The Relationship between Veteran Status and Smoking

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Abstract

About 10-12% of young men have served a term in the military. However, we know rather little about the consequences of military service for the lives of those who serve. In this paper, we provide estimates of the relationship between peacetime military service during the All-volunteer Era (AVE) and smoking behaviors using data from the National Longitudinal Survey of 1979 (NLSY-79). Ever smoking and continued smoking by veterans are strongly related to multiple dimensions of poor health (Bondurant and Wedge 2009; Cornfield, Haenszel, Hammond, Lilienfeld, Shimkin and Wynder 2009; Wynder 1988). Using multivariate logistic regression with numerous controls for selectivity into the military, we find that veterans of active-duty military service are similar to veterans of reserve duty on ever having smoked and that veterans of active duty military service are less likely to stop smoking. Consistent with previous research we find veterans differ from nonveterans on all aspects of smoking behavior examined. The social and institutional influences experienced in the military are explored as potential sources for the differences.

Introduction

A remarkable decline in tobacco use for both the civilian and armed forces populations followed the findings in the 1950s that cigarette smoking causes lung cancer (Cornfield, Haenszel, Hammond, Lilienfeld, Shimkin and Wynder 2009; USDHHS 2004; Wynder 1988). However, from 1998 to 2005, this general downward trend was reversed, as cigarette use rose in the Army, Navy, and Marine Corps despite the increasing proportion of older, more highly educated, ethnically diverse and higher earning personnel; characteristics ordinarily associated with a lower prevalence of smoking (Bray and Hourani 2007, Bray, Kroutil and Marsden 1995). While it may come as no surprise to some that those in military service have a higher prevalence of smoking than the general population, given the history of the military providing cigarettes with soldiers' rations in World War II, giving new recruits "smoke breaks" during basic training, and providing discounted cigarettes through military outlets, the health ramifications of continued tobacco use by servicemen cannot be ignored (Associated Press 2009, Ballweg 1991).

The use of tobacco by service members is especially troubling for two reasons. First, in addition to causing a host of upper respiratory diseases, various cancers of the mouth and lungs, and coronary heart disease, smoking increases the risk of infection and reduces the body's ability to heal wounds (Bondurant and Wedge 2009; Cornfield, Haenszel, Hammond, Lilienfeld, Shimkin and Wynder 2009; Wynder 1988). Also, the Department of Defense (DoD) is the largest single employer of US citizens, and as such, the DoD is responsible for the continued healthcare of a large segment of the population; this translates to the Department of Veterans Affairs (VA) spending in excess of half a billion dollars annually to treat smoking-related diseases (McKinney, McIntire, Carmody and Joseph 1997), not to mention the large number of veterans that never use a VA facility. That these veterans are then covered by private healthcare

companies means that the long-term health consequences of military service present a considerable interest for all health care providers.

While there now exists a sizable body of research pertaining to substance use in the military, there still remain gaps in our full understanding of how the military experience impacts the smoking behaviors of veterans. Using a 1998 sample from the National Longitudinal Survey of Youth 1979 (NLSY79), we contrast the rates of tobacco use and cessation of active-duty and reserve-duty veterans to nonveterans in order to determine the effect of military service on tobacco use. Our use of cross-sectional analysis and the issue of selectivity into the military are addressed.

Smoking Habits in the Military

Previous research finds that servicemen experience higher rates of smoking than the civilian population (Bray and Hourani 2007; Klevens, Giovino, Peddicord, Nelson, Mowery and Grummer-Strawn 1995; Mckinney, McIntire, Carmody and Joseph 1997). A variety of data and methods employed in the existing literature yield this conclusion; however, it has been acknowledged that it is difficult to draw direct comparisons between military and civilian populations because the military has higher demands for physical fitness and proportionally consists of a much younger, more ethnically diverse population (Klevens, Giovino, Peddicord, Nelson, Mowery and Grummer-Strawn 1995). To assess whether the same discrepancy between rates of smoking in the civilian and active duty population still hold when comparing individuals that are matched for the physical, mental, educational and legal requirements for military service, we analyze the prevalence of smoking among veterans of active duty and veterans of reserve duty. Both active duty and reserve duty veterans met the same selection criteria to have been in

the service. However, only active duty personnel are separated from their homes while reserve duty personnel were not.

Among those in the military, entrance into active duty has been shown to increase the tendency of men to use tobacco products, indicating that a change in smoking behavior occurs during service (Bray, Fairbank and Marsden 1999; Feigelman 1994). Illustrating this point, Chisick, Poindexter and York (1998) found that among white males on active duty, twice as many were smokers compared with similar new recruits, and that among black males tobacco use quadrupled when individuals entered active duty. A number of explanations for this dramatic increase may be culled from the literature. First, new recruits enter military service when they are in their late teens, a period where they are most likely to experiment with smoking and other risk-taking behaviors to assert their independence (Chen and Kandel 1995; Conrad, Flay and Hill 1992). Also, being immersed in an environment where cigarettes are easily available, such as at military outlets, increases one's likelihood of smoking (Conrad, Flay and Hill 1992). Finally, the influence of peers and role-models present strong pressure for new recruits to begin smoking in an effort to conform to what they observe are the social norms in the military (Conrad, Flay and Hill 1992; Cronan, Conway and Kaszas 1991; Fergusson, Lynskey and Horwood 1995; Green, Hunter, Bray, Pemberton and Williams 2008; Krohn, Massey, Skinner and Lauer 1983; Wiltshire, Amos, Haw and McNeill 2005).

The opportunity for peer influences are particularly strong during basic training, when recruits are fully immersed in a military setting for the first time, and are undoubtedly forced to live with and associate with smokers. When the only breaks from otherwise intensive training are initiated by the call of, "take ten—smoke if you got 'em," recruits are put in a position where they observe their friends around them smoking and they may be intrigued by the relaxing

effects associated with tobacco use (Ballweg 1991; Finkenauer, Pomerleau, Snedecor and Pomerleau 2009). After finishing basic training, recruits that enter active duty are further enveloped in the armed forces' microcosm until their contractual obligations are fulfilled. There, the combined influences of young age, easy access to discount cigarettes, and the influence of belonging to a group of friends that smoke has, over time, contributed to a "culture of smoking" that is reinforced by the tobacco use of military training leaders and classroom instructors (Fergusson, Lynskey and Horwood 1995; Krohn, Massey, Skinner and Lauer 1983; Wiltshire, Amos, Haw and McNeill 2005). These role-models have been shown to perpetuate the belief in the cultural acceptance of smoking for newly enlisted personnel (Green, Hunter, Bray, Pemberton and Williams 2008). What are the long-term effects of the 'culture of smoking' that may affect active duty veterans more than reserve duty? What is it about the social and institutional military experience of active duty veterans that differs from that experienced by reserve duty veterans?

Selectivity Controls

The literature suggests several relevant variables to include in our analyses. Some of these variables are important to control for selectivity into the military. This investigation includes family income, education, marital status, (Federman, Bray and Kroutil, 2000) armed forces qualifying test, a measure of drug use (Bray and Hourani, 2007) and a race/ethnicity measure (Chisick, Poindexter and York, 1998; Finkenauer et al., 2009; Kabat, Morabia and Wynder 1991). The inclusion of these multiple controls will limit the effects of selectivity into the military. However, it still remains that some variables not in the analysis are potentially related to selectivity into the military.

The analytical comparison between active duty and reserve duty veterans implements an additional control for selectivity given all individuals who enter the military are subject to the same pre-service screens for health, mental acuity and moral behavior. Additionally, both active duty and reserve duty veterans experienced the same basic training. However, reserve duty veterans are not on active duty outside an annual two-week training period. Therefore, reserve duty veterans were not subject to the rigors of experiencing a military occupation on a daily basis, did not eat in mess halls, did not experience the disruptions of multiple moves between duty stations and otherwise led an average civilian life. Failure to implement controls for selectivity therefore runs the risk of generating biased estimates of the effects of military service on health.

Military Service as an Agent Directly Impacting Health

In addition to selecting men with predispositions that may be related to smoking, military service may act directly to alter the health-related behaviors of young men. Here the timing of military service in the life course is important to note. For the most part, men serve in the military in their late teens and early twenties, ages during which habits surrounding health-related behaviors such as alcohol use and eating, as well as tobacco use are being formed. Because the military removes men from their familiar surroundings and places them in a near complete institution, there is the opportunity for military service to have major impact on a variety of behaviors. As a number of authors have noted, social context affects the likelihood of behaviors beyond the effects of individual-level characteristics (Boardman, Saint Onge, Rogers, and Denney, 2005; Inagami, Cohen, Finch, and Asch, 2006; Smith and Christakis, 2008). A number of alternatives are possible.

First, norms of physical fitness, hygiene, and, exercise associated with military service may affect smoking, both in the short term and in the long term through the development of lifelong habits linked to physical activity (LaVerda, Vessey, and Waters, 2006). Indeed, veterans are generally more physically active than nonveterans (Gizlice, 2002; Littman, Forsberg, and Koepsell, 2009). Second, military recruits are also provided easily accessible and high quality health care at no cost that reduces the risk of illness that may increase the risk of a sedentary lifestyle. Military personnel are also required to maintain a certain level of physical fitness which may have the effect of lower tobacco use. Third, military service removes many men from negative social environments that might positively influence personal behaviors related to tobacco use (e.g., social networks built around social habits or activities related to increased smoking). These factors suggest that military service should keep tobacco use of veterans lower than that of nonveterans. And by the same logic, the total institutional experience for veterans of active duty may result in lower tobacco use relative to the less imbedded military experience of reserve duty veterans.

On the other hand, military service may have offsetting negative effects on the habits of recruits. Despite the emphasis on healthy lifestyles, previous research has demonstrated that military service is linked to increased consumption of alcohol and tobacco products. Bray, Marsden, and Peterson (1991:868) report that "[m]ilitary personnel are, in general, less likely to use drugs than civilians but are more likely to drink and drink heavily and to smoke and smoke heavily." Other researchers have reported similar findings (Lau, Quadrel, and Hartman, 1990; Klevens et al., 1995; Kroutil, Bray, and Marsden, 1994; McKinney et al., 1997). The greater reliance of military personnel on alcohol and tobacco may be attributable to the macho culture of military service, the stress of fulfilling demanding and dangerous occupations, often while

deployed, and the fact that alcohol and tobacco products during much of the AVE were subsidized for on-base purchase. Greater use of these substances may also be due to the stage in the lifecycle most typical of those in the military, as college students have also been shown to drink and smoke heavily. Rates of tobacco and alcohol use remain elevated among veterans long after their service, suggesting the pervasive effects of military service itself.

During active-duty service when rigorous physical activity is often the norm, and fitness standards must be met. After discharge, however, physical activity regimens often change with many men adopting a much less active lifestyle. As Smith, Klosterbuer, and Levine (2009) suggest, the transition from war-time active-duty service to civilian life is often accompanied by subsequent changes as a result of habits acquired in the service that do not match reduced activity levels after return to civilian life.

In the case of peacetime service where issues of stress is less likely to play a role in determining tobacco use, it is more likely the case that military service serves as a structural or social context within which smoking (as well as drinking and eating) lifestyles are generated (Cockerham, 2005). Once formed during adolescence and early adulthood, these health lifestyles continue to have consequences throughout the life course. In the case of tobacco use, one consequence of military service is the continuation of smoking by active duty veterans later in the life course. In order to determine what effect this continued immersion in the military's "culture of smoking" may have had on long-term tobacco use, the present study compares the veterans of active duty with reserve duty veterans who finished basic training and returned to the civilian population.

Unlike the case for selectivity it is not possible to draw a firm conclusion about the direction of the direct impact of military service on health. Both positive and negative influences

are possible, and they may to some extent cancel each other. Thus, the direct impact of military service on health remains an empirical issue to be resolved.

We formulate three hypotheses concerning the relationship between veteran status and smoking. Previous research finds that veterans are more likely to smoke than nonveterans. This research focuses on active duty versus reserve duty veteran's differences in smoking behavior. Our assessment of the literature leads us to expect differences between the veterans of active duty and reserve duty. We anticipate that the total military institution environment combined with 'culture of smoking' imposed on recruits at a crucial stage of the life course results in a greater impact on active duty veterans than on reserve duty veterans. Hypothesis 1: Active duty and reserve duty veterans do not differ in having ever smoked prior to 1998. Hypothesis 2: Veterans of active duty are less likely than veterans of reserve duty to have stopped smoking as of the 1998 interview. Hypothesis 3: Veterans of active duty are more likely to smoke daily in 1998 than veterans of reserve duty.

Data and Methods

We use data taken from the National Longitudinal Survey of Youth (NLSY79), a household survey that starting in 1979 interviewed 12,686 men and women between the ages of 14-21. Interviews were conducted annually through 1994 and biennially thereafter. Questions about smoking behavior used in this analysis are drawn from the 1998 survey. The 1998 survey is the only year that asked the three questions needed for this analysis. Only male respondents who were interviewed and answered the questions on smoking behavior are included in the analysis. Our sample consists of 2,678 nonveterans, 324 veterans of active duty service, and 134 veterans of reserve duty service.

Approximately one third of the households used in our analysis contain two or more brothers, due to the fact that all eligible members of the sampled household were interviewed. In order to account for sibling clustering within households, we estimated our models using a GEE estimator that corrects for correlated errors within sibling clusters.

Distinguishing between active duty and reserve duty service in the analysis allows us to control for selectivity. The entrance requirements for both types of service are the same. That is, both active duty and reserve duty service members must meet the same legal, educational, mental, and physical standards for enlistment. A commitment of two or more years is required of reserve duty as well as active duty personnel that include penalties for not completing. However, though the entrance requirements are identical, the type of service is different in that reserve duty personnel are not immersed in the unique components of military life and are not exposed to the same social support network that active duty personnel experience. During the 1980s and 1990s, after completing boot camp, members of the reserves generally served only one weekend per month with two weeks of annual training on active duty and were usually not subject to relocations. Outside of these relatively minor military commitments, and unlike today's reserve duty soldiers, members of the reserves were seldom activated during the period in our study and worked and lived in an otherwise civilian environment. Most important for our purposes, except during their short period of annual training, reserve duty service members were not subject to the social and institutional forces of military life that may have influenced smoking for active duty personnel. Thus, reserve duty status serves as an important control for selectivity on unmeasured characteristics that might influence the outcome measures on smoking. Based on selectivity on unmeasured background characteristics alone, we expect that both active duty and reserve duty veterans will be more likely to resemble each other than nonveterans when

examining smoking behavior.

Descriptive Statistics

Table 1 shows the descriptive statistics for our sample according to military service. The descriptive statistics show a greater proportion of veterans of active duty service engaged in daily smoking in 1998. However, veterans of active duty and veterans of reserve duty are about equally likely to have ever smoked daily. Consistent with prior research we find that nonveterans are less likely to have ever smoked than veterans (Bray and Hourani 2007; Klevens, Giovino, Peddicord, Nelson, Mowery and Grummer-Strawn 1995). Mean family income, measured in 1983-84 constant dollars, for veterans of reserve duty is highest with $29,820. Nonveteran family income, with a mean of $25,973, is higher than the mean family income for veterans of active duty who are the lowest of the three veteran statuses at $23,648. Veterans of active duty and veterans of reserve duty reported higher use of illegal drugs than nonveterans. Thirty one percent of veterans of active duty were divorced, which is 11 percentage points higher than veterans of reserve duty and 12 percentage points higher than nonveterans.

Table 1 about here

Multivariate Results

In Table 2 we present the results of multivariate logistic regression models. The three dependent variables are coded from the questions 1, 2 and 3 below. For each smoking condition, the affirmative response is coded 1 and otherwise=0. Two models are presented for each of the

following three smoking conditions: (1) Did the respondent smoke daily in 1998? (2) Did the respondent ever smoke prior to 1998? and (3) among respondents who have ever smoked, has the respondent stopped smoking as of 1998? Panel 1 of Table 2 is the result of the following two panels in the table. Put another way, to be a daily smoker in 1998 (shown in Panel 1), you must have ever smoked (Panel 2) and not stopped smoking (Panel 3).

Nonveteran is the omitted category in all of the models of Table 2. Model 1 includes only the variables measuring veteran status. In Model 2 we introduce several background variables to compare active duty and reserve duty veterans net the effects of the controls. In addition to the variables measuring the status of veteran service, the variables in Model 2 include log of family income, highest grade completed, cohabiting and divorced dummy variables (married omitted), the armed forces qualifying test score (AFQT), the number of illegal drugs used, and the race/ethnicity dummy variables Black and Hispanic (White omitted).

Table 2 about here

Veteran and Nonveteran Comparison

We find that veterans of active duty are substantially different from nonveterans with respect to all three smoking questions asked in 1998: they are more likely to be currently smoking daily, more likely to have ever smoked, and less likely to have stopped smoking. However the veterans of reserve duty differ from nonveterans only on the question of whether they ever smoked. Veterans of reserve duty were not significantly different from nonveterans when it comes to their stopping smoking behavior and their smoking daily in 1998 net of the

other variables in the models.

From Model 2 in Table 2 we find the odds of smoking daily in 1998 are 64% ([1.640-1] * 100 = 64) higher for veterans of active duty compared to nonveterans. The odds of ever smoking are 51% ([1.510-1] *100=51) higher for veterans of active duty compared to nonveterans. The odds of stopping smoking are lowered by 30.6% ([.694-1]*100= -30.6) for veterans of active duty. The differences between veterans of active duty and nonveterans for the three Model 2 results are statistically significant at $p<.05$.

The odds of ever having smoked are nearly identical for both active and reserve duty veterans compared to nonveterans in our analysis. The odds of ever smoking are 49.6% ([1.496-1]*100 = 49.6) higher for veterans of reserve duty compared to nonveterans. Neither difference for smoked daily or stopped smoking was statistically significant for reserve duty veterans in the models. The odds for ever having smoked for veterans of reserve duty was statistically significant ($P<.05$).

Active Duty Veteran and Reserve Duty Veteran Comparisons

In all of the models for the respondents smoking behaviors we conducted tests contrasting the veterans of active duty with the veterans of reserve duty. These results are provided in summary form at the bottom of Table 2. The examination of Model 1, shows the odds of smoking daily in 1998 are 43.33% [(exp(.512-.152)-1)*100)] higher for active duty veterans than for reserve duty veterans and the difference is statistically significant. Model 2, with the control variables, yields similar findings with the odds of smoking daily in 1998 being 48.14% higher for active duty veterans than for reserve duty veterans and the difference is statistically significant. The differences in the odds of ever having smoked for active duty

veterans than for reserve duty veterans are minimal in both Model 1 (9.31% higher) and Model 2 (nine tenths of one percent higher) and both are not significant. And last we compare stopping smoking for active duty veterans and reserve duty veterans. In Model 1, with no controls, the odds of stopping smoking are 38.68% lower for active duty veterans than for reserve duty veterans and this difference is statistically significant. When the control variables are added in Model 2 the odds of stopping smoking are 47.11% lower for veterans active duty than for veterans of reserve duty and this difference is statistically significant.

Conclusion

When examining Panel 2 concerning respondents who have *ever smoked*, no significant difference is found between active duty veterans and reserve duty veterans for both Model 1 and Model 2. Recall that both veterans of active duty and veterans of reserve duty were significantly different from nonveterans on having ever smoked prior to 1998. Our next contrast of interest concerns the *stopping smoking* behavior found in Panel 3 of Table 2. When active duty veterans are compared to reserve duty veterans on this aspect of smoking, we find a significant difference between the veteran statuses in both models. Model 1 significance was ($P<.10$) and Model 2 net the effects of the control variables we find a significant difference between active duty and reserve duty veterans ($P<.05$) indicating that active duty veterans are less likely to stop smoking. Our final contrast is found in from Panel 1. In the examination of *smoking daily in 1998*, we find that active duty veterans were significantly different from reserve duty veterans in Model 1 without controls and in Models 2 with the control variables ($P<.10$) with veterans of active duty more likely to be daily smokers in 1998.

Discussion

Our results are consistent with previous research in the examination of veterans versus non-veterans smoking behavior and provide new findings by comparing veterans of active duty with veterans of reserve duty. We report that active duty veterans are significantly more likely to smoke daily in 1998 than are veterans of reserve duty without or with controls in the model. This finding is the result of the fact that both active duty and reserve duty veterans are equally likely to have ever smoked, but veterans of active duty are more likely to have continued smoking. Current smoking behavior is the result of the combination of having ever smoked and whether or not one stops smoking. We find no difference between veterans of active duty and veterans of reserve duty when we examine whether the respondent has ever smoked. Veterans of reserve duty are more likely to stop smoking than are veterans of active duty. In summary, we find veterans of active duty equally likely to have ever smoked and less likely to have stopped smoking than are veterans of reserve duty. Therefore active duty veterans are more likely to smoke in 1998 than are reserve duty veterans.

Though not possible with the current data, an interesting topic of future research might explore in greater detail why veterans of active duty are less likely to stop smoking than are veterans of reserve duty even when they have similar experience with ever having smoked. We suggest that the active duty military experience, which differs from the experiences of reserve duty personnel, involves social (Fergusson, Lynskey and Horwood 1995; Green, Hunter, Bray, Pemberton and Williams 2008) and institutional support (Associated Press 2009; Ballweg 1991) for smoking as factors that may account for higher incidence of smoking behavior of active duty veterans in 1998. Though this study contrasts the AVE peace time active duty and reserve duty veterans it provides a better understanding of the dynamics of the higher incidence of active duty veteran

smoking behavior. This research suggests the possibility that the military as a total institution involving a culture of smoking (via peer pressure, low cost availability and opportunity) at an influential stage of the life course of recruits has resulted in a higher incidence of tobacco use by active duty veterans. As we have provided social and institutional explanations for the tobacco use by active duty veterans, we are optimistic that a reversal is possible by introducing changes in the social and institutional processes extant in the military. Also, the dramatic increase in the cost of healthcare in general and for veterans in particular, demands more enlightened avenues for reducing healthcare costs. The recent policy emphasis on tobacco cessation by the military provides an excellent opportunity to test whether a 'culture of non-smoking' will reduce later life course tobacco use by veterans and lead to a reduction in tobacco related health costs. The results also suggest that there is something about boot camp that increases smoking because both active duty veterans and reserve duty veterans are equally likely to have ever smoked. Yet continued active duty service acts to reduce the likelihood that someone stops smoking.

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Table 1 Descriptive Statistics for Variables Used in Examining the Link between Veteran Status and Smoking

Variable	Nonveteran (Civilian) N=2,678		Veteran of Active Duty, N=324		Veteran of Reserve Duty, N=134	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Smoked daily, 1998	.26		.37		.29	
Ever smoked daily	.45		.57		.55	
Stopped smoking 1998	.42		.35		.47	
Log of family income 1998	7.89	4.24	8.21	3.91	8.43	3.94
Family income 1998	25,973	27,940	23,648	23,422	29,820	29,986
Highest grade completed 1998	13.08	2.59	12.90	1.58	12.97	2.26
Cohabiting 1998	.08		.07		.07	
Divorced 1998	.19		.31		.20	
Single 1998	.17		.15		.11	
AFQT	40.88	30.99	41.19	24.36	37.84	27.12
Used drugs	1.06	1.86	1.53	2.50	1.43	2.37
Black	.28		.41		.36	
Hispanic	.19		.16		.17	

Table 2 Multivariate Logistic Regression Results Examining the Relationship between Veteran Status and Smoking: Smoked Daily-1998, Ever Smoked and Stopped Smoking.

Variable	Smoked Daily, 1998		Ever Smoked		Stopped Smoking	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Veteran of Active Duty	.512****	.495****	.510****	.412***	-.264	-.365**
Veteran of Reserve Duty	.152	.102	.421**	.403**	.225	.272
Log of family income 1998		-.018*		-.015		.013
Highest grade completed 1998		-.286****		-.266****		.148****
Cohabiting 1998		.569****		.238		-.726****
Divorced 1998		.465****		.369****		-.366**
Single 1998		.388***		.160		-.501***
AFQT		-.005**		-.000		.008***
Used drugs		.182****		.284****		-.045*
Black		-.263**		-.155		.320**
Hispanic		-.800****		-.486****		.718****
Intercept	-1.043****	2.670****	-.211****	3.076****	-.334****	-2.461****

*p < .10 ** p < .05 *** p<.01 **** p<.001

Smoked daily 1998 veteran contrast (Active duty vs Reserve duty) Model 1 and 2 (P<.10)

Ever smoked daily veteran contrast (Active duty vs Reserve duty) Model 1 and 2 not significant.

Stopped smoking veteran contrast (Active duty vs Reserve duty) Model 1 (p<.10) and Model 2 (p<.05).