Rape Rates and Military Personnel in the United States: An Exploratory Study

Leora N. Rosen

VIOLENCE AGAINST WOMEN 2007; 13; 945
DOI: 10.1177/1077801207305264

Violence Against Women
Volume 13 Number 9
September 2007 945-960
© 2007 Sage Publications
10.1177/1077801207305264
http://vaw.sagepub.com
hosted at
http://online.sagepub.com

Rape Rates and Military Personnel in the United States

An Exploratory Study

Leora N. Rosen
National Institute of Justice

This study involves a test of the cultural spillover hypothesis through a state-level analysis of the relationship between rape rates and the proportion of military personnel in the population. A statistically significant correlation not predicted by this hypothesis was found between rape rates and the proportion of Air Force personnel in the population. Further exploration revealed that this was largely because of the high correlation between the Air Force and the Indian population. Multivariate analyses revealed that the proportion of Indian women in the population was the main predictor of rape rates. Per capita alcohol consumption was also found to be positively correlated with both rape rates and Air Force personnel but was not significantly related to rape in the multivariate analysis.

Keywords: *alcohol; American Indians; rape; Uniform Crime Reports; U.S. Air Force; U.S. military*

Almost two decades ago, Baron, Straus, and Jaffee (1988) developed the cultural spillover theory of rape. The core assumption of this theory is that the more a society tends to endorse physical force to attain socially approved ends, the greater the likelihood that this legitimation of force will be generalized to other spheres of life where force is less socially approved. Their study, which examined the relationship between "legitimate violence" and the incidence of rape in the 50 states and the District of Columbia, found some support for this hypothesis. Among their indices of participation in socially approved violent activities were National Guard enrollment and proportion of the state budget spent on the National Guard (although in a reanalysis of their data by the present author, these variables were not individually correlated with rape rates). Surprisingly, their measure included no indices regarding the active duty military, but perhaps that was because these measures were not readily available at that time.

The association between rape and armed conflict is well known. Feminists and human rights advocates have extensively documented the sexual mistreatment of women during war, including the forced prostitution of Korean and Japanese women during World War II (Watanabe, 1999), the systematic rape of Muslim women by

Author's Note: The views are those of the author and do not purport to reflect the position of the National Institute of Justice or the U.S. Department of Justice.

Serbian forces during the Balkan conflict (Swiss & Giller, 1993), and the brutal rapes of thousands of women and girls during the Rwandan war and genocide of 1994 (Human Rights Watch, 2002). Information on sexual abuse perpetrated by soldiers during peace time is less readily available. Comparisons across studies of sexual victimization, both military and civilian, are often problematic because of differences in method, including different definitions of rape and sexual assault and different time frames in which victimization is reported. For example, in a landmark study of sexual assault on college campuses (Fisher, Cullen, & Turner, 2000), the definition of rape included oral and anal penetration and penetration with an object. These behaviors were not included in the definition of rape in a study conducted at the U.S. Air Force Academy but were categorized as "sexual assault" (Office of the Inspector General, Department of Defense [DoD], 2003). Furthermore, in the Air Force study, students were asked to report on all sexual assaults that had occurred since they entered the academy, whereas in the civilian study, students were asked to report only on those that had occurred since the beginning of the school year.

Although data collected by military and civilian law enforcement are based on similar definitions of rape, comparisons are problematic because of demographic differences between military and civilian populations. Morris (1996), in her comparison of military and civilian crime rates from 1987 to 1992, attempted to deal with this problem by statistically controlling for age and gender. She reported that rape rates per 100,000 were as follows: 64 for the Army, 28 for the Navy, 42 for the Marine Corps, and 26 for the Air Force. The rape rate for civilians during the same period was 42, but when controlling for age and gender, the civilian rate was 135. Thus, Morris concludes that the rape rate among civilians is significantly higher than among those in the military. However, speculation about the reasons for these substantial differences, both within the military and between military and civilian communities, seems premature without more information about whether rape is reported and investigated in a comparable manner in all of these groups.

Victim surveys conducted in military and civilian populations suggest that certain types of sexual harassment may be higher in the military, both among men and women (Rosen & Martin, 1998). However, a federal government-wide survey conducted in 1994 found that rates of sexual harassment for women in the armed services (ranging from 46% in the Army to 50% in the Navy) were not substantially higher than the government average of 44% (U.S. Merit Systems Protection Board, 1995).

Aside from the behavior of military members themselves, there is little or no publicly available information on the impact of the military on crimes in local civilian communities. Communities near military bases are profoundly affected by them demographically, culturally, and economically, yet we know very little about the impact, if any, on crime. There are a number of potential mechanisms through which the military could be associated with community crime rates. First, military personnel could commit crimes off base. Second, they could be victims of crime off base (e.g., they may be easy prey for certain types of loan sharks). Third, military bases

may simply be located in areas where there are high levels of crime. Fourth, according to the cultural spillover hypothesis, the presence of the military as a representation of legitimate violence would influence the surrounding culture to commit acts of violence that are not legitimate. If this hypothesis were correct, we might expect to find higher levels of violence in civilian communities located near military communities that are directly associated with ground combat, as compared to those less directly associated with combat.

The present research began as an exploratory study seeking to investigate whether there is any association between the type and number of military personnel in certain locations and rape rates in the surrounding civilian communities. Our hypothesis is that the correlation between rape rates and military personnel would be higher in communities associated with Army and Marine personnel because of their more direct association with combat and lower in those associated with Navy and Air Force personnel, controlling for demographic variables. Known victimization rates and perceptions of victimization among women across the services are consistent with the proposed direction of our hypothesis. Specifically, significantly fewer Air Force women experienced sexist behavior and sexual coercion than did women in the other branches of the military, and significantly more Army and Marine women believed that sexual harassment was more of a problem inside the military than outside the military (Lipari & Lancaster, 2003).

Study A

Method

Data Collection

Rape. Rape rates for 50 states and the District of Columbia were obtained from the Uniform Crime Reports (UCR), a system used by the Federal Bureau of Investigation (FBI) for tracking crime rates throughout the United States. According to the UCR, forcible rape is defined as

> the carnal knowledge of a female forcibly and against her will. Rapes by force and attempts or assaults to rape regardless of the age of the victim are included. Statutory offenses (no force used—victim under age of consent) are excluded. (FBI, 2003, p. 454)

Complaints of crime that are determined to be unfounded or false after an investigation are eliminated from an agency's count.

Rapes occurring in civilian jurisdictions and reported to civilian law enforcement authorities are included in the UCR. The primary purpose of the UCR program is to generate reliable crime statistics for use in law enforcement administration, operation, and management. Nearly 17,000 agencies contribute data to the program, which is

voluntary and is based on crimes brought to the attention of city, county, and state law enforcement agencies (FBI, 2003).

According to the FBI, the goal of the UCR program is to depict the nature of crime that occurs in a particular jurisdiction. Generally, crimes committed on military bases would not be reported to the UCR program unless the incident was under joint investigation by civilian and military law enforcement agencies (D. K. Mack, Chief Program Support Section, Criminal Justice Information Services Division, FBI, personal communication, April 2, 2004). In most cases, however, crimes committed on military bases would be reported through a separate system, the Defense Incident-Based Reporting System.

The period covered by this study included all years from 1994 to 2002, the last year for which complete UCR statistics were available when the study was conducted. Rape rates and population indices were obtained from the FBI Web site (http://www.fbi.gov/ucr/ucr.htm).

Military presence. Data on the number and distribution of military personnel in the United States from 1994 to 2002 were obtained from the Statistical Information and Analysis Division (SIAD) of the Directorate for Information Operations and Reports (DIOR), an agency within the DoD. SIAD is responsible for collecting, processing, and publishing DoD military and civilian workforce information. The information used in the present study is available on the DIOR–SAID Web site (http://www.dior.whs.mil).

Demographic information. The demographic composition of the U.S. military has undergone major changes during the past three decades. First, with the inception of the all-volunteer force in 1973, the need to retain trained personnel beyond their first enlistment resulted in an increase in the proportion of married enlisted service members. Second, the opening of certain military occupations to women resulted in an increase in the proportion of women in the military. In 1973, 98.4% of the approximately 2 million military service members were male, and 49% were single (Martin & McClure, 2002). By the late 1990s, 86% of the approximately 1.4 million military service members were male, and 42% were single. Thus, the presence of the military is still likely to inflate the proportion of males and possibly of single males in a given local area, although perhaps less so at the present time than in the past.

Baron et al. (1988) reported that the proportion of single males aged 15 and older in the population was significantly associated with state differences in rape. This variable is published in a standard table on the marital status of the population by the U.S. Census Bureau. However, because almost no active duty personnel are younger than 18 or older than 65, we also considered controlling for another demographic variable, namely, the proportion of men in the population aged 18 to 64. This demographic information was obtained from census data for 2000 located on the Web site maintained by the U.S. Census Bureau (http://www.census.gov).

Analyses

The proportion of military personnel stationed in each state was calculated per 1,000 people in the state population for the military as a whole and for each branch of the service separately from 1994 to 2002. Zero-order correlations between state rape rates and the proportion of assigned military personnel were calculated for the military as a whole and for each branch of the service for every year from 1994 to 2002.

The percentages of single men 15 years and older, and the percentages of men aged 18 to 64, were calculated for each state based on the sample data for the 2000 census, made available on the U.S. Census Bureau Web site. Zero-order correlations were computed between the demographic variables and rape rates and between the demographic variables and the proportion of military personnel in the population. In addition, partial correlations were calculated to control for the effects of the percentage of men 18 to 64 in the state population.

Results

Since the FBI began maintaining UCR data until 1992, state rape rates steadily rose from an average rate of 8 per 100,000 in 1960, reaching their highest point in 1992 at 42 per 100,000. Since then, rates have declined to an average of about 33 per 100,000 in 2002. During the period of the study, the average state rape rate decreased from 39.6 per 100,000 in 1994 to 33.9 per 100,000 in 2001 and then slightly rose in 2002 to 34.6. Standard deviations ranged from 14.1 to 11.1. In 2002, the state with the lowest rape rate was New Jersey (15.7), and that with the highest rape rate was Alaska (79.4).

During this same period, the military was undergoing a major downsizing initiative that began in 1988. Between 1988 and 2002, 97 major military bases closed. The number of active duty Army personnel went from 416,018 in 1994 to 383,112 in 2002, the Navy went from 359,460 in 1994 to 205,390 in 2002, and the Air Force went from 355,203 in 1994 to 290,193 in 2001 and then rose to 306,089 in 2002. Much of the downsizing was related to changes in the structure of the force in Europe. In the United States, despite increases in personnel at some military bases, there was an overall drop in the proportion of military personnel per 1,000 state residents from 1994 to 2002. The average proportion of Army personnel per 1,000 state residents went from 2.07 in 1994 to 1.67 in 2002. The average proportion for the Navy went from 1.42 to 0.75, and that for the Air Force went from 2.67 to 2.05 per 1,000 state residents. The highest proportion of military personnel in any branch of the service per 1,000 state residents was 16.5.

Table 1 presents the correlations and partial correlations between state rape rates and the proportion of military personnel for the years 1994 to 2002. The results show that although some of the correlations are moderately significant for the military as a whole, they are consistently significant for the Air Force when it is examined separately from the other branches of the service. Individually, none of the other branches of the service exhibited statistically significant correlations between the

Table 1
Correlations and Partial Correlations of State Rape Rates and the Number of Military Personnel per 1,000 Population

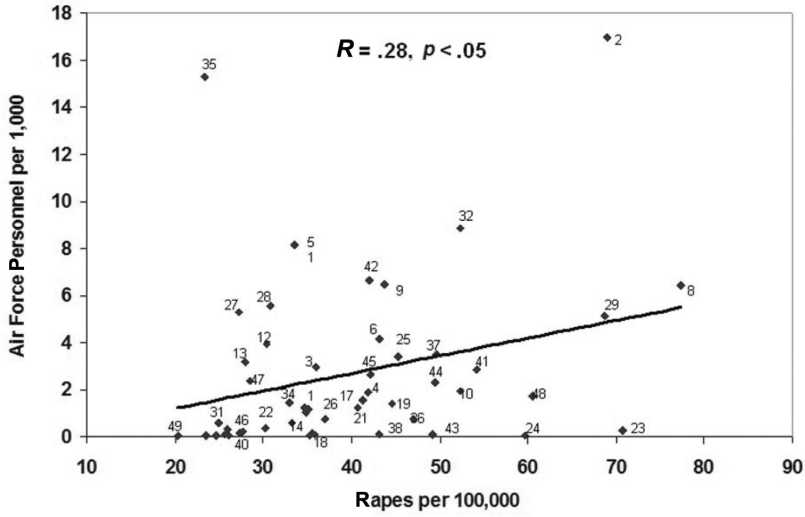
	Air Force		Army		Navy or Marines		Marines		Total Force	
Year	*r*	r^p	*r*	r^p	*r*	r^p	*r*	r^p	*r*	r^p
1994	.28*	.24	.12	.03	–.06	–.14	—	—	.17	.09
1995	.37*	.31*	.21	.09	.00	–.10	—	—	.29*	.18
1996	.34*	.31*	.18	.10	–.02	–.09	—	—	.25	.18
1997	.29*	.26	.17	.09	–.04	–.10	—	—	.20	.13
1998	.43**	.38**	.17	.07	–.08	–.16	—	—	.25	.17
1999	.53**	.49**	.25	.13	–.01	–.10	—	—	.37*	.29*
2000	.53**	.48**	.22	.09	–.03	–.10	–.07	–.16	.34*	.24
2001	.49**	.45**	.24	.14	–.05	–.11	–.09	–.17	.32*	.24
2002	.49**	.45**	.26	.16	–.03	–.09	–.04	–.11	.35*	.27

Note: $N = 51$. r^p is the partial correlation controlling for the percentage of men aged 18 to 64 in the state population. For the period 1994 to 1999, the personnel statistics for the Navy and the Marine Corps are combined. From 2000 onward, they are separately reported.
*$p < .01$. **$p < .001$.

variables of interest. Furthermore, although the correlations for the Air Force were statistically significant in every year from 1994 to 2002, the magnitude of the correlation dramatically increased in 1998 and remained high throughout the rest of the period of the study.

To better understand the increased significance of the relationship between state rape rates and the presence of Air Force personnel during the study period, the correlations for 1994 and 1999 (the years with the lowest and highest correlations) were plotted, and the plots were compared across the years. A closer examination of the data for 1994 and 1999 revealed the following changes: (a) All but 10 states evidenced a decrease in rape rates from 1994 to 1999. The most dramatic decreases occurred in states with fewest Air Force personnel. For example, Michigan's (23) rape rate decreased by 21.6 per 100,000, Minnesota's (24) decreased by 17 per 100,000, and Washington's (48) decreased by 13.4 per 100,000 (see Figures 1 and 2). (b) Six of the 10 states that evidenced increases in rape rates were above the mean with regard to number of Air Force personnel per 1,000. The largest increase occurred in Alaska (2), which is the state with the largest number of Air Force personnel per 1,000 state population. (c) Certain states with low rape rates and larger proportions of Air Force personnel lost personnel between 1994 and 1999. The largest decrease occurred in North Dakota, which lost 3.51 Air Force personnel per 1,000 state residents, going from 15.3 to 11.8. This represents a 23% decrease, which reduced North Dakota's

Figure 1
State Rape Rates and Air Force Personnel, 1994



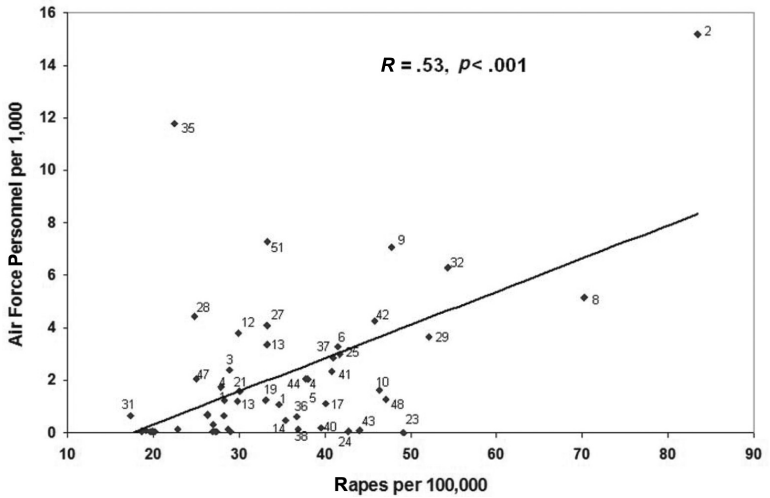
Note: See appendix.

outlier status. (d) Some states with high rape rates and high proportions of Air Force personnel experienced reductions in both, for example, Delaware (8), Nebraska (28), and Nevada (29).

These results led us to speculate that states with fewer Air Force personnel might have been more successful in reducing their rape rates. To test this hypothesis, we calculated the rate of decrease in state rape rates between 1994 and 1999. Next, we correlated the change in rape rates with the average proportion of Air Force personnel in the state from 1994 to 1999. The rate of change in rape between 1994 and 1999 was significantly positively correlated with the average proportion of Air Force personnel in the state population during that period ($r = .41$, $p = .003$). This means that the smaller the decrease in rape, the greater the proportion of Air Force personnel in the state.

Correlations between state rape rates and the demographic variables were not significant, although the percentage of men aged 18 to 64 came close to significantly correlating with state rape rates for 1999 and 2000 (see Table 2). The percentage of never-married men 15 years and older in the population was primarily associated with Navy personnel, with correlations reaching .5 or higher from 1994 to 2002. The percentage of men aged 18 to 64 was associated with all branches of the service. Correlations for the Army reached .5 or higher from 1994 to 2002. Controlling for

Figure 2
State Rape Rates and Air Force Personnel, 1999



Note: See appendix.

this variable did reduce the size of some of the correlations, but most remained statistically significant (see Table 1).

Discussion

This study found no support for the cultural spillover hypothesis as described in the introduction and, in fact, went contrary to that hypothesis. Specifically, there were no significant correlations between rape rates and the presence of Army, Marine, or Navy personnel. However, there were significant positive correlations between state rape rates and the proportion of Air Force personnel in the population for a 9-year period from 1994 to 2002. The study also found that this correlation increased after 1997, reaching a peak in 1999, and remained high through 2002. Finally, the study found that the decrease in rape rates during the period 1994 to 1999 was associated with relatively fewer Air Force personnel in the state population.

Attempts to interpret these findings should not take place, however, before certain additional questions are addressed:

1. To what degree can we assume that the correlations are based on the number of Air Force personnel actually present the state during the course of the year?

Table 2
Correlations Between State Rape Rates and Demographic Variables From Census 2000

Year	Never Married Men 15 Years and Older *R*	Men Aged 18 to 64 *R*	*p*
1994	.02	.19	
1995	.14	.26	.06
1996	.09	.18	
1997	.03	.17	
1998	.03	.21	
1999	.15	.26	.06
2000	.14	.27	.05
2001	.06	.23	.10
2002	.15	.23	.10

Note: $N = 51$.

2. Is there any independent evidence to suggest that Air Force personnel may be overrepresented as perpetrators of rape?
3. Could coincidental demographic factors be responsible for these correlations?
4. Could the Air Force's influence have led to increased rapes, but in a way not necessarily spelled out by the cultural spillover hypothesis?

Actual military presence in the state. Military personnel spend a certain amount of time on deployments that take them away from home for anywhere from a few days to a year or more. The average amount of time for deployments varies widely by branch of service, and the definition of what constitutes deployment also varies by branch of service. A Government Accountability Office (GAO, 1996) report noted that the Navy defines deployment as 56 days or more away from a home station, as compared to 7 days for the Army and 1 day for the Air Force.

Navy deployments have traditionally been the longest and Air Force deployments the shortest. From the late 1980s through the 1990s, deployments for all branches of the service increased, particularly for the Army and the Air Force. The GAO report estimated that the percentage of deployed Air Force personnel increased from 2.0% of the force in 1987 to 6.0% in 1995. During the same period, the Army increased the percentage of its deployed personnel from 5.0% to 8.5%, whereas the Navy increased its percentage of deployed personnel from 11.0% to 14.0% (GAO, 1996). In its 2003 Annual Report to the President and Congress (Rumsfeld, 2003), the DoD, using a new and streamlined method of calculating personnel tempo, reported that more than 50% of personnel in all branches of the service were deployed away from their home station at some point in time during fiscal years 2001 and 2002. The average length of deployment for Navy personnel in 2001 was 66.3 days, whereas that for Marine

personnel was 35.5 days and that for Air Force personnel was 23.5 days. Information for the Army was not available (Rumsfeld, 2003).

It should also be noted that Navy personnel assigned to ships are not considered deployed unless the ship is deployed overseas. For example, on July 6, 2004, the U.S. Navy Web site reported that 63,199 of the Navy's 375,548 personnel were on deployment and that 41% of its 295 ships were deployed. However, the Web site also reported that 48% of the Navy's ships were "underway," meaning that they were away from home port. Thus nondeployed Navy personnel may also not be physically present in the state to which they are assigned. Official personnel assignments, therefore, may be least likely to reflect the amount of time that Navy personnel spent in the state where their home stations are located but may be a better reflection of the amount of time that Air Force personnel spent in these states.

Overrepresentation as perpetrators. Morris's (1996) study found reported rapes in the Air Force during a 5-year period to be *less than half* the rate in the Army (26 vs. 64 per 100,000). Furthermore, rates of incarceration for rape are also lower in the Air Force than in the Army (U.S. Department of Justice, 1999). Thus, there is no independent evidence to suggest that Air Force personnel are likely to be overrepresented as perpetrators of rape.

Coincidental demographic factors. An important point for consideration is whether specific demographic characteristics of states with large proportions of Air Force personnel place them at risk for high rape rates. Many Air Force bases are located in large, sparsely populated Western states such as Alaska, North Dakota, South Dakota, Wyoming, and Nevada. Alaska, the state with the largest proportion of Air Force personnel and the highest rape rate, is also noteworthy for its large American Indian population. Interestingly, research data show that American Indians are at higher risk than other ethnic groups for violent crime victimization, including rape (Greenfield & Smith, 1999; Rennison, 2001). Therefore, it is possible that the Air Force's association with rape rates could be because of its coincidental presence in states with a population that happens to be at high risk for victimization.

Air Force influence. Another point to consider is whether certain aspects of Air Force culture, unrelated to symbols of violence, might have a rape-facilitating impact on civilians living in proximity to air bases. A press release regarding a study conducted in the Air Force reported that alcohol was found to be a major factor in rapes committed by Air Force personnel, particularly in Alaska ("Study Finds," 2004). It is possible that bars and clubs that provide alcohol to airmen may also be serving large quantities of liquor to civilian customers, and this may provide increased opportunities for alcohol-facilitated rapes by civilians.

Thus, coincidental demographic factors and Air Force influences appear to be the most promising explanations for the correlations found in Study A. To examine their possible effects, we conducted additional analyses, which became Study B.

Study B

Method

For this study, two new independent variables were examined in relation to rape rates. The first dealt with state differences in alcohol consumption. This variable was based on per capita alcohol consumption for states as reported by the National Institute of Alcoholism and Alcohol Abuse (Lakins, Williams, Yi, & Hilton, 2005). Specifically, the variable comprised gallons of alcohol averaged across all beverages for the state population aged 14 and older for the years 1994 to 2002. The second variable, obtained from the U.S. census of 2000, was the proportion of American Indians (including Native Alaskans) in the state population. Analyses were also conducted specifically in relation to the female Indian population.

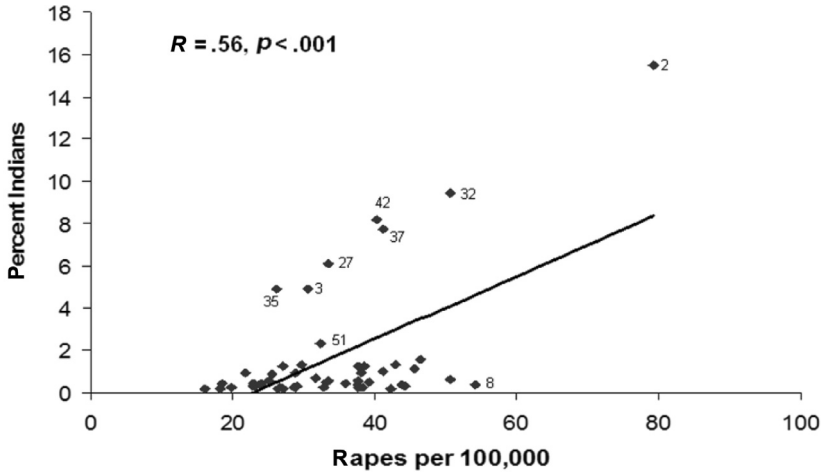
Two additional control variables were also included in these analyses. The first, proportion of divorced men in the population, was noted to be a predictor of rape rates in an earlier study (Baron et al., 1988) and was found to be related to proportion of Indian women in the population and to alcohol consumption in the present study (see Table 3). The second variable, men aged 18 to 64 in the population, was significantly related to proportion of Air Force personnel and to alcohol consumption and showed a trend toward significance in relation to rape rates at the $p = .07$ level (see Table 3).

Correlations were conducted between the proportion of Indians (and proportion of Indian women) in the population in 2000; per capita alcohol consumption from 1994 to 2002; proportion of Air Force, Army, and Navy personnel in the population from 1994 to 2002, rape rates from 1994 to 2002; and the change in rape rates during the period 1994 to 1999. Multiple regression was used to examine the extent to which the major study variables—Indians, Air Force personnel, and alcohol—predicted rape rates, controlling for the two additional demographic variables. For this part of the analysis, annual data reported for rape rates, Air Force population, and alcohol consumption were averaged across the last 4 years of the study (1999 to 2002). This approach is believed to reduce the influence of random year-to-year fluctuations (Martin, Vieraitis, & Britto, 2006).

Results

Alcohol consumption was significantly correlated with rape rates at the $p < .05$ level in 1995 ($r = .293$), 1999 ($r = .324$), and 2000 ($r = .327$), showing trends toward significance at the $p < .10$ level in 1994, 1996, and 1998. Alcohol consumption was significantly correlated with the proportion of Air Force personnel at the $p < .05$ level for 6 of the 9 years of the study period and showed a trend toward significance at the $p < .10$ level for the other 3 years (1996, 1997, and 2000). The highest correlations were for 1998 ($r = .32$, $p < .05$), 1999 ($r = .33$, $p < .05$), and 2002 ($r = .32$, $p < .05$). Alcohol consumption was not correlated with the proportion of Army or Navy personnel in the

Figure 3
State Rape Rates and Percentage Indians in the Population, 2000



Note: See appendix.

population at any time during this period. Proportion of Indians in the population was significantly correlated with the proportion of Air Force personnel and rape rates for all the years of the study and with the change in rape rates during the period 1994 to 1999, but not with alcohol consumption.

Figure 3 presents the correlation between proportion of Indians in the population and rape rates in 2000. An examination of this figure revealed that the correlation between rape rates and proportion of Indians in the population was largely determined by eight states in which Indians composed more than 2% of the population (referred to as high Indian states). When these states were separately examined, the correlation between rape rates and proportion of Indians was .945 ($p < .001$), whereas for the remaining 43 states (low Indian states), the correlation was .306 ($p < .05$). Based on this discovery, we created an additional binary dummy variable—whether the state's Indian population was greater than 2% of the total state population. High Indian states (Indians more than 2% of the population; $n = 8$) were assigned a value of 1. Low Indian states (Indians less than 2% of the population; $n = 43$) were assigned a value of 0. This variable is referred to as Indian state type (IST).

Because rape rates were slightly more highly correlated with the proportion of Indian *women* in the population, this was the variable subsequently used in the multivariate analysis. Table 3 presents a correlation matrix comprising the key study variables, including average rape rates (1999 to 2002), changes in rape rates from

Table 3
Correlation Among Key Study Variables

	RAPE	IND	AIR	ALC	IST	MEN	DIV
IND	.567**						
AIR	.532**	.71**					
ALC	.287*	.089	.306*				
IST	.29*	.994**	.666*	.096			
MEN	.253[a]	.17	.351*	.412**	.042		
DIV	.351*	.291*	.195	.268[b]	.267[b]	.311*	
CHG	.099	.419**	.428**	.067	.362*	.097	–.058

Note: $N = 51$. RAPE = average rape rate 1999 to 2002; IND = proportion of Indian women in the state population, 2000; AIR = average proportion of Air Force personnel in the state population, 1999 to 2002; ALC = average per capita alcohol consumption by state, 1999 to 2002; IST = Indian state type; MEN = men aged 18 to 64 in the state population, 2000; DIV = divorce men 15 years and older in the state population 2000; CHG = change in rape rates, 1994 to 1999.
a. $p = .07$.
b. $p = .06$.
*$p < .05$. **$p < .01$.

1994 to 1999, average per capita alcohol consumption (1999 to 2002), average proportion of Air Force personnel in the population (1999 to 2002), proportion of Indian women in the population in 2000, IST, and the two demographic control variables.

A general linear model general factorial analysis was used to examine the extent to which rape rates were predicted by five covariates and one fixed factor. The covariates included Indian female population, Air Force population, alcohol consumption, divorced men, and men aged 18 to 64, and the one fixed factor was IST. Proportion of Indian women in the population was the strongest predictor of rape rates ($F = 23.8$, $p < .001$), followed by IST ($F = 18.6$, $p < .001$). Proportion of Air Force personnel in the population was a much weaker though statistically significant predictor ($F = 4.4$, $p < .05$). Proportion of divorced men in the population almost reached significance ($F = 4$, $p = .05$). Alcohol consumption did not reach significance ($p = .12$). The adjusted R^2 for this model was .529 ($F = 10.3$, $df = 6$, $p < .001$).

Summary and Conclusion

This exploratory study found statistically significant three-way correlations among state rape rates, proportion of Air Force personnel in the population, and proportion of Indians or Indian women in the population. Per capita alcohol consumption was found to be positively correlated with both rape rates and Air Force personnel, but not with Indians. A fourth variable—IST—was also significantly related to rape rates.

In a multiple regression analysis using data averaged across 4 years for rape rates, proportion of Indian women in the population and IST were the major predictors of rape rates, followed by proportion of Air Force personnel in the population. Alcohol consumption did not reach statistical significance as a predictor of rape rates in this analysis.

The high correlation between rape rates and the proportion of Indian women in the population is most likely related to the high rate of victimization of Indian women. In Anchorage, Alaska, for example, Indians compose 10% of the population but 45% of rape victims (Rosay, 2004). However, it is important to emphasize that this study produced no evidence to indicate that Air Force personnel are responsible for these crimes. Nor should it be assumed that Indian men are typically the perpetrators. In most violent crimes, including rape, the victim and perpetrator are usually of the same ethnic group. Indian women are the exception, with 90% of rape victims reporting that the perpetrator was of another ethnic group (Greenfield & Smith, 1999).

Future research should investigate the connection of the Air Force and alcohol consumption to rape rates. Although alcohol was not a predictor of rape rates in the present study, these results should be viewed as preliminary and not as definitive. Questions for future research should include whether the presence of the Air Force leads to an overall increase in alcohol consumption and whether this, in turn, leads to increased rape rates. An examination of patterns of perpetration at the micro level in relation to the presence of air bases may be useful in this regard.

Finally, research should investigate why states with large proportions of Indians and Air Force personnel failed to reduce their rape rates during the decade of the 1990s relative to other states. It remains unclear as to whether this failure to reduce rape rates is primarily related to the proportion of Indians or to the proportion of Air Force personnel in the population. Future research should examine whether rape investigations are hampered by jurisdictional disputes where multiple jurisdictions may be involved (e.g., military, federal, tribal, and local civilian jurisdictions). Understanding the basis for the failure to reduce rape rates in certain states will be of critical importance in developing policies and practices for implementing changes that will keep women safe.

Appendix

Key to Figures

1 Alabama
2 Alaska
3 Arizona
4 Arkansas
5 California[a]
6 Colorado
7 Connecticut[a]
8 Delaware
9 District of Columbia
10 Florida
11 Georgia[a]
12 Hawaii
13 Idaho
14 Illinois
15 Indiana[a]
16 Iowa
17 Kansas
18 Kentucky

19	Louisiana	36	Ohio
20	Maine[a]	37	Oklahoma
21	Maryland	38	Oregon
22	Massachusetts	39	Pennsylvania[a]
23	Michigan	40	Rhode Island
24	Minnesota	41	South Carolina
25	Mississippi	42	South Dakota
26	Missouri	43	Tennessee
27	Montana	44	Texas
28	Nebraska	45	Utah
29	Nevada	46	Vermont
30	New Hampshire[a]	47	Virginia
31	New Jersey	48	Washington
32	New Mexico	49	West Virginia[a]
33	New York[a]	50	Wisconsin[a]
34	North Carolina*	51	Wyoming
35	North Dakota		

a. States with very low proportions of Air Force personnel and moderate to low rape rates are bunched together in the lower-left-hand corners of the plots and are not individually numbered because of lack of space and overlapping.

References

Baron, L., Straus, M. A., & Jaffee, D. (1988). Legitimate violence, violent attitudes, and rape: A test of the cultural spillover theory. *Annals of the New York Academy of Sciences*, *528*, 79-110.

Federal Bureau of Investigation. (2003). *Crime in the United States: 2002 Uniform Crime Reports*. Washington, DC: Government Printing Office.

Fisher, B. S., Cullen, F. T., & Turner, M. G. (2000). *The sexual victimization of college women*. Washington, DC: National Institute of Justice.

Government Accountability Office. (1996). *Military readiness: A clear policy is needed to manage frequently deployed units.* Washington, DC: Author.

Greenfield, L. A., & Smith, S. K. (1999). *American Indians and crime*. Washington, DC: U.S. Department of Justice, Office of Justice Programs.

Human Rights Watch. (2002). *The war within the war: Sexual violence against women and girls in eastern Congo*. New York: Author.

Lakins, N. E., Williams, G. D., Yi, H., & Hilton, M. E. (2005). *Apparent per capita alcohol consumption: National, state and regional trends. 1977-2003* (Surveillance Report 73). Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism.

Lipari, R. N., & Lancaster, A. R. (2003). *Armed Forces 2002 Sexual Harassment Survey*. Arlington, VA: DMDC.

Martin, J. A., & McClure, P. (2002). Today's active duty military family: The evolving challenges of military family life. In J. A. Martin, L. N. Rosen, & L. Sparacino (Eds.), *The military family: A practice guide for human service providers* (pp. 3-23). Westport, CT: Praeger.

Martin, K., Vieraitis, L. M., & Britto, S. (2006). Gender equality and women's absolute status: A test of the feminist models of rape. *Violence Against Women*, *12*, 321-339.

Morris, M. (1996). By force of arms: Rape, war, and military culture. *Duke Law Review*, *45*, 651-771.

Office of the Inspector General, Department of Defense. (2003). *United States Air Force Academy: Initial Sexual Assault Survey findings*. Alexandria, VA: Author.

Rennison, C. (2001). *Violent victimization and race, 1993-98* (NCJ 176354). Washington, DC: U.S. Department of Justice.

Rosay, A. (2004). Forcible rape and sexual assaults in Anchorage. *Alaska Justice Forum*, *20*. Retrieved April 26, 2006, from http://justice.uaa.alaska.edu/forum/20/4/winter2004/a_rapes.html

Rosen, L. N., & Martin, L. (1998). Incidence and perceptions of sexual harassment in U.S. Army combat service support units. *Military Psychology*, *10*, 239-257.

Rumsfeld, D. H. (2003). *Annual report to the president and the Congress*. Alexandria, VA: U.S. Department of Defense.

Study finds rape accusations high at Alaska Air Force bases. (2004, March 11). *Juneau Empire Online State News*. Retrieved October 28, 2004, from http://www.juneauempire.com/stories/031104/sta_rapes.shtml

Swiss, S., & Giller, J. E. (1993). Rape as a crime of war: A medical perspective. *Journal of the American Medical Association*, *270*, 512-515.

U.S. Department of Justice (1999, April). *Correctional populations in the United States, 1996*. Washington, DC: Author.

U.S. Merit Systems Protection Board. (1995). *Sexual harassment in the federal workplace: Trends, progress, continuing challenges*. Washington, DC: Office of Policy and Evaluation.

Watanabe, K. (1999). Trafficking in women's bodies, then and now: The issue of military "comfort women." *Psychology of Women Quarterly*, *27*, 19-23.

Leora N. Rosen, PhD, is a senior social science analyst at the National Institute of Justice, U.S. Department of Justice. She manages a grant portfolio comprising studies on a wide range of topics in the area of violence against women and family violence, including studies on custody and visitation, cross-cultural issues, measurement, and women's use of violence. She previously worked for the Walter Reed Army Institute of Research, where she specialized in research on military families and women in the military. She is coeditor of a book on the military family and has published numerous articles on topics related to women in the military and military families.