CAB D0008863.A2/Final
July 2004

How Has PERSTEMPO's Effect on Reenlistments Changed Since the 1986 Navy Policy?

Heidi L. W. Golding • Henry S. Griffis

4825 Mark Center Drive • Alexandria, Virginia 22311-1850

Approved for distribution: July 2004

Henry S. Griffis, Director
Workforce, Education and Training Team
Resource Analysis Division

CNA's annotated briefings are either condensed presentations of the results of formal CNA studies that have been further documented elsewhere or stand-alone presentations of research reviewed and endorsed by CNA. These briefings represent the best opinion of CNA at the time of issue. They do not necessarily represent the opinion of the Department of the Navy.

Executive Summary

The Navy has been operating under either a heightened state of alert or wartime conditions since the terrorism attacks of September 11, 2001. To respond to the new threats, the Navy has had to increase its personnel tempo of operations (PERSTEMPO). The Director of Military Personnel Plans and Policy Division (N13) asked CNA to examine the retention implications for Sailors who experience high PERSTEMPO during wartime or heightened tensions. A previous CNA study explored the relationship between high PERSTEMPO and reenlistments; it focused on PERSTEMPO patterns through the mid-1980s. In 1986, however, the Navy restricted deployment length and frequency, and high PERSTEMPO became less routine. In this annotated briefing, we update that study using 1990s personnel and ship employment data.

In the pre-1986 period, long deployments were not necessarily associated with crises, whereas the extra-long deployments from the post-1986 period *were* typically associated with crises. Anecdotally, Sailors identified such deployments as important and worth the extra hardships. Because of this, we expect that high PERSTEMPO in the 1990s has not been associated with lower reenlistments. This paper investigates this hypothesis. We use statistical methods to measure the effects of PERSTEMPO on the first-term reenlistment decisions of Sailors. Our findings follow:

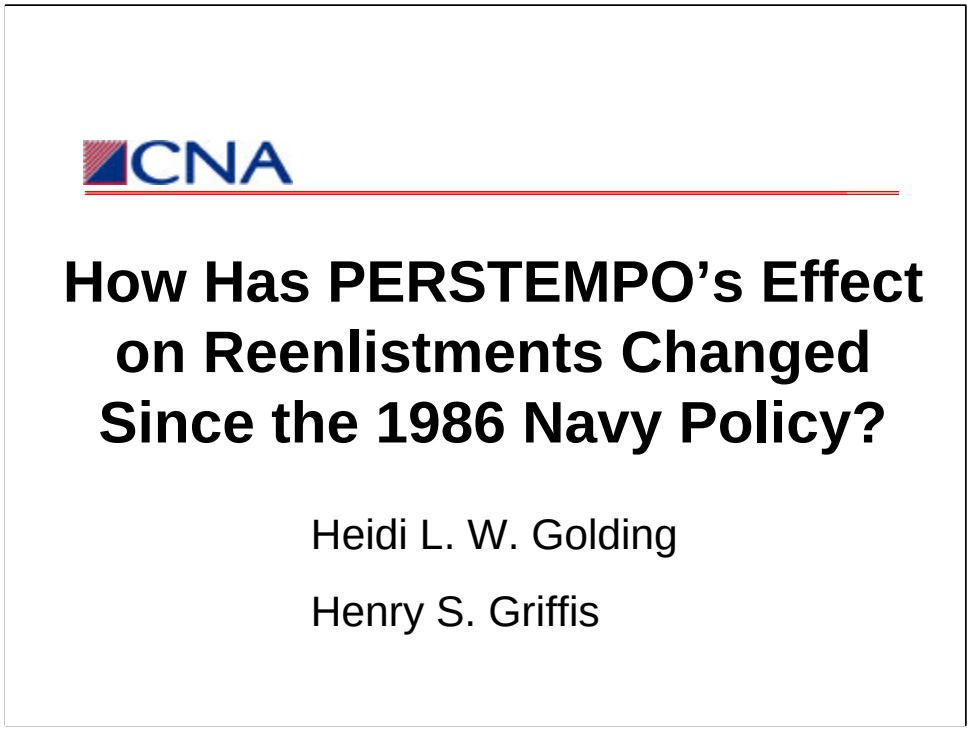
- In the post-1986 period, deployment lengths have not been a driver of reenlistment rates. Sailors who experience short deployments (under 4 months) do have reenlistment rates 1.2 percentage points higher than Sailors who deploy for 6 months. Sailors who deploy for over 8 months, however, do not have lower reenlistment rates than Sailors who face a typical 6-month deployment.

- The time between deployments influences reenlistment behavior. Very quick turnarounds (turnaround ratios or TARs, of 1.5 or less) reduce reenlistment rates by 1.9 percentage points, whereas slow TARs of 2.5 or higher increase reenlistments by 1.2 percentage points.

- Increasing nondeployed underway time by 25 percent decreases reenlistments 0.6 percentage point. Sailors state that this type of work is arduous and involves long hours, yet does not provide the same sense of mission as a deployment. And, to the degree that nondeployed underway time is not scheduled far in advance, it may disrupt Sailor's schedules more than deployments do.

- Sailors involved in long maintenance activities while in port also have reenlistment rates between 1.3 and 1.5 percentage points lower than other Sailors.

We conclude that the quick turnarounds from the current operations have negative consequences on reenlistments. The longer deployments, however, are not likely to lower reenlistments unless the missions continue for so long that the morale-boosting effect of the mission fades. If the extra-long deployments begin to appear routine, long deployments may adversely affect reenlistment rates. We suggest that the Navy monitor Sailors' quality of life and reenlistments carefully and be prepared to compensate them if retention does slip. One option currently available to the Navy is to increase sea pay for Sailors whose deployments exceed 6 months. In the longer term, the new High Deployment Allowance could be used to compensate Sailors for both recurrent and extended deployments.



The Navy has been operating under either a heightened state of alert or wartime conditions since the terrorism attacks of 9/11. To respond to the new threats, the Navy has had to increase its personnel tempo of operations (PERSTEMPO). Though many Sailors were not affected, some experienced longer than standard deployments—for example, Sailors on USS *Abraham Lincoln* were deployed for almost 10 months. Other Sailors faced compressed maintenance and training periods, resulting in shortened interdeployment periods.

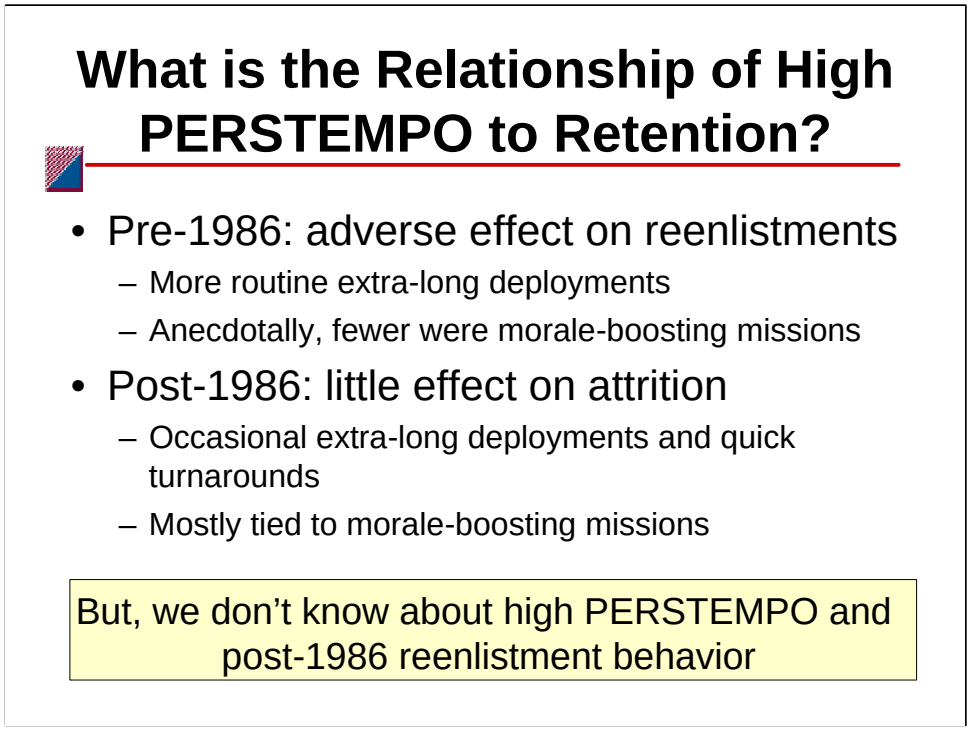
The Director of Military Personnel Plans and Policy Division (N13) asked CNA to examine the retention implications for Sailors who experience high PERSTEMPO during wartime or heightened tensions. In a companion piece [1] to this annotated briefing, CNA researchers used current Navy personnel data to investigate the short-term impact on retention of participation in Operation Enduring Freedom and Operation Iraqi Freedom, and they drew inferences from previous CNA studies regarding the potential long-term effects. An earlier study [2] explored the relationship between high PERSTEMPO and reenlistments; it focused on PERSTEMPO patterns through the mid-1980s. However, the Navy institutionalized its PERSTEMPO rules in 1986, and high PERSTEMPO became less routine. Consequently, the results of the study may not hold for the post-1986 period. In this annotated briefing, we update that study using 1990s personnel and ship employment data.

What Are the Navy PERSTEMPO Rules?

- Instituted in 1986
- Rules
  - Deployments constrained to 6 months
  - Turnaround ratios (TARs) restricted to a minimum of 2:1
  - Units required to spend at least 50% of time in homeport over 5-year span
- Measured at unit, not individual, level

This slide lists the PERSTEMPO rules put into place in the mid-1980s. The rules restrict the length of deployments, set a floor for the time between deployments, and constrain the total time away from homeport. They may be broken under special circumstances.

Although the policies were formalized, in part, to preserve Sailors' quality of life and retention, the Navy has imposed these standards on units, not individual Sailors. In FY 2000, however, Congress legislated that the services monitor individual service members' PERSTEMPO and pay them for excessive time away. Although the pay was suspended after 9/11, the services continue to collect data on individual PERSTEMPO.



Here, we present longer term retention implications based on previous CNA statistical analyses examining Sailors with higher than normal PERSTEMPO. Long deployments, before the PERSTEMPO rules were changed, tended to affect retention adversely [2]. Deployments over 8 months lowered first-term reenlistments 0.8 to 2.1 percentage points. In addition, a 25-percent increase in nondeployed time away resulted in a 0.7-percentage-point decline in reenlistments.

Similarly, a more recent study examining attrition from the Navy after the PERSTEMPO rules were changed showed that more nondeployed time away increased attrition. However, there was little or no change in attrition for Sailors deployed over 8 months [3].

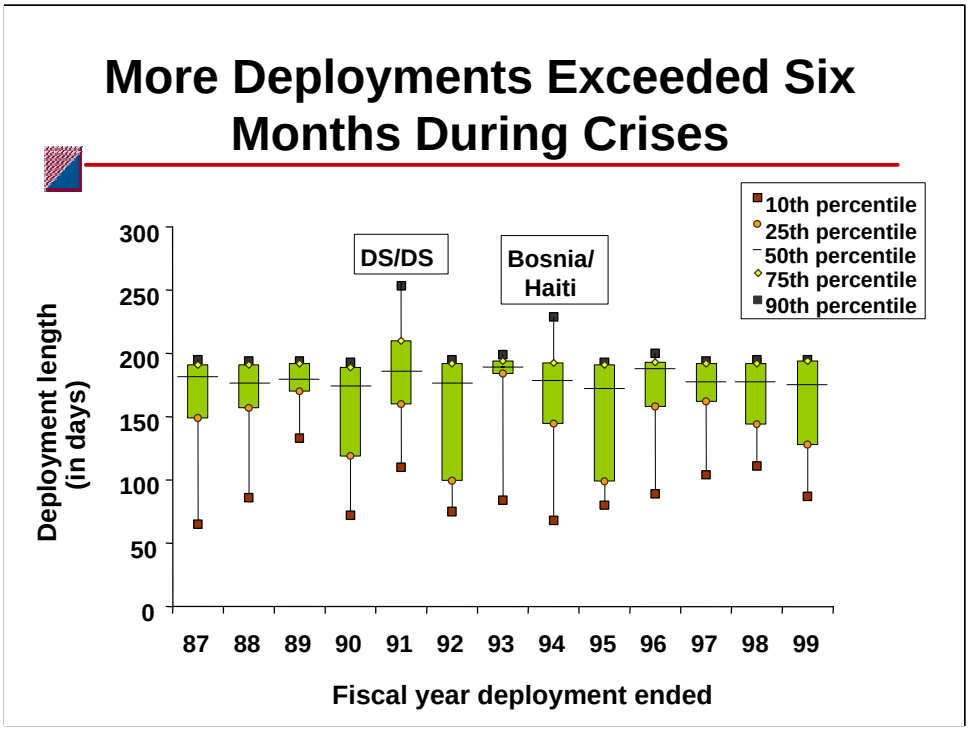
How do we explain the different findings on deployment effects? It could be that Sailors attrite for different reasons than they separate at end of active obligated service (EAOS). However, with the institutionalization of the PERSTEMPO rules, the environment changed. Before 1986, long deployments were not necessarily associated with crises, whereas the extra-long deployments from the post-1986 period *were* typically associated with crises. Anecdotally, Sailors identified such deployments as important and worth the extra hardships. It is not surprising, therefore, to see little effect from high PERSTEMPO in recent years.

We expect that high PERSTEMPO has not been associated with lower reenlistments in the 1990s. This paper investigates this hypothesis.

What We Did

- Measured each surface Sailor's PERSTEMPO
  - Based on the activities of the Sailors' ship
- Combined reenlistment data with PERSTEMPO data
- Conducted regression analysis of Sailors' reenlistment behavior
  - Isolated the effect of PERSTEMPO from other influences

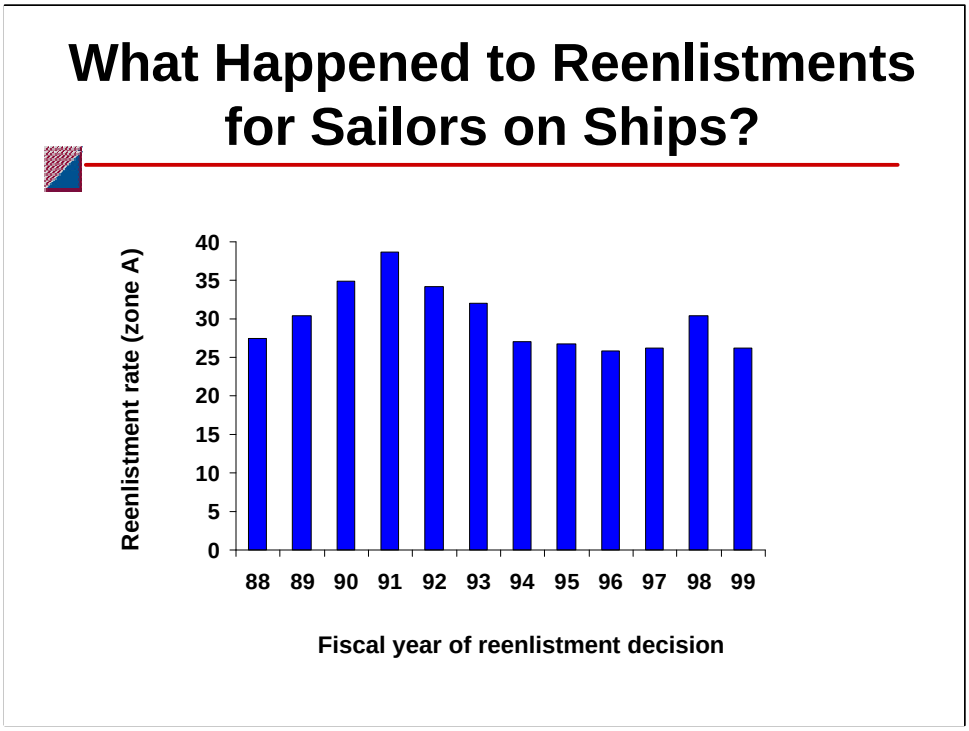
First, we looked at trends in Sailors' PERSTEMPO using data from CNA resident ship employment histories and from published sources (such as the *Navy Times*). To test the relationship between reenlistments and PERSTEMPO, we merged individual ship data with personnel data to categorize Sailors' PERSTEMPO experiences. Then we compared the arduousness of Sailors' deployment experiences with their reenlistment behavior. Finally, to measure the effect of high PERSTEMPO on Sailors, we conducted regression analyses of Sailors' reenlistment behavior, with each Sailor as the unit of observation. This technique allowed us to quantify the importance of a characteristic while holding other influences fixed.



In this slide, we examine Navy deployment lengths since the PERSTEMPO rules were formalized. Aggregating individual ship data, we organize deployment lengths by the ending date of the deployment. Each bar represents the range in deployment days for deployments ending in that fiscal year. For example, for deployments that ended in FY87, half of all deployments lasted less than 180 days (the median is represented by the horizontal line). Twenty-five percent of FY87 deployments lasted 150 days or less, and 75 percent were 195 days or less.

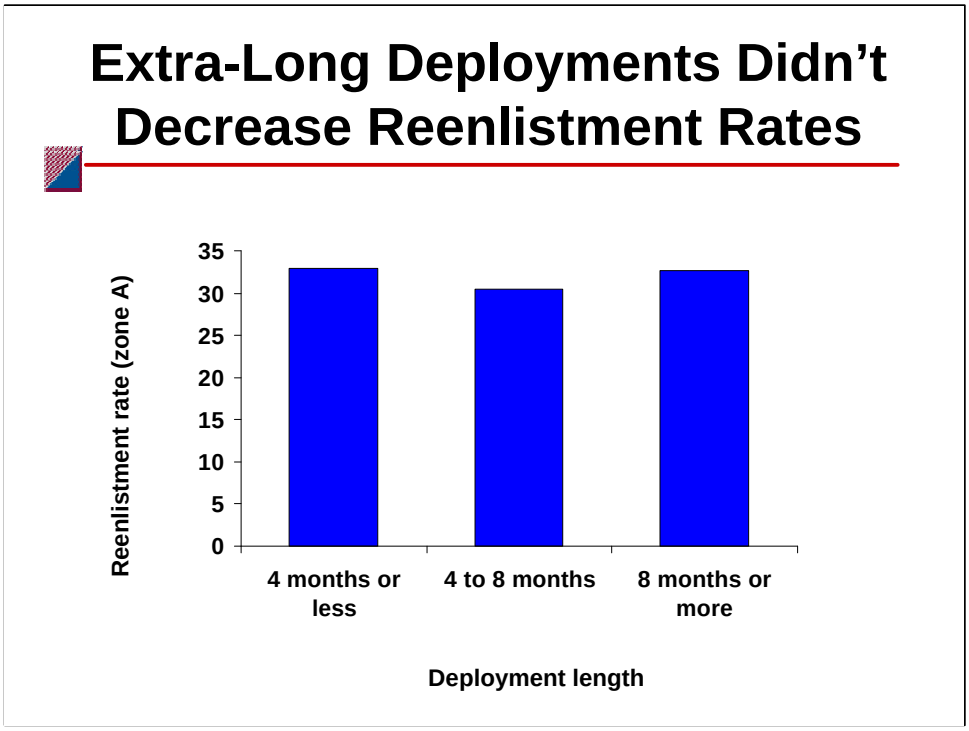
There is virtually no change in the median deployment length throughout this period; however, we see sizable variation in deployment lengths. Spikes in deployment length correspond to U.S. participation in conflicts. For example, deployments still averaged about 180 days in FY91—the year of Desert Shield/Desert Storm (DS/DS) —but 10 percent of deployments exceeded 250 days versus 200 days as experienced in the previous year. The Navy also prolonged a few deployments during the Bosnia/Haiti crises in FY94. We see substantial variation in the shortest deployments throughout this time period, although it is not as clearly related to U.S. participation in special missions as the spikes.

We defined a deployment as time away from homeport greater than 56 days (not including extended overhauls and maintenance away from homeport). The data sample excludes submarines and ships homeported overseas because ship's employment data for those categories of ships are unreliable.



This slide shows the pattern in reenlistments for zone A Sailors. In this data sample, we included only 4-year obligors assigned to a surface ship for at least 30 months. We chose the minimum service threshold so we could look at behavior of Sailors who had experienced more than one complete deployment cycle. Using a lower threshold of 24 months doesn't change the pattern in reenlistments. The sample did not include Sailors who made their decisions while deployed. Because Sailors who reenlisted in a combat zone during this period received any Selective Reenlistment Bonus (SRB) tax-free, deployed Sailors—particularly those deployed during conflicts—had much higher rates of reenlistment than those shown above. We also restricted the data to males and excluded Training and Administration of Reserves and Temporary Active Duty Sailors.

The Navy experienced large increases in reenlistments that correspond to Desert Shield/Desert Storm—with reenlistments rising to almost 39 percent and eventually stabilizing at about 26 percent. Because these Sailors were not reenlisting while deployed, the spike cannot be explained by any SRB tax-free advantages Sailors would have received. One explanation is that, although the arduousness and stresses of higher PERSTEMPO and wartime imply lower retention, the morale-boosting effect of participating in national crises offsets the hardships. It is not clear, however, that this is the correct explanation for the rise in reenlistments. Reenlistment rates also increased in the two fiscal years before the war.

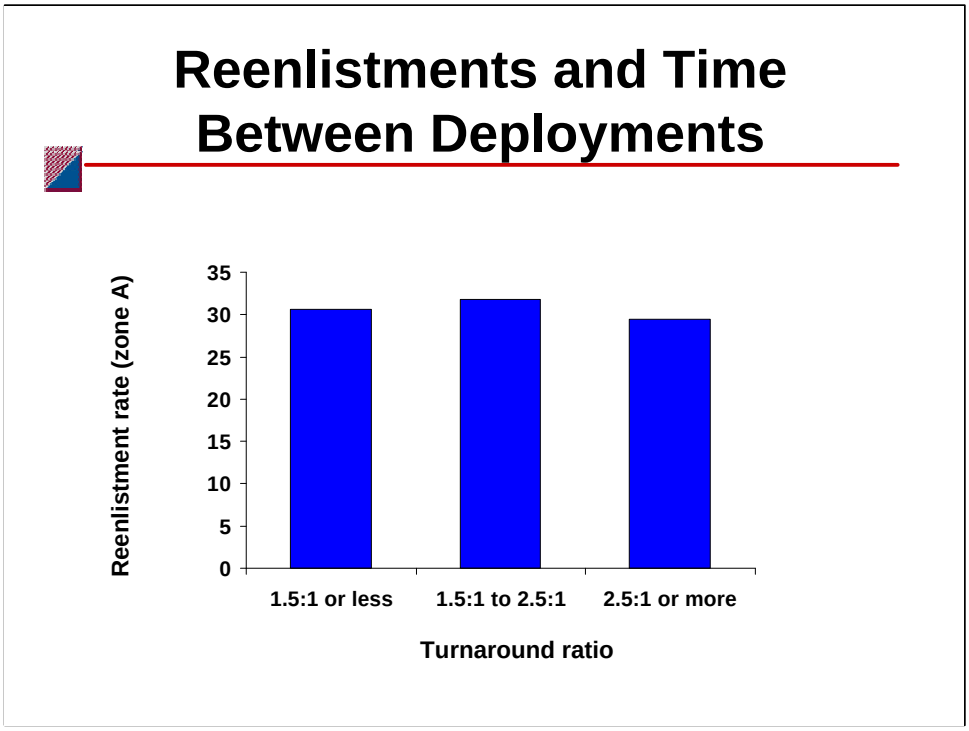


To test the relationship between reenlistments and PERSTEMPO, we analyzed reenlistment rates for Sailors who served at least 30 months of sea duty on a surface ship and completed at least one deployment cycle. First, we looked only at reenlistment and deployment length, without controlling for any other factors. Our more important results, controlling for other influences on reenlistments, will follow.

In this slide, we show the relationship between zone A reenlistments and deployment length. Because we expect to see the greatest effects on retention for Sailors serving the longest and shortest deployments, we group them into three categories by the length of their last deployment. This grouping of deployment lengths replicates that from the earlier CNA PERSTEMPO study [2].

The data show that the length of past deployments is associated with retention. As expected, Sailors with the shortest deployments (13 percent of the sample) had higher reenlistment rates. We also find, however, that Sailors with very long deployments (about 3 percent of the sample) had *higher* reenlistment rates—32.7 percent compared with 30.5 percent for most deployments. In contrast, the previous research found that longer deployments were associated with lower retention, as anticipated. It may be that other factors are offsetting the arduousness of the longer deployments.

We also group Sailors into other deployment length categories (e.g., less than 5 months, 5-7 months, and greater than 7 months). When redefining short and long deployments more broadly, the relationship we show above dissipates—implying that only the extremely short or long deployments influence reenlistments.



Because the PERSTEMPO rules also specify that turnaround ratios exceed 2:1, we looked at whether the ratio of time spent deployed mattered in a Sailor's reenlistment decision. Using the same data sample, we divided it into three categories: TARs of 1.5:1 or less, 1.5:1 to 2.5:1, and 2.5:1 or more. A cycle of 6-month deployment followed by 15 months in port would equate to a 2.5:1 TAR. Again, these categories are the same as reported in the previous PERSTEMPO study [2].

Looking at simple correlations between TARs and reenlistment, the data show some change in retention when turnaround ratios are high or very low. Consistent with the hypothesis that more deployed time negatively affects Sailors, those with quick TARs (1.5:1 or less) have a reenlistment rate of 30.6 percent versus 31.8 percent for Sailors with TARs of 1.5:1 to 2.5:1. Also, however, Sailors with high turnaround ratios, or relatively more time in port, have a lower reenlistment rate—29.5 percent (or 7 percent lower). A high percentage of these Sailors experienced the long TARs because their ships were undergoing overhauls—a condition that has also been associated with negative impacts on retention. We will see in the next section how controlling for overhauls and other related factors changes this relationship between long TARs and the reenlistment rate.

Ten percent of the Sailors had TARs of 1.5:1 or lower. Sixty-three percent had TARs of 2.5:1 or higher, and 20 percent exceeded 3.5:1. When we compare the reenlistment rates for the quartile of Sailors with the highest TARs with the remainder of Sailors with TARs of 2.5:1 or higher, we find no statistical difference in rates. The TARs of Sailors within our sample are similar to those in the earlier CNA report [2], as are our findings.

Regression Analysis Can Control for Other Factors

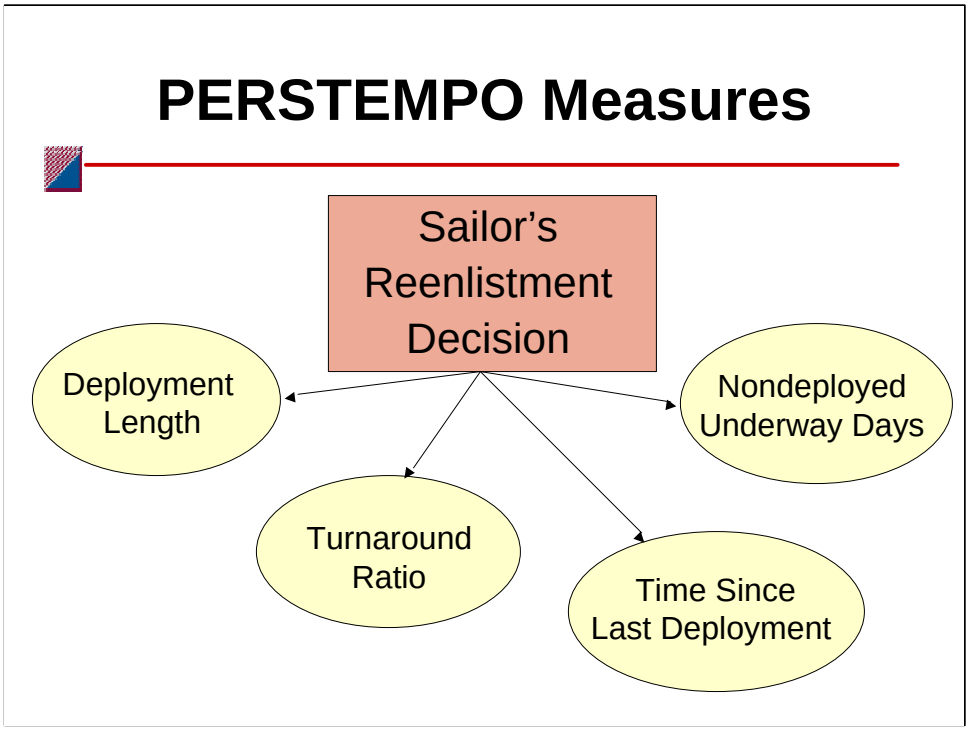
- Who is included
  - Sailors making reenlistment decisions from FY88 to FY99
  - 4-year obligors
  - Males
  - Served on same surface ship for 30 or more months
  - Homeported in CONUS
- CNA resident data
  - Enlisted Master Record (EMR)
  - Ship Employment History

Reenlistment rates are influenced not only by Sailors' PERSTEMPO experiences, but also by their opportunities outside the Navy and their individual circumstances. To isolate the effects of PERSTEMPO on reenlistments, we conducted regression analyses using logit specifications. We measured the effects of individual influences on zone A (LOS 2–6) reenlistments. We studied the behavior of Sailors at their first reenlistment decision, which is defined as a long-term stay or leave decision. Short extensions (less than 2 years) did not qualify. We included Sailors considered by the Navy to be either eligible or ineligible. The sample consisted of zone A reenlistments between FY88 and FY99; these Sailors accessed between FY83 and FY96.

Because the focus of this study is to analyze the effects of Sailors' PERSTEMPO, we eliminated Sailors who had not experienced substantial time on sea duty by their reenlistment decision. To do this, we restricted the sample to Sailors who had served at least 30 months on their surface ship and who had completed a deployment. We excluded Sailors who had been cross-decked and those who were stationed OCONUS because we had insufficient data to calculate their PERSTEMPO. Also, we did not include Sailors for whom we had incomplete or implausible deployment information.

We exclude Training and Administration of Reserves, Temporary Active Duty Sailors, Sailors with prior service, and women. Many changes were occurring in women's assignments to ships that were difficult to track, and their experiences may not be representative of women now serving in the Navy.

Our final data set contains information on 46,283 Sailors. We used the Enlisted Master Record to obtain the reenlistment decisions, demographic data, and work history on the Sailors. We constructed the deployment data by ship from the Ship Employment History. We then merged the ship data with the Sailor's record to recreate the Sailor's PERSTEMPO experiences.

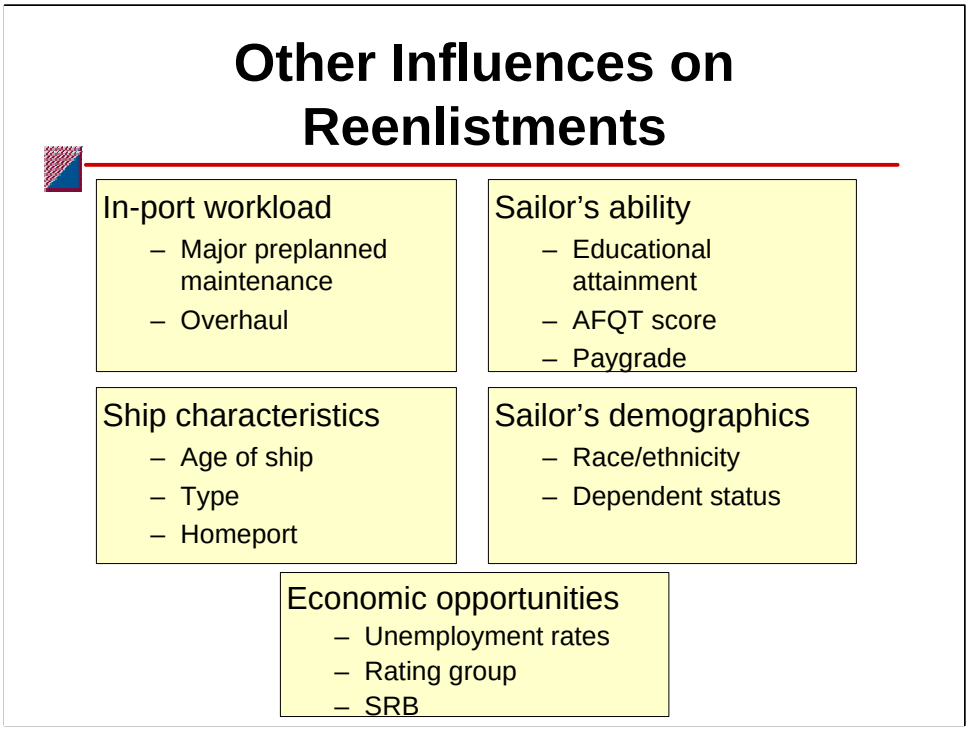


Here are the PERSTEMPO measures we included in our regression analyses. We used several measures to capture the effect of deployment length on reenlistment. In some specifications, we included a deployment length variable as a continuous variable; in others, we measured deployment length as well as a categorical variable (e.g., very short versus long or very long). To qualify as a deployment, a time-away period must be at least 56 days long.

We constructed the turnaround ratio as the length of the previous deployment versus the time between the previous deployment and the next earlier deployment. Because the absolute time between deployments may matter, not the ratio, we also looked at time between (in days).

Time away from homeport (nondeployed) is integral to training the crew for deployment. We use percentage of underway (nondeployed) time for the previous 30 months as an indirect way to measure the Navy's directive of restricting time away to 50 percent over a 5-year time horizon.

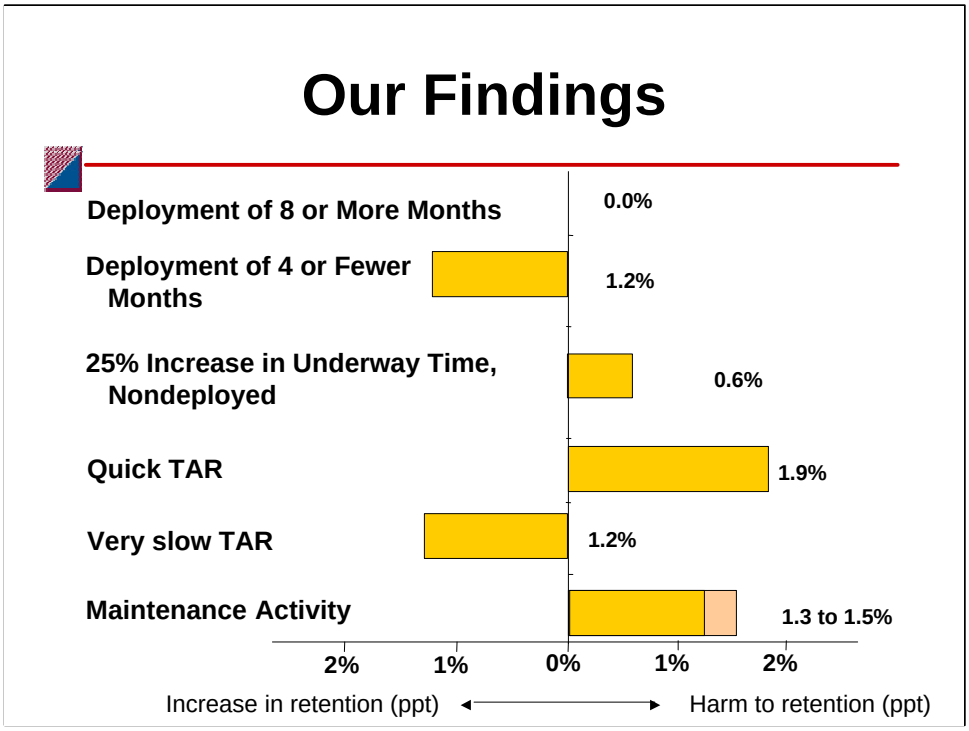
The time-since-last-deployment variable is measured as the time from the Sailor's last deployment to the reenlistment date. This value is truncated for the entire sample because none of the Sailors in the sample are deployed at the time of their decision. This variable should reflect quick or slow turnaround times since the last deployment but is difficult to interpret since it may also represent where the Sailor is in the deployment cycle. Some of the regression specifications we ran replaced this variable with the time to the ship's next deployment. This assumes that the Sailor will remain on sea duty through the next deployment and captures the effect of the expected length of the interdeployment period that the Sailor would experience by staying in the Navy.



Working conditions, satisfaction with the Navy and their jobs, and outside opportunities also influence Sailors' reenlistment decisions. We measure these factors indirectly in many cases. To measure working conditions and job attributes, we include measures of Sailors' in-port experiences. Sailors who experienced major maintenance activities are expected to experience long work hours and difficult working conditions. Rating group (we divided Sailors into 15 groups) also reflects both differences in the working conditions by occupation and the Sailor's opportunities outside the Navy. Finally, ship characteristics, such as the age and type of ship (e.g., surface combatant, carrier, auxiliaries, amphibious warfare), reveal information about the condition/repair of the ship.

We measure the relative pay and economic opportunities of Sailors through other variables. To capture the relative ease with which Sailors can find a job, we include the unemployment rate (obtained from the Bureau of Labor Statistics) from the Sailor's home state at the time of his reenlistment decision. In our final specifications, we included a pay ratio constructed as the ratio of an annual index of regular military compensation to an index of average full-time earnings of civilians (similar to the earlier PERSTEMPO paper [2]). This reflects broad changes in compensa-tion over time; a disadvantage is that it may also reflect other aspects of Navy life that changed over the 1990s. In some specifications, we replaced the compensation index with fiscal year variables to reflect all aspects of the Navy experience that were changing over the period. SRB levels are also included.

Finally, we include individual Sailors' characteristics. We include race/ethnicity to reflect any advantages/disadvantages in the civilian labor market not experienced in the Navy. Preferences for the Navy lifestyle and benefits may change with marital status. For example, married Sailors may be more interested in job security (leading to higher reenlistment rates) than single Sailors; however, they may not want to travel/deploy away from their families. We also include indirect measures of Sailors' ability—their schooling and Armed Forces Qualification Test (AFQT) score at entry into the Navy, as well as their paygrade at the time of their reenlistment decision. Higher ability Sailors are likely to have better civilian opportunities than other Sailors. Faster promoters, however, may be more satisfied with Navy life and less likely to leave, all else constant.



Here we summarize our findings of PERSTEMPO's effect on reenlistments. We report the full results, as well as sample statistics, in the appendix.

Unlike the earlier PERSTEMPO study, we find no effect from long deployments on reenlistments. We believe this is because of the limited number and special nature of the long deployments after the 1986 Navy policy. Should long deployments become more routine and Sailors begin to expect them, we anticipate that a negative relationship between long deployments and reenlistments may emerge. As demonstrated in an earlier CNA paper [4], Sailors' expectations about future hardships significantly affect reenlistments.

Our statistical analysis does show that Sailors with very short deployments (under 4 months) had higher reenlistment rates—approximately 1.2 percentage points higher. We do not know if that is because short deployments involve less hardship or because of the special nature of many short deployments. Most involve drug interdiction (which anecdotally is not morale-boosting), although some are associated with Desert Shield/Desert Storm.

We find that, overall, when using a continuous TAR variable in our regression specifications, the quicker turnarounds are associated with small decreases in reenlistment. However, the relationship between TAR length and reenlistments is not constant. To see if our results hold under alternate specifications, we categorize the TARs into four groups: quick (1.5:1 or lower), acceptable (1.5:1 to 2.5:1), slow (2.5:1 to 3.5:1), and very slow (3.5:1 or higher). The relationship between turnaround ratio and reenlistment then becomes more evident. Those Sailors with the quickest turnarounds have reenlistment rates 1.9 percentage points lower, whereas Sailors with the slowest turnarounds have reenlistment rates 1.2 percentage points higher than Sailors with TARs of 1.5:1 to 2.5:1. When we replace the TAR with the time between deployments in our statistical analyses, we also find that the longer the interdeployment period the higher the reenlistment rate. Quick turnarounds may result in lower retention for several reasons.

One reason is that quick turnarounds are an indication that a higher proportion of a Sailor's career is spent deployed. In addition, quick turnarounds are often not scheduled years in advance, and may allow little time for Sailors to arrange their personal matters. Finally, the interdeployment period may be particularly intense—with training and maintenance crowded into a short time frame.

Nondeployed underway time away decreases reenlistments. This is not surprising. Sailors state that the work is arduous and involves long hours, but it does not have the same sense of mission that they experience with a deployment. In addition, unanticipated scheduling changes with time away may create disruptions and scheduling problems for Sailors [3]. Our reported estimates for nondeployed underway time are slightly lower but consistent with those reported in the earlier CNA PERSTEMPO study [2]. We find that when we use the time between deployments rather than the TARs, our measured effects for nondeployed underway time are even closer to the earlier study. However, because time between deployments and underway time are correlated, we believe the lower estimates are more reliable.

Finally, Sailors involved in long maintenance activities while in port also reenlist at lower rates than other Sailors. Depending on the type of maintenance activity, Sailors who experience long maintenance periods have reenlistment rates that are between 1.3 and 1.5 percentage points lower than those of other Sailors. The earlier study also found this relationship. It is one of our largest and most persistent findings.

As a check on the robustness of our findings, we repeated our statistical analysis using less restrictive samples. In one set of regression analyses, we include Sailors who rotated to shore duty before their decision point but who had a minimum of 30 months on sea duty. This increases our sample size 10 percent to over 50,000 Sailors. Our results are very similar but for two exceptions. First, we find that the length of the deployment matters even less for Sailors on shore duty at their first decision point, and, second, the nondeployed underway time matters more. Consequently, in the larger sample, short deployments do not lead to higher retention, and the estimate for nondeployed underway time rises about 20 percent. When we expand our data set to include Sailors who complete less time (24 months) on sea duty by their reenlistment decision, we find no significant changes in our findings.

Our results suggest that what Sailors do while in homeport, and why they do it, influence retention decisions more than long deployments. Again, however, the only long deployments we've studied here are rare and unique cases.

PERSTEMPO and Desert Shield/Desert Storm

- No effect for DS/DS participants from
  - Long deployments
  - Nondeployed underway time
  - Quick turnaround
- Small sample and less certainty of result
- PERSTEMPO effect for Sailors who did not participate in DS/DS

We conducted similar regression analyses on a small sample of Sailors (about 3,000) who had participated in Desert Shield/Desert Storm. We used [5] to identify the ships deployed to DS/DS. We assumed that Sailors who were assigned to those ships in FY91 were involved in DS/DS.

We found that PERSTEMPO experiences were less important to reenlistment decisions for DS/DS participants than for the other Sailors we studied. It could be that the special nature of the mission offset any negative effects of high PERSTEMPO. An alternate explanation of the lack of results is that the small sample size made it impossible to untangle the effects of PERSTEMPO on reenlistment. This latter explanation is not wholly satisfactory; we found significant and large differences in reenlistments based on other Sailor characteristics, such as their demographics and education.

We also conducted regression analyses on Sailors who did not participate in DS/DS—about 43,000 who had reenlistment decisions between FY89 and FY99. In this group, very few Sailors had long deployments; of those Sailors who did, some deployed on special missions to Bosnia or Haiti. It was in this sample only, however, that we saw long deployments associated with lower reenlistments. We estimate that Sailors with over 8 months deployed have reenlistment rates more than 3 percentage points lower than other Sailors. Because of the small number of long deployments, this finding should be regarded as suggestive, not conclusive.

Implications and Recommendations

- What Sailors do between deployments matters
- Infrequent longer deployments with an important mission don't hurt retention
- As long deployments become more routine, reenlistments may fall
- Quick turnarounds do lower retention
- Monitor reenlistment behavior and be prepared to act

In the 1990s, time spent in arduous activities between deployments (e.g., under way, in maintenance) tended to reduce retention. This effect is similar to that found in the 1980s data.

Our results do differ from the previous study in one important respect—the effect of long deployments on retention. Sailors who've experienced extra-long deployments do not appear to be less likely to reenlist. We believe this is because extra-long deployments are now rare and typically associated with morale-boosting missions. We conclude that the recent longer deployments are likely not to have negative consequences on reenlistments unless the missions continue for so long that the morale-boosting effect fades. If the extra-long deployments begin to appear routine, long deployments may adversely affect reenlistment rates. The quicker turnarounds do appear to lower retention. This may be the result of several factors. First, Sailors are spending more of their careers deployed. But, with the quicker turnarounds, Sailors may experience shortened, more strenuous, preparation and training periods before deploying. Finally, because some of the quick turnarounds are not anticipated, the redeployment may be more disruptive to a Sailor's home life than a normal deployment for two reasons: (a) an abbreviated time at home and (b) less time to arrange personal matters before redeploying.

We suggest that the Navy monitor current trends in Sailors' quality of life and reenlistments carefully and be prepared to compensate them if retention does slip. In the short term, if long deployments translate into losses from the Navy, one option is to increase sea pay for Sailors whose deployments exceed 6 months [1]. Over the longer term, the new High Deployment Allowance could be used to compensate Sailors for both recurrent and lengthy deployments.

We also recommend further statistical reenlistment studies if there are changes in deployment lengths and, consequently, Sailors' expectations. Obtaining estimates of the effects of changing expectations, as in [4], should assist the Navy in predicting reenlistment trends.

Appendix

Results

Table 1, which follows, shows the sample means and the estimated coefficients for factors that influence zone A reenlistments. The change in the probability of reenlisting for a one-unit change in any factor is b*(1 – p) * p, where b = the estimated coefficient and p = the sample proportion reenlisting. For example, a 1-percentage-point change in the percentage of time under way, not deployed, would equal a reduction in reenlistments of -0.506 * 0.308 * (1 – 0.308) = -0.108.

Our estimates for non-PERSTEMPO influences on reenlistment are consistent with the earlier study. Sailors who are married or are not white have higher reenlistment rates, as do Sailors who are promoted more quickly. Sailors on carriers have lower reenlistment rates. Finally, economic opportunities and pay matter. As found previously, Sailors who receive higher pay in the Navy versus the civilian sector or who are eligible for SRBs have higher retention. Our SRB estimate, however, is higher and our military-to-civilian wage estimate lower than found in the previous PERSTEMPO study. In addition, our military-to-civilian wage estimate is not stable over alternate specifications. Correlation between pay variables in our data may contribute to estimation problems.

Table 1. Sample means and estimated coefficients

Variable [a]	Coefficient	Mean
PERSTEMPO		
Short deployment	0.056*	0.134 [b]
Long deployment	-0.046	0.029 [b]
Quick turnaround	-0.090**	0.095 [b]
Slow turnaround	0.027	0.337 [b]
Very slow turnaround	0.055*	0.333 [b]
Percentage under way, not deployed	-0.506*	0.220
Time since last deployment (days)	0.000**	361.644
Ship characteristics		
Age of ship (years)	-0.001	19.487
Pacific fleet	-0.110**	0.503 [b]
Auxiliary ship	-0.090**	0.144 [b]
Carrier - conventional	-0.151**	0.150
Carrier - nuclear	-0.247**	0.167
Surface combatant	-0.020	0.326 [b]
Sailor characteristics		
Black	1.019**	0.208 [b]
Race/ethnicity (not black or white)	0.643**	0.137 [b]
A-cell	-0.269**	0.425 [b]
B-cell	-0.060	0.055 [b]
D-cell	0.211*	0.008 [b]
Number of children	0.247**	0.289
Married	0.709**	0.365 [b]
Pay and civilian opportunities		
Unemployment rate (in home state)	-0.009	5.698
E-3 at decision	-0.727**	0.141 [b]
E-5/6 at decision	0.425**	0.196 [b]
SRB level	0.150**	0.928
RMC to civilian wage	0.470**	1.056

Occupational category			
Surface engineering		-1.309**	0.162 [b]
Hull/mechanical engineering		-1.365**	0.130 [b]
Aviation maintenance		-0.313**	0.027 [b]
Aviation operations		-0.702**	0.116 [b]
Aviation supply		0.025	0.016 [b]
Deck		-0.833**	0.110 [b]
Supply		-0.158**	0.118 [b]
Medical		0.324*	0.003 [b]
Cryptography	-0.787**	0.007 [b]	
Surface combat systems		-0.949**	0.056 [b]
Surface operations		-0.982**	0.144 [b]
Submarine ratings		-1.196**	0.004 [b]
General detail	-1.273**	0.059 [b]	
Maintenance			
Major preplanned maintenance	-0.069**	0.266 [b]	
Overhaul		-0.062**	0.736 [b]
Other			
Decision during or following Desert Shield/Desert Storm		0.232**	
Decision in fiscal year 1999		-0.143**	
Constant		-0.141	
Observations		46,283	
Log likelihood		-25,226	
Reenlistment rate		0.308	

[a] Reference group is E-4 Sailors in administrative ratings with normal length deployments and TARs, assigned to amphibious ships, white, not married, and C-cell.

[b] Statistic represents proportion of sample with this characteristic.

** Statistically significant at the 95-percent confidence level.

* Statistically significant at the 90-percent confidence level.

References

[1] Heidi L. W. Golding and Henry S. Griffis. *Increased PERSTEMPO, Retention, and Navy Policy*, Jul 2003 (CNA Annotated Briefing D0008040.A2)

[2] Timothy W. Cooke, Alan J. Marcus, and Aline O. Quester. *Personnel Tempo of Operations and Navy Enlisted Retention*, Feb 1992 (CNA Research Memorandum 91-150)

[3] Heidi L. W. Golding et al. *Fleet Attrition: What Causes It and What To Do About It*, Aug 2001 (CNA Research Memorandum D0004216.A2)

[4] Martha E. Shiells and Joyce S. McMahon. *Effects of Sea Duty and Advancement on First-Term Retention,* Jun 1993 (CNA Research Memorandum 92-205)

[5] Norman Friedman. *Desert Victory: The War for Kuwait*. Annapolis: Naval Institute Press, 1991


CNA