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OPTEMPO: Effects on Soldier and Unit Readiness

CARL A. CASTRO and AMY B. ADLER

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"The man is the first weapon of battle. Let us study the soldier, for it is he who brings reality to it." --
Ardant du Picq, 1870

The effect of operations tempo (OPTEMPO) on soldier and unit readiness is an important issue for military and civilian leaders.[1] The reason for this concern is that while the size of the US military has decreased, the frequency of military operations has greatly intensified. The situation in Europe is a case in point. Within the past ten years, the US Army in Europe (USAREUR) has shrunk by nearly 70 percent--from 213,000 Army personnel in 1990 to approximately 62,000 in 1999. Yet, the number of military deployments has dramatically increased. From 1945 to 1989, USAREUR participated in only 29 peacekeeping or humanitarian missions; however, from 1991 (marking the end of the Gulf War) to the present, USAREUR has participated in over 100 such missions. This change represents more than a threefold increase in the number of military deployments, with less than one-third of the original number of personnel available to perform them.

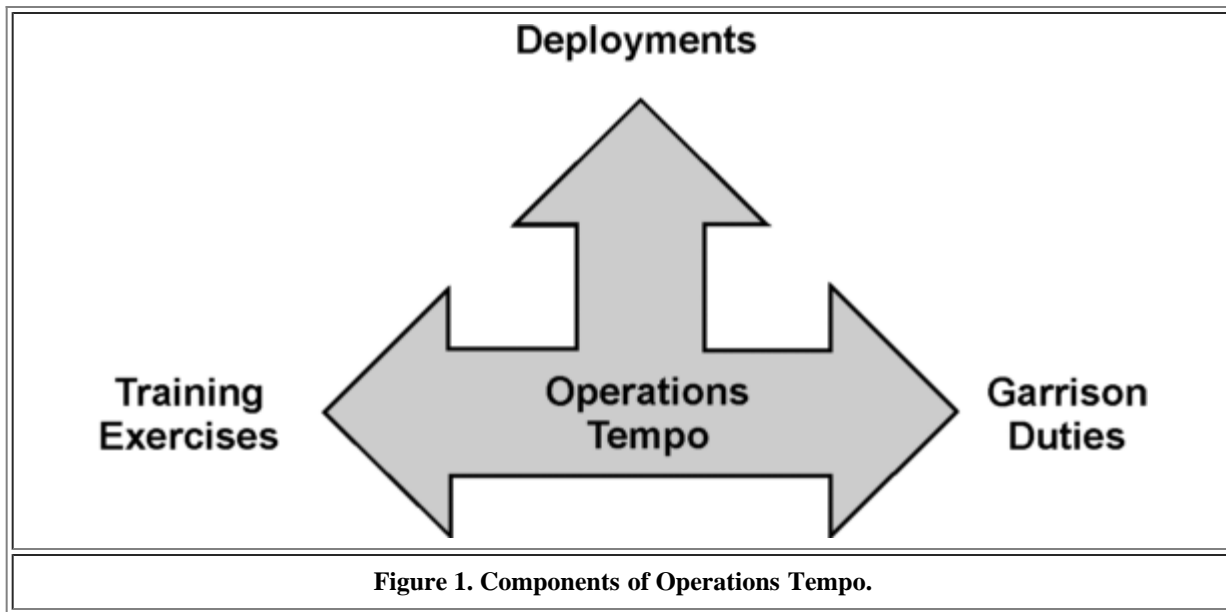
In addition to supporting these primarily peacekeeping and humanitarian military operations, USAREUR units must still maintain their combat readiness, which usually involves field training exercises. Thus, upon returning from a military deployment, many soldiers immediately begin preparing for a field training event. Garrison support must still be provided, and yet there are fewer units available for this duty because of the marked increase in the number of contingency operations. Often these "normal" garrison duties are just as stressful on soldiers and units as military deployments. This stress is even more pronounced for low-density units, such as military police and signal units, because such units are usually required to support both the deployed task forces and the garrison forces that remain behind.[2]

Compounding the situation, the number of contingency operations has increased so rapidly that some USAREUR units are tasked to support more than one military operation at a time. Other units must deploy multiple times within a relatively brief period. The most recent example of this is the US deployment in support of the NATO mission in Bosnia-Herzegovina and Croatia to implement the Dayton Peace Accords. Nearly 50 percent of the soldiers who deployed on the mission during its first year deployed on the same mission a second time.[3] This proportion probably would have been even higher if not for the fact that many soldiers rotated to different units as part of the normal changes in duty station that occur about every three years. For all these reasons, USAREUR is a useful case to begin exploring the relationship between operations tempo and soldier and unit readiness. The present article reports the interim results of a continuing investigation of this subject by personnel of the US Army Medical Research Unit in Europe.

Defining OPTEMPO

As we use the term in this article, the acronym OPTEMPO joins the two words "operations" and "tempo." The Department of Defense defines an "operation" as "a military action or the carrying out of a strategic, tactical, service, training, or administrative military mission." A useful dictionary definition of "tempo" is "the rate of motion or activity." [4] Thus, a good working definition of "operations tempo" is "the rate of military actions or missions." Notice that the military's definition of an operation is not limited to a single type of military action or mission. In our sense of operations tempo, nearly all military missions fit into one of three categories: deployments, training, or garrison duties. Thus, in our definition of operations tempo, we include all three mission components, as illustrated in Figure 1 below. In order to understand the effects of operations tempo on soldiers and units, all three components must be

considered.[5]



Our definition of operations tempo does not specify whether the military mission is related to units or to individual soldiers, but given that operations tempo can (and does) affect both units and soldiers, we believe that the definition of operations tempo should be understood to apply to both the unit and the soldier. We acknowledge that our definition of operations tempo is at variance with current usage, which usually equates operations tempo with unit tempo. But we regard unit tempo here as only part of the definition of operations tempo, with individual (or soldier) tempo comprising the remainder.[6]

Unfortunately, operations tempo is typically viewed in terms of military deployments, usually considering the *number* of deployments only. We believe this view is too restricted. Military deployments vary along many dimensions such as length, intensity, location, and type (i.e., combat, peacekeeping, or humanitarian), each of which can have a dramatically different effect on soldier and unit readiness. All of these dimensions should be considered when assessing the effects of deployments on readiness. More important, we should keep in mind that other types of missions, such as training, administrative support missions, and service support requirements, also affect readiness.

Deployment Tempo

Although operations tempo is actually composed of three components--deployments, training exercises, and garrison duties--operations tempo is most typically associated with deployments. In fact, the terms operations tempo and deployment tempo are often used interchangeably. While we view deployments as only one component of operations tempo, it is still important to determine how a soldier's deployment load should be measured.[7] Usually, a soldier's deployment load is calculated by simply considering the total number of deployments (combat, peacekeeping, and humanitarian missions) in which a soldier has participated. Yet the key to deployment commitment is not just the number of deployments, but the rate at which they occur. For this calculation, we divided the soldier's total number of deployments by the number of years the soldier had served in the military. This technique yields what we call the soldier's "deployment tempo," a term describing the number of deployments per year of service.

For example, if a junior enlisted soldier has been on active duty for two years and has participated in two military deployments, his deployment tempo would be 1.0, while a senior enlisted soldier who has been on active duty for ten years and also has been on two deployments would have a deployment tempo of only 0.2. In this example, both the junior enlisted soldier and the senior enlisted soldier have been on the same number of deployments, but the junior enlisted soldier's deployment tempo is five times greater than the senior enlisted soldier's. The junior enlisted soldier is deploying once a year, while the senior enlisted soldier is deploying once every five years. Thus, deployment tempo reflects the frequency of deployment over time, whereas the number of deployments by itself ignores the time factor and thus fails to capture the critical element of intensity or frequency. We believe that deployment tempo is a far more

effective measure of operations tempo than the total number of deployments.

To determine the situation in USAREUR, we surveyed 2,256 soldiers, recording the number of deployments each had experienced and his or her total years of active duty. The data were then aggregated to show the average number of deployments and the average deployment tempo, broken out by active-duty years-in-service groupings. The results are depicted in Figure 2. When we simply focused on the number of times soldiers had been deployed, it was not surprising to learn that the longer soldiers had served in the military, the more they had deployed. However, when we took deployment tempo into account, meaning the number of deployments averaged across the number of years of service, the results were starkly different. Soldiers with fewer years of service actually had a greater deployment tempo than those with more years of service. That is, although soldiers with fewer years of active duty have been on fewer deployments, their rate per year of service is higher. It is important to note that these differences in deployment tempo were not simply due to differences in rank. Of course, rank affects deployment status, with junior-ranking individuals more likely to be deployed, but it does not explain the pattern of deployment tempo across entire careers. Soldiers with a given length of service are deploying far more frequently today than yesterday's soldiers with an identical length of service.

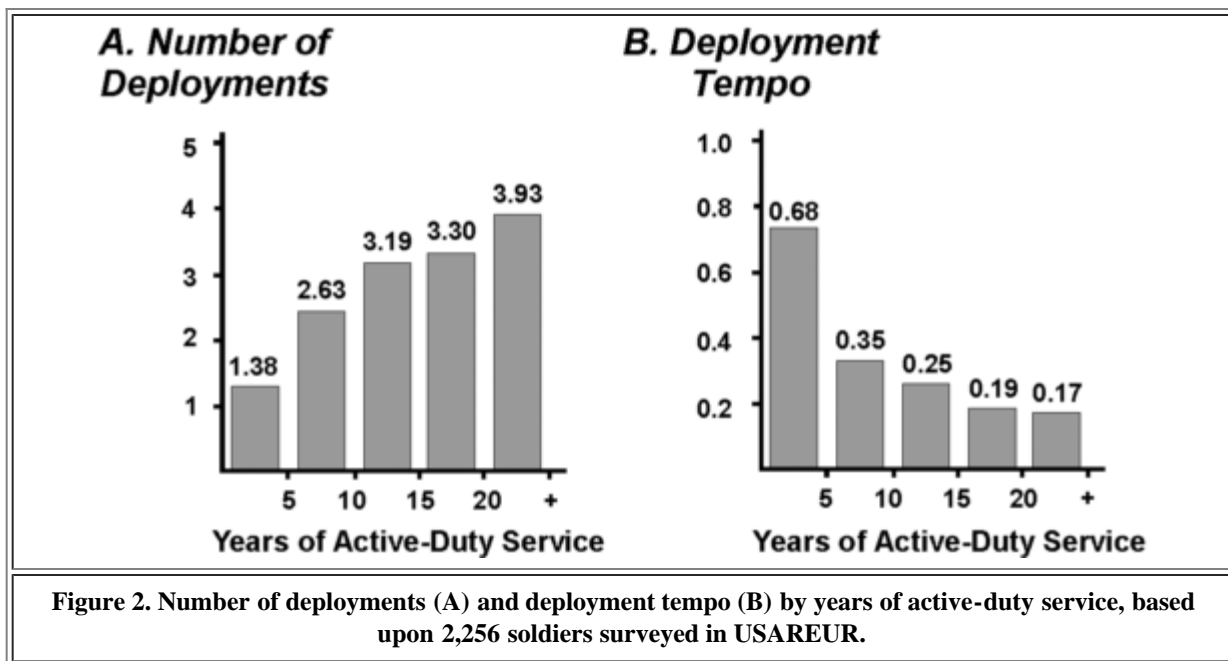


Figure 2. Number of deployments (A) and deployment tempo (B) by years of active-duty service, based upon 2,256 soldiers surveyed in USAREUR.

But how about the future? Using data from our operations tempo study, we projected deployment rates in order to illustrate how dramatically deployment tempo is changing. At the current deployment rate, soldiers entering the military today will experience an average of 14 deployments by the time they serve 21 years or more in the service. This projected rate means that a soldier can expect to deploy once every 18 months. Such a projection is in sharp contrast to the rates reported by soldiers with 21 years or more of service today. These soldiers report a total of four deployments in their 21-year career, or an average of one deployment about every six years. Of course, these projections are averages and do not preordain that each soldier will experience this particular deployment pace. But certainly the implications are significant for those soldiers who approach or exceed these deployment rates. Specialization, rank, world events, and other factors will influence each soldier's deployment history. Still, such projections highlight a startling trend in the deployment component of operations tempo.

It is also important to remember that deployments are only one of the components that constitute operations tempo. Thus, when increased garrison duties and training exercises are also considered, the effects of increased military deployments are no doubt even more dramatic. Unfortunately, the dynamics of how military deployments, training exercises, and garrison duties interact to degrade or enhance soldier and unit readiness have not yet been determined. Indeed, it is this issue that the US Army Medical Research Unit in Europe is currently addressing.

In the meanwhile, we recommend that deployment load be gauged in terms of deployment tempo. The issue of deployment load is important since as workload increases, the risk of burnout can increase, potentially leaving soldiers

feeling exhausted, unmotivated, and cynical about their work and mission. As one soldier stated, "I don't mind deployments, there are just too many too soon. Slow down!"[8]

Other variables will eventually need to be cranked into the deployment equation. These include the length of the deployment, the geographical location, the type of military operation, and the meaningfulness and relevance of the operation.[9] All are likely to have an effect on such military outcomes as morale, unit cohesion, family adaptation, career intentions, and health because they affect the soldiers' and units' quality of life during the deployment. Preliminary investigation suggests that all these variables are important.[10]

Garrison Tempo and Training Tempo

The two other determinants of operations tempo are garrison duties and training exercises. Many commanders report that the intensity of garrison activity and workload is frequently greater than that which occurs during military deployments. Garrison activity not only includes regular garrison duties, but also extra obligations like guard duty and vehicle and equipment maintenance caused by the necessity to cover for already-deployed units. Yet, remarkably, no study has been conducted to determine the effect of garrison tempo on soldier and unit readiness. Garrison stress is compounded when commanders expect that garrison duties be performed as if the garrison were staffed at full strength. Consequently, soldiers who are not deployed are often asked to sustain the same workload that the command would carry if none of its units were deployed. Moreover, garrison stressors are typically endured without the supportive media attention and awards that acknowledge the contributions of those who are deployed.

Training exercises also create a cycle of stressors in their own right. Field training exercises may last many weeks and mean additional family separation, despite the fact that the training may occur in the same country (or state) as the soldier's home station. For example, field training in Europe often occurs in Germany. Yet despite the proximity to family not available during a deployment from stateside, the soldier is still removed from his or her home, and it is often difficult to remain in contact with family members. Field training stress intensifies even more once a unit is alerted for deployment.

The training cycle itself offers other parallels to the deployment cycle of preparation, deployment, and return. Recent research has shown that during the preparation period prior to a rotation to the National Training Center at Fort Irwin, California, soldiers and leaders reported more distress, lower morale, and a higher incidence of adverse physical health symptoms than during periods in garrison.[11] These results are important because they indicate that a major field exercise is similar in its stressfulness to a military deployment. They also argue for the inclusion of training tempo as a major component in assessing operations tempo.

The Effect of Operations Tempo: Recent Findings

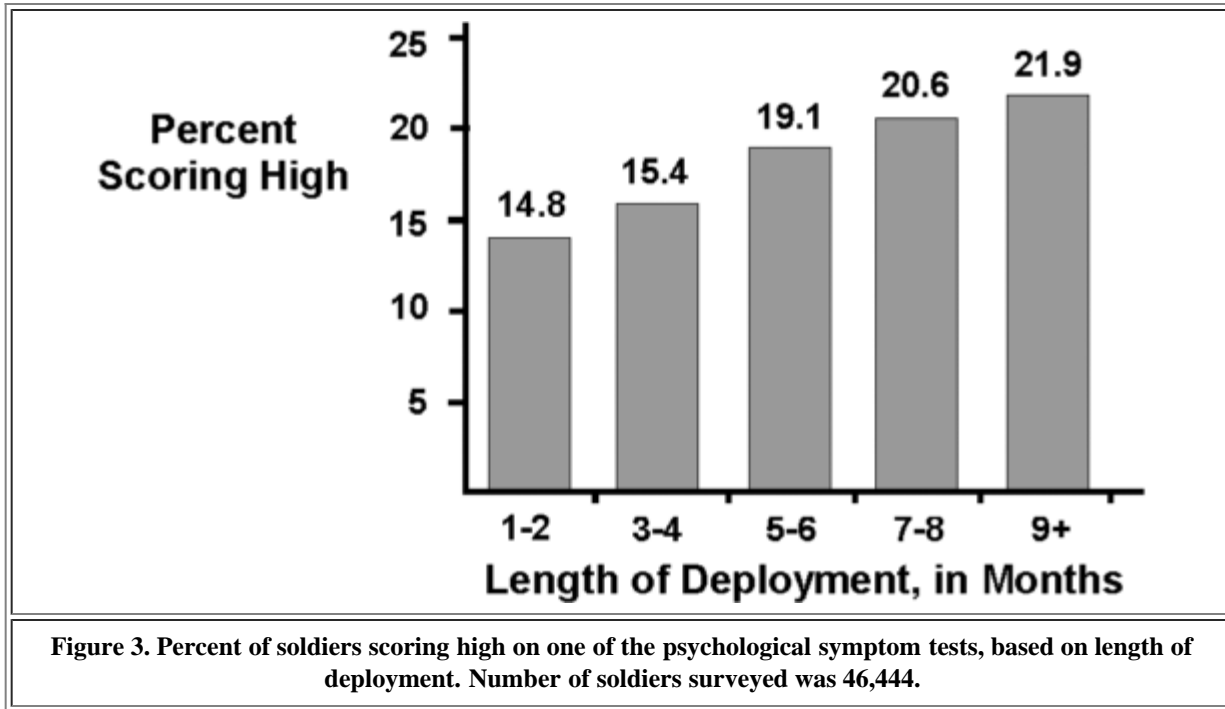
Soldier Retention and Family Readiness. Although USAREUR has high reenlistment rates for first-time soldiers,[12] planners, policymakers, and commanders are aware that if left unchecked, operations tempo may begin to degrade the force not only in terms of morale but also in terms of retention and family strain. Our operations tempo study assessed both these issues. When asked about making the military a career, 17 percent of soldiers surveyed responded that they would not do so because there are too many deployments, and this response was consistent among ranks.[13] Of those intending to get out of the military at the end of their obligation, a third reported they were doing so because there were too many deployments.

Yet deployments are not in and of themselves a negative experience. Over half of the soldiers surveyed agreed that deployments have made their work more interesting, and almost half agreed that deployments show how important their job is.[14] Soldier attitude toward deployments is an important variable in understanding the effects of operations tempo. For example, most soldiers who wanted to make the military a career reported that deployments made their work more interesting, while this was not the case with those intending to leave the military once their obligation was over.[15]

Soldiers intending to leave the military also were more likely to report that the number of deployments had hurt their marriage and caused a strain on their family than those soldiers who reported that they were remaining in the military. However, even for those soldiers who reported that they would stay until retirement, about half reported that

deployments had put a big strain on their family.[16] Thus, although deployment tempo appears to take its toll on soldier retention and family well-being, it has the potential to work as a motivational force as well.

Medical Readiness. Operations tempo has the potential for adversely affecting soldier health. This effect was demonstrated in a large-scale study of military personnel deployed on the NATO mission to the former Yugoslavia. A clear relationship emerged between the amount of time soldiers had been deployed and scores on a brief psychological screening questionnaire. Soldiers who deployed longer were more likely to score high on a psychological symptom test than soldiers deployed for shorter periods of time. As can be seen in Figure 3, the highest rates occurred among those personnel deployed for more than five months. And soldiers who scored high on a psychological symptom test were almost twice as likely to report *physical* symptoms than soldiers who scored low on a psychological symptom test.



The results from the medical screening program suggest that deployment length does indeed have an effect on medical readiness. The results also indicate that both psychological and physical health are related, lending support to our contention that the cost of operations tempo may be in terms of physical health as well as psychological health.[17]

Implications

Certainly the issues surrounding operations tempo are not new. What is new, however, is the focus on identifying the links between workload and military readiness. These issues are quite timely given the increased pace of peacekeeping and contingency operations and the smaller pool of available service members who are called upon to do the work.

Our perspective of how operations tempo is related to soldier and unit readiness is depicted in Figure 4. We believe that there is a level of operations tempo that *enhances* unit and soldier readiness. Conversely, there is also a level of operations tempo that *decreases* unit and soldier readiness. In other words, there is a level of operations tempo that is related to optimal performance. If the operations tempo is too intense, individual and unit performance suffers; but if the operations tempo is too low, individual and unit performance also suffers. Furthermore, we expect a steep increase in performance as operations tempo reaches its optimal level of intensity. That is, soldiers will readily perform to needed levels up to a certain point. Beyond that optimal level of performance, further increases in intensity will be accompanied by a gradual decline in performance. As research continues, we hope to be able to define within limits the operations tempo associated with optimal soldier and unit performance.



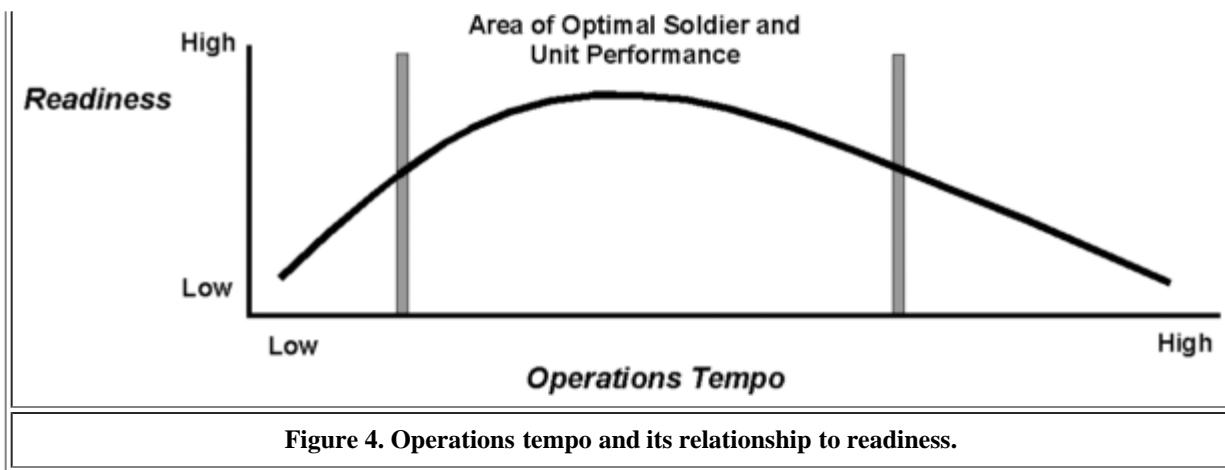


Figure 4. Operations tempo and its relationship to readiness.

Conclusions

Operations tempo has now been linked to retention, family stability, and medical readiness. Understanding this link between operations tempo and soldier readiness clearly has both practical and theoretical relevance. At the strategic and tactical levels, we will be able to identify predictors of military readiness. Such readiness encompasses several variables including unit cohesion, retention, family adjustment, and soldier health. Predicting these outcomes serves as a guide to policy planners and commanders in anticipating shortfalls in readiness, understanding how far a unit can be pushed before effectiveness is significantly degraded, and targeting prevention and intervention strategies. At the more theoretical level, we can develop useful hypotheses for testing in future studies and for developing evaluation studies of policy changes or interventions.

Finally, it is critical that operations tempo be understood in a larger context. All components of operations tempo--military deployments, training exercises, and garrison duties--are useful in maintaining soldier and unit readiness. It is only when the combined levels are either very high or very low that soldier and unit readiness declines. Future research should focus on all three components of operations tempo, the specifics of the operations tempo/readiness relationship, and the length of time it takes soldiers to recover from periods of heavy workload. Ultimately, answers in these areas of investigation will enable us to optimize the readiness of our soldiers, the effectiveness of their units, and the well-being of their families.

NOTES

The authors are indebted to the late Colonel John J. Madigan III for his insight and guidance in preparation of this article.

1. The acronym OPTEMPO has been used to stand for operations tempo, operational tempo, and operating tempo, with the latter usage being the most frequent. Indeed, OPTEMPO is defined in Joint Pub 1-02, *DOD Dictionary of Military and Associated Terms*, as "operating tempo." We prefer the term operations tempo. On operations tempo itself, see Dennis J. Reimer, "Developing Great Leaders in Turbulent Times," *Military Review*, 78 (January-February 1998), 5-12; J. Hairston, "OPTEMPO to OPRED: Building an Accurate Measurement Tool to Determine Readiness," Defense Technical Information Center Report, Document ADA 345566, Alexandria, Va., 1998; and J. L. Whitlow, "A Method for Collectively Measuring the Operating Tempo of Individuals in Marine Corps Units--Why and How?" Defense Technical Information Center Report, Document ADA 241099, Alexandria, Va., 1990.

2. We base this conclusion on conversations and interviews we have conducted with brigade, battalion, and company commanders, as well as senior noncommissioned officers and staff officers from units stationed both in Europe and the United States.

3. Victor Crawley, "Mission Launchers back in Bosnia," *The Stars and Stripes*, 23 October 1997, p. 1.

4. The definition of "operations" was obtained from the Department of Defense Dictionary, which is posted on the

Defense Technical Information Center homepage (<http://www.dtic.mil/doctrine/jel/doddict/data/o/04291.html>).

5. Amy Adler, Paul Bartone, and Carl A. Castro, "OPTEMPO/Burnout II Survey: Final Report," US Army Medical Research Unit-Europe Technical Report, Heidelberg, Germany, 1997.

6. Depending on the level of analysis, the outcomes of interest can reflect either unit or soldier variables. That is, when the level of analysis is the unit, unit tempo can be studied using a variety of unit-related outcome measures. Units can be assessed using operational readiness rates (e.g., equipment maintenance, unit strength), unit combat evaluations (e.g., ratings made by observers that assess compliance with standard military procedures), and survey ratings of unit cohesion. When the level of analysis is the individual, personnel tempo can be studied using outcome measures such as retention rates, family strain, psychological well-being, and physical health. From the perspective of model building, this distinction between the unit and the soldier is important because it indicates the level of analysis to be employed when making predictions. In some instances, the unit will be the appropriate level of analysis, while in other instances, the individual soldier will be the appropriate level of analysis. The level selected for analysis depends on what outcome or set of outcomes is of key interest. Furthermore, this distinction is important because we believe that measures of both unit tempo and personnel tempo reflect the *total* effect that operations tempo has on military readiness.

7. This issue was highlighted in a study conducted by our research unit of a division-size unit deployed to Bosnia. The US Army Medical Research Unit-Europe, located in Heidelberg, Germany, is a special foreign overseas activity of the Walter Reed Army Institute of Research, located in Washington, D.C. The investigators on the OPTEMPO study presented here are Amy Adler, Paul Bartone, and Carl Castro. Through a brief survey, we assessed the effect of operations tempo on soldiers and were able to refine our definition of operations tempo. The survey was administered to 2,256 soldiers and leaders deployed as part of the NATO mission to the former Yugoslavia.

8. When deployment rates are compared across unit type, a similar pattern emerges. The average number of deployments for soldiers in combat support (CS) and combat service support (CSS) units is significantly higher than soldiers in combat units, 2.29 deployments compared to 1.89 deployments, respectively. In contrast, the deployment load for combat soldiers is significantly higher than the deployment load for CS and CSS soldiers. On average, a combat arms soldier deploys twice every four years, while a CS or CSS soldier deploys twice every five years. In another comparison of OPTEMPO measurements, we compared the deployment history of soldiers from the active Army, Army Reserve, and National Guard components. Although there is no difference between the three components when the measure used is number of deployments, there is a significant difference between the three components in terms of their deployment tempo. The active-duty soldier's deployment tempo is nearly twice as high as the Army Reserve soldier's and nearly three times higher than the National Guard soldier's. This difference in deployment tempo is due partly, but not only, to the fact that active-duty soldiers deploy more often earlier in their careers than they do later in their careers compared to Army Reserve or National Guard soldiers. This example demonstrates that different methods for viewing the same deployment histories can lead to different conclusions, depending on how deployment tempo is defined.

9. Issues of mission relevance and meaningfulness are discussed in Thomas W. Britt and Amy B. Adler, "Stress and Health During Medical Humanitarian Assistance Missions" (in press), *Military Medicine*; Thomas W. Britt, "Psychological Ambiguities During Peacekeeping Operations," paper presented at the annual meeting of the American Psychological Association, Chicago, August 1997.

10. Carl A. Castro and Amy Adler, "Joint Medical Surveillance in Bosnia: Psychological Screening," US Army Medical Research Unit-Europe Technical Report, Heidelberg, Germany, 1997. Ronald Halverson et al., "Psychological Well-being and Physical Health Symptoms of Soldiers Deployed for Operation Uphold Democracy: A Summary of the Human Dimensions Research in Haiti," Defense Technical Information Center, Document ADA 298125, Alexandria, Va., 1995.

11. Paul D. Bliese, Sandra M. Escolas, Richard Christ, and Carl A. Castro, "Human Dimensions Assessment of Task Force XXI Technological Advancements," Defense Technical Information Center Report, Document ADA 349889, Alexandria, Va., 1998.

12. Phone call with 1st PERSCOM, US Army, Europe in March 1998. It was reported that in 1997, USAREUR achieved 131 percent of its retention goal for eligible first-term soldiers, making it number one in meeting its retention mission across all major commands.
 13. Seventeen percent of junior and senior enlisted soldiers agreed versus 15 percent of officers.
 14. The figures were 51 percent versus 45 percent, respectively.
 15. The figures were 60 percent versus 38 percent, respectively.
 16. For example, among the 1,305 soldiers with families surveyed, 61.7 percent of those intending to get out after their obligation reported that the number of deployments caused a big strain on the family versus 54 percent of those intending to stay past their obligation, and 49 percent of those intending to stay at least until retirement.
 17. Nonmilitary studies reinforce this conclusion. See P. L. Perrewe and W. P. Anthony, "Stress in a Steel Pipe Mill: The Impact of Job Demands, Personal Control, and Employee Age on Somatic Complaints," *Journal of Social Behavior and Personality*, 5 (1990), 77-90; S. Cohen, D. A. J. Tyrell, and A. P. Smith, "Negative Life Events, Perceived Stress, Negative Affect, and Susceptibility to the Common Cold," *Journal of Personality and Social Psychology*, 64 (1993), 131-40; A. A. Stone, et. al., "Evidence That Secretory IGA Antibody is Associated with Daily Mood," *Journal of Personality and Social Psychology*, 52 (1987), 988-93.
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Reviewed 20 August 1999. Please send comments or corrections to carl_Parameters@conus.army.mil