch of service, nine dummies for level of schooling completed at the time of entry into the service, dummies for race and officer status, the total number of (non-spouse) dependents aged 1-22, service time, and three dummies for subsamples. The number of dependents refers to those over one year old to make this a "pre-treatment" measure

of family size. The coefficient  $\beta_1$  is the effect of Gulf War deployment on the parent's time away from home. All regression estimates are weighted by survey sample weights.

Samples of currently married soldiers were used to estimate effects on spouse's employment, and samples of ever-married soldiers were used to estimate effects on divorce. In addition, we report estimates for the subsample of soldiers who began serving before 1990. This strategy allows us to control for additional prewar variables. In particular, the regressions for soldiers whose military service began before 1990 also include a dummy for receipt of hazardous duty pay in the first two quarters of 1990, three dummies for marital status in

1990, and total pay received in the first two quarters of 1990. The 1990 variables are included to better control for military occupation and family structure before deployment.<sup>10</sup>

Average career time away is about 19 months for men and 10 months for women in both the currently married and ever-married samples. Deployment for military service in the Gulf is associated with about 5 months additional time away for men and 3–4 months additional time away for women. Controlling for covariates has little effect on these estimates. The results are also similar when the samples are restricted to pre-1990 enlistees, who could not have anticipated Gulf War service at the time they entered the military.

We use the following model to describe the effect of deployment on spouse employment and divorce rates:<sup>11</sup>

$$(2) \quad Y_i = X_i' \pi_0 + \pi_1 D_i + v_i,$$

where  $Y_i$  is the dependent variable for soldier  $i$  and  $X_i$  is the same vector of covariates used in (1). Estimates of  $\pi_1$  in (2) can be interpreted as reduced-form effects of deployment in a 2SLS procedure where the first-stage is equation (1) and the second stage is

$$(3) \quad Y_i = X_i' \gamma + \delta T_1 + \varepsilon_i.$$

Here,  $\delta$  is the causal effect of time away and the instrument is  $D_i$ .

Estimates of the reduced-form effect of deployment on spouses' employment and on soldiers' divorce status are also reported in Table 3. Uncontrolled differences by deployment status suggest that deployment

of men reduced spouse employment rates by 4–5%, but this falls to around 3% in models with covariates. The negative effect on wives' employment seems likely to be due to the increased child care responsibilities borne by wives while their husbands were deployed. Negative employment effects may have persisted into 1992, since some deployments were still in progress and employment status is serially correlated.<sup>12</sup> The causal interpretation of deployment effects on wives' labor supply is supported by the fact that 74% of deployed men reported that their spouse or ex-spouse took care of their dependents while they were away. In contrast to the results for men, deployment of married women had no (lasting) effect on the employment status of a male spouse. This is consistent with the fact that only 32% of deployed women identified their husband as the primary dependent-care provider in their absence.<sup>13</sup>

As noted earlier, reduced-form estimates of effects on divorce were computed using samples of ever-married men and women, which includes the currently married sample used to estimate spouse employment effects. Although deployment is associated with higher divorce rates for ever-married men, this effect disappears in models with covariates. The coefficients on covariates suggest that the probability of divorce increases with age, but men with more education, who had children, and who were officers were less likely to get divorced. For women, however, the effects of deployment are positive and significantly different from zero in models with or without covariates. Estimates from a model with covariates show a 4.2 percentage point higher divorce rate among deployed

<sup>10</sup>Heteroskedasticity-consistent standard errors are reported for all regressions. The 1990 pay variable is our calculation from administrative records showing pay by individual categories. The hazardous-duty variable also comes from the administrative data.

<sup>11</sup>Information on the labor force status of the spouse is reported by the service person and is available for currently married personnel only. Employment is defined as working full-time or part-time in the military or in a civilian job.

<sup>12</sup>The median deployment time was 6–8 months. About 6% of deployed soldiers report deployments of 9 months or more. Deployments that began in 1991 could therefore have extended into 1992.

<sup>13</sup>In models with an interaction term between deployment and parent-status, negative employment effects of deployment were larger for parents (though the interaction is not statistically significant).

women. Restricting the sample to women in the military before 1990 and including controls for marital status and military pay in 1990 actually makes the estimates a little larger. Robustness with respect to the inclusion of pre-deployment marital status variables is important because it supports the notion that the higher divorce rates for deployed women were in fact caused by deployment. On the other hand, it should be noted that the administrative data on marital status are not always accurate, since changes in marital status are reported with a lag.

Tables 4a and 4b report OLS and 2SLS estimates of the effect of time away in equation (3). The 2SLS estimates simply re-scale the reduced-form estimates in Table 3, but they also present an opportunity for interesting comparisons with OLS estimates of equation (3). The OLS estimates of the effect of time away on male spouse's employment, reported in Table 4a, are very small and not significantly different from zero. In contrast, the corresponding 2SLS estimates in columns (2) and (6) suggest that each month away from home reduced the employment rate of wives by 6/10 of a percentage point. This estimate is significantly different from zero. The OLS estimate of the effect on spouse's employment status for women is positive but only marginally significant. The corresponding 2SLS estimate of effects on female soldiers' husbands is negative but not significantly different from zero. It is interesting to note that being an officer has a negative effect on spousal labor force participation for both men and women, although the results are more precise for men. Spousal employment rates are also higher for nonwhites.

OLS estimates of the effects of time away on divorce are positive and statistically significant for both men and women, though very small. This can be seen in columns (1) and (3) of Table 4b. The 2SLS estimates for men are insignificant, as are the OLS estimates for men with 1990 controls. In contrast with the results for men, the 2SLS estimates for women are positive, statistically significant, and much larger than the corresponding OLS estimates. The 2SLS

estimates for women in column (4) imply that each month away from home raises divorce probabilities by about 1.4 percentage points. Overall, the results in Table 4 suggest that time away due to deployment did have an impact on soldiers' families, though the nature of this impact differs by sex. Negative employment effects appear only for the spouses of deployed male soldiers, while divorce rates increased only for female soldiers who were deployed. This suggests that managing the additional child care and household responsibilities caused by deployment may have been easier for male soldiers' wives than for female soldiers' husbands. The idea that a military lifestyle can be hard on marriages is also supported by the fact that about 71% of SOEP respondents who got divorced while on active duty reported that military service contributed at least in part to the breakup of their marriage.

#### Effects on Child Disabilities

Previous research suggests that the children of Gulf War veterans were affected by the deployment of a parent. For example, Jensen, Martin, and Watanabe (1996) reported higher levels of depression and stress among the children of deployed personnel. We study the effect of deployment and time away from home using measures of children's disability status. The dependent variables in this case are indicators of the incidence of permanent and temporary disabilities among soldiers' children. These are coded from responses to the question, "Are any of your dependents physically, emotionally, or intellectually handicapped, requiring specialized treatment or care?" Respondents replied either "yes, permanently," "yes, temporarily," or "no." The child disability measure may not capture the full range of problems children could experience as a result of deployments. However, the distinction between permanent and temporary problems does allow us to differentiate between problems that could be caused by deployment and pre-existing conditions. Unfortunately, the SOEP is not specifically designed to elicit

Table 4a. OLS and 2SLS Estimates of Effects on Spouse's Employment Status.  
(Heteroskedasticity-Consistent Standard Errors in Parentheses)

Covariates	Currently Married Men		Currently Married Women		Currently Married Men, First Year of Service before 1990		Currently Married Women, First Year of Service before 1990	
	OLS (1)	2SLS (2)	OLS (3)	2SLS (4)	OLS (5)	2SLS (6)	OLS (7)	2SLS (8)
Time Away	.0003 (.0004)	-.006 (.002)	.0005 (.0003)	-.002 (.004)	.0004 (.0004)	-.006 (.002)	.0007 (.0004)	-.004 (.004)
Age	.019 (.006)	.026 (.007)	.008 (.006)	.010 (.007)	.027 (.007)	.031 (.007)	.017 (.007)	.020 (.007)
Number of Dependents	-.061 (.005)	-.053 (.006)	-.008 (.005)	-.008 (.005)	-.053 (.005)	-.046 (.006)	-.003 (.005)	-.005 (.005)
Army	.018 (.016)	.008 (.017)	-.050 (.013)	-.048 (.014)	.031 (.017)	.019 (.018)	-.037 (.014)	-.034 (.015)
Navy	.014 (.016)	.034 (.017)	-.031 (.012)	-.036 (.014)	.009 (.017)	.027 (.018)	-.024 (.013)	-.032 (.015)
Air Force	.044 (.015)	-.012 (.026)	-.011 (.011)	-.021 (.019)	.055 (.016)	-.009 (.028)	.002 (.012)	-.018 (.000)
Officer	-.089 (.014)	-.083 (.015)	-.027 (.016)	-.017 (.022)	-.146 (.019)	-.155 (.019)	-.030 (.023)	-.017 (.026)
Non-White	.058 (.013)	.049 (.014)	.001 (.010)	.002 (.010)	.068 (.014)	.060 (.014)	.003 (.010)	.004 (.011)
Sample Size	24,136	24,136	11,411	11,411	22,882	22,882	10,164	10,164

Notes: Regressions with covariates include age, age-squared, three service dummies, nine dummies for education level, dummies for race and officer status, service time, number of dependents, and three dummies for sampling strata. The regressions conditional on service before 1990 also include a dummy for receipt of hazardous duty pay in the first two quarters of 1990, three dummies for marital status in 1990, and military compensation in the first quarter and the second quarter of 1990.

information about children, so these are the only children's outcome variables available. One reason this question was included in the survey is that military dependents with disabilities, whether chronic or temporary, are eligible for a variety of special programs and benefits (see, for example, Department of the Navy 1993).

Estimates of effects on children are computed using a sample of parents, whom we define as military personnel with dependents aged 1–22.<sup>14</sup> We begin by comparing disability rates in our data set to those in other representative data sets. The Census

Bureau estimates that 2.9 million young Americans had a disability in 1991–92; this is approximately 5.2% of the U.S. population under the age of 15.<sup>15</sup> The U.S. Department of Education reports that in 1990–91, approximately 4.7 million children under the age of 21 participated in federal supported programs for disabilities, about 11% of total enrollment (Department of Education, p. 62). Our estimates for military children are bounded by these two alternative estimates; we find that about 5.3% of our sample reported having a child with a temporary handicap and 3.7% reported

<sup>14</sup>Here we interpret dependent's disabilities as referring to children. But since dependents can also be over 65 in the SOEP, a small number of dependents with handicaps in the parent sample could be

elderly instead of children. Discarding parents with elderly dependents leaves the results unchanged.

<sup>15</sup>Census Bureau information is available on the website [www.census.gov](http://www.census.gov) under the heading *Disabilities*.

Table 4b. OLS and 2SLS Estimates of Effects on Divorce.  
(Heteroskedasticity-Consistent Standard Errors in Parentheses)

<i>Covariates</i>	<i>Currently Married Men</i>		<i>Currently Married Women</i>		<i>Currently Married Men, First Year of Service before 1990</i>		<i>Currently Married Women, First Year of Service before 1990</i>	
	<i>OLS</i> (1)	<i>2SLS</i> (2)	<i>OLS</i> (3)	<i>2SLS</i> (4)	<i>OLS</i> (5)	<i>2SLS</i> (6)	<i>OLS</i> (7)	<i>2SLS</i> (8)
Time Away	.0008 (.0003)	.003 (.002)	.0016 (.0004)	.014 (.005)	.0005 (.0003)	.0021 (.0014)	.0012 (.0004)	.016 (.005)
Age	.022 (.003)	.020 (.004)	.040 (.006)	.027 (.009)	.009 (.004)	.008 (.004)	.014 (.007)	.002 (.009)
Number of Dependents	-.024 (.003)	-.027 (.004)	-.004 (.005)	-.001 (.005)	-.025 (.003)	-.028 (.004)	-.014 (.005)	-.007 (.006)
Army	-.007 (.010)	-.005 (.010)	-.009 (.015)	-.020 (.016)	-.008 (.011)	-.006 (.011)	-.015 (.016)	-.027 (.018)
Navy	-.008 (.010)	-.013 (.010)	-.054 (.015)	-.031 (.018)	-.009 (.010)	-.013 (.011)	-.033 (.015)	-.002 (.020)
Air Force	-.008 (.009)	.008 (.016)	-.049 (.014)	-.002 (.025)	-.017 (.010)	-.001 (.017)	-.064 (.015)	-.001 (.026)
Officer	-.045 (.008)	-.047 (.008)	-.055 (.016)	-.088 (.022)	-.043 (.010)	-.041 (.010)	-.067 (.023)	-.097 (.027)
Non-White	.004 (.008)	.006 (.008)	.048 (.011)	.042 (.012)	.010 (.009)	.012 (.008)	.050 (.011)	.044 (.012)
Sample Size	26,589	26,589	14,760	14,760	25,226	25,226	13,216	13,216

*Notes:* Regressions with covariates include age, age-squared, three service dummies, nine dummies for education level, dummies for race and officer status, service time, number of dependents between age 1 and 22, and three dummies for sampling strata. The regressions conditional on service before 1990 also include a dummy for receipt of hazardous duty pay in the first two quarters of 1990, three dummies for marital status in 1990, and military compensation in the first quarter and the second quarter of 1990.

having a child with a permanent handicap. The differences across data sources can be accounted for in part by the difficulties inherent in defining and measuring childhood disabilities. For example, the SIPP respondents may report health problems as disabilities, and the Department of Education definition only counts persons participating in special programs for the disabled. Military personnel are also younger, married earlier, and have more children than the general population.

Reduced-form estimates of the effect of deployment on time away in the parents sample, reported in Table 5, show a slightly larger effect than in the full and ever-married samples. The table also shows that the effect of deployment on temporary disabilities is positive, whereas the effect on permanent disabilities is negative. Neither effect, however, is significantly different from

zero.<sup>16</sup> These findings appear in models with or without covariates, and in models that control for 1990 variables. It is important to note that the effects on both temporary and permanent handicaps are small relative to the dependent mean, so the absence of an effect is not solely due to sampling variance. Finally, similar results are obtained when the effects are estimated separately for men and women.

Parental absence is usually associated with worse outcomes for children. What might explain the absence of an association in this case? Above, we argued that deploy-

<sup>16</sup>In an earlier draft of this paper we reported statistically significant estimates of effects on temporary handicaps. Those estimates, however, did not use the survey sampling weights.

Table 5. Reduced Form Estimates—Handicap Status.  
(Heteroskedasticity-Consistent Standard Errors in Parentheses)

Dependent Variable	All Parents			All Parents First Year of Service before 1990		
	Mean (1)	Deployment Effect (2)	Effect with Covariates (3)	Mean (4)	Deployment Effect (5)	Effect with Covariates (6)
Time Away	20.8	6.60 (.439)	6.08 (.394)	21.4	6.51 (.450)	6.13 (.411)
Temporary Handicaps	.053	.002 (.006)	.003 (.006)	.056	.001 (.006)	.001 (.006)
Permanent Handicaps	.037	-.005 (.005)	-.003 (.005)	.037	-.006 (.005)	-.004 (.005)
Sample Size	28,898	28,898	28,898	27,681	27,681	27,681

Notes: Regressions with covariates include age, age-squared, three service dummies, nine dummies for education level, dummies for race and officer status, service time, number of dependents between age 1 and 22, and three dummies for sampling strata. The regressions conditional on service before 1990 also include a dummy for receipt of hazardous duty pay in the first two quarters of 1990, three dummies for marital status in 1990, and military compensation in the first quarter and the second quarter of 1990.

ment did not lead to a decline in income for most families. In fact, the military earnings of deployed soldiers appear to have gone up slightly. Moreover, since the effect of deployment on employment rates is small, reduced spouse earnings seem unlikely to have been a major concern for most families. In addition to maintaining income levels while soldiers are away, the military also offers a wide range of support services for families, including child care, counseling, and help managing household finances. The findings reported here suggest that the combination of support services and a stable economic situation provided effective insulation against the negative effects of single parenting for the children of deployed personnel. Another important feature of our study is that deployment may provide a better "experiment" for parental absence. Absence in other studies may be more likely to be a choice of the parent, or associated with unobserved family characteristics.

#### Caveats

The results in Tables 3–5 have been interpreted as capturing the causal effect of

time away from home due to deployment in the Persian Gulf. An alternative interpretation is that differences by deployment status are not caused by deployment, but rather reflect the characteristics of deployed soldiers. Of course, deployed personnel clearly differ from non-deployed personnel along some dimensions. But since the basic pattern of results reported here is not very sensitive to the list of included covariates, unobserved confounding variables may not be important either. In future work, we hope to improve on this control strategy by using better longitudinal data on soldiers and their families.

Another caveat is that even if the deployment effects reported here are causal, they need not be due to time spent away from families. Possible alternative explanations are related to Gulf War Syndrome. If military service in the Gulf created health problems for service people, than the instrumental variables strategy used here confounds effects due to illness with effects due to time away from family. The leading explanations for Gulf War Syndrome are stress and exposure of some units to chemical weapons. Clearly, deployed soldiers and their families experienced stress and

anxiety. On the other hand, there is no evidence that service-related illnesses or Gulf War Syndrome symptoms spilled over to families (Presidential Advisory Committee on Gulf War Veterans' Illnesses 1996).

### Summary and Conclusions

The notion that work affects family life has a long history in economics. For example, many labor economists have considered the possibility that improved labor market opportunities for women contributed to the increase in divorce, although the evidence on this point is mixed (see, for example, Becker, Landes, and Michael 1977; Hoffman and Duncan 1994). As noted in the introduction, economists have also looked at the effects of mothers' labor supply on children's cognitive achievement. The Gulf War provides a unique opportunity to study the impact of a dramatic work-related shock on families. The Gulf War experience differs from the absences experienced by other types of workers, such as truck drivers, airline pilots, and consultants, in that it was exogenous, difficult to avoid, and a prolonged though isolated incident. Gulf War absences were potentially more dangerous for the soldiers and stressful for the families left at home than absences experienced by persons in other occupations. On the other hand, Persian Gulf War fatalities were low, and a useful feature of this natural experiment is the likelihood that family income changed little as a consequence of deployment.

The most striking result reported here is that deployment of female soldiers appears to have increased the likelihood of divorce, while the deployment of men did not have a similar effect. This is consistent with the notion that deployment of female soldiers was stressful for marriages, while the wives of deployed men were able to adapt to their husbands' absences. These results provide an interesting contrast to the World War II experience. The massive demobilization of male soldiers was accompanied by an unprecedented spike in divorce rates (see, for example, Davanzo and Rahman 1993). However, it is not clear in the World War II

case whether the divorce spike was caused by the war or represented delayed divorces that would have happened anyway. Even if World War II reflects war-related marital stress, the World War II episode differs from the Persian Gulf War episode in a number of respects. First, World War II deployments were much longer than Persian Gulf War deployments, and may therefore have been more stressful. Second, communications between deployed and non-deployed spouses were undoubtedly briefer and less frequent in the World War II era. Today, soldiers have access to regular and reliable voice communication. Finally, World War II soldiers were generally young men drafted and married as teenagers, making them far more likely to get divorced under any circumstance.

A second finding is that time away from home reduced the employment rates of male soldiers' wives. The employment effects are probably due to increased child care responsibilities, since deployed husbands reported that their wives bore most of the responsibility for child care in their absence. On the other hand, wives' deployment did not lead to a change in husbands' labor market behavior, a finding consistent with Angrist and Evans's (1998) results showing no interaction between wives' fertility and husbands' labor supply. Again, there is an interesting contrast to World War II, where wives' labor supply may have increased during deployment to supply the war effort.

Finally, we found no evidence of an increase in disabilities in the children of service personnel, at least as measured by the reported incidence of disabilities. Because Gulf War deployments were not associated with appreciable declines in earnings, this result offers some support for the view that loss of income is largely responsible for negative effects of parental absences, though the extensive support network for military families may also have been a factor. Of course, the Gulf War experience is not necessarily representative of the impact of other types of separations on families. A natural avenue for further research is the analysis of additional episodes involving exogenous work-related separations.

## APPENDIX

*1. Military Income Records*

The Department of Defense records pay data in an administrative record-keeping system called the Joint Uniform Military Pay System (JUMPS). These files contain a record of all payments for military compensation by allowance category. For the purposes of this project, the Defense Manpower Data Center (DMDC) matched survey respondents to income records from the JUMPS files from January 1989 through December 1992. Because of a change in record-keeping, records before 1991 were recorded for a single month each quarter and after 1991 were recorded monthly. Our data are for a single month each quarter. Records of zero pay, which appear for soldiers before they join the military, were excluded. Also, a few records showing negative pay were excluded. The pay measure in Figure 1 aggregates the largest pay components: basic pay, career sea pay, hostile fire pay,

hazardous duty incentive pay, basic allowance for subsistence, basic allowance for quarters, family separation allowance, variable housing allowance, and the variable-housing-allowance-offset amount.

*2. Information on Pre-Deployment Marital Status*

Information on family status is recorded in the military's Defense Enrollment Eligibility Reporting System (DEERS) files. The DMDC matched data from the DEERS for March 1990 to the SOEP at our request. The data for pre-Gulf marital status indicates whether each survey respondent was married, divorced, legally separated, annulled, a widower, or married to another military service person as of March 1990. As noted in the text, a potential problem with these data is that information on changes in family status may be reported with a substantial lag.

**Appendix Table A1**  
**Descriptive Statistics: 1992 D.O.D. Survey of Officers and Enlisted Personnel**  
**(Standard Deviations in Parenthesis)**

<i>Variable</i>	<i>Full Sample</i> (1)	<i>Men</i> (2)	<i>Women</i> (3)	<i>Male Parents</i> (4)	<i>Female Parents</i> (5)
<b>Demographic Variables</b>					
Male	.592 (.491)	—	—	—	—
Age	32.0 (7.58)	33.1 (7.75)	30.2 (6.97)	35.7 (6.56)	32.7 (6.07)
High School Graduate	.426 (.494)	.453 (.497)	.387 (.483)	.460 (.498)	.443 (.496)
Some College	.157 (.364)	.142 (.349)	.178 (.383)	.150 (.357)	.199 (.399)
College Degree (2 or 4 year)	.390 (.487)	.364 (.481)	.428 (.495)	.340 (.474)	.349 (.476)
Married in 1992	.645 (.479)	.743 (.437)	.501 (.500)	.908 (.290)	.739 (.004)
Any Dependents	.512 (.499)	.613 (.487)	.365 (.482)	—	—
Non-White	.239 (.426)	.198 (.399)	.298 (.457)	.209 (.407)	.358 (.480)

*Continued*



Appendix Table A1

Continued

<i>Variable</i>	<i>Full Sample (1)</i>	<i>Men (2)</i>	<i>Women (3)</i>	<i>Male Parents (4)</i>	<i>Female Parents (5)</i>
<b>Outcomes</b>					
Spouse's Employment Status	.673 (.469)	.574 (.494)	.882 (.323)	.544 (.498)	.869 (.337)
Divorced or Separated in 1992	.114 (.317)	.078 (.268)	.166 (.372)	.083 (.276)	.236 (.425)
Child Has a Temporary Handicap	—	—	—	.045 (.207)	.053 (.224)
Child Has a Permanent Handicap	—	—	—	.039 (.194)	.040 (.195)
<b>Service Variables</b>					
Army	.243 (.429)	.237 (.425)	.253 (.435)	.256 (.437)	.273 (.446)
Navy	.278 (.448)	.260 (.439)	.304 (.460)	.246 (.430)	.276 (.447)
Air Force	.292 (.455)	.273 (.445)	.319 (.466)	.289 (.453)	.343 (.475)
Marines	.187 (.390)	.230 (.421)	.124 (.329)	.209 (.407)	.108 (.310)
Officer	.462 (.499)	.475 (.499)	.443 (.497)	.477 (.499)	.368 (.482)
Deployments	.205 (.403)	.256 (.436)	.130 (.002)	.238 (.426)	.099 (.299)
Time Away	18.3 (17.3)	22.0 (18.2)	11.9 (13.4)	24.0 (18.4)	12.2 (13.1)
Service Time	119 (81.2)	138 (84.9)	93.2 (67.5)	168 (73.3)	119 (62.3)
<b>Subsamples</b>					
Enlisted Recruiter	.041 (.199)	.066 (.249)	.005 (.071)	.087 (.282)	.007 (.082)
Regular Member Sample	.761 (.426)	.682 (.466)	.875 (.330)	.600 (.490)	.804 (.397)
Full-Time Reserve Component	.068 (.252)	.098 (.297)	.024 (.153)	.118 (.323)	.036 (.185)
Longitudinal Sample	.130 (.336)	.153 (.360)	.096 (.294)	.194 (.396)	.153 (.360)
Sample Size	59,896	35,473	24,423	21,693	8,919
<b>1990 Service Sample</b>					
Married in 1990	.672 (.469)	.769 (.421)	.519 (.550)	.935 (.247)	.764 (.425)
Divorced or Separated in 1990	.041 (.199)	.025 (.155)	.067 (.250)	.026 (.161)	.090 (.287)
Sample Size	52,064	31,865	20,199	20,964	8,310

*Notes:* Statistics are not weighted in this table. Education variables refer to schooling at the time of entry into military service.

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