

Decision Analysis with Value Focused Thinking as a Methodology to Access Air Force Officer Retention Alternatives

Sang-ho Moon¹⁾

Abstract

Decision Analysis(DA) using Value Focused Thinking(VFT) can be an excellent process to deal with hard decisions. The intent of this research is to provide better understanding of the United States Air Force(USAF) officer retention problem. This thesis effort involves building a VFT model to find out more effective alternatives in retaining pilots and non pilots. This model, in conjunction with the results of the post analysis, shows an example of the application of a VFT approach to the USAF officer retention problem.

Key Words : Decision Analysis, Value Focused Thinking, Air Force Officer Retention, Value Trend, Value Hierarchy

1. Introduction

In 1998, U.S. military recruiting and retention showed signs of problems. Despite the increases in recruiting resources, all services had difficulty retaining experienced personnel in technical skill areas. For example, the Air Force and Navy struggled with the outflow of aviators to the private sector. To alleviate this situation, the Pay Action in the Fiscal Year(FY)00 National Defense Authorization Act raised military basic pay by 4.8 percent and committed to higher-than-usual pay increases through FY06. But officer continuation rates in the Air Force have continued to decline in recent years, especially for those in their mid-career with 6 to 13 Years Of Service(YOS)(Asch, et al., 2002).

Many countries have tried to solve this problem using various methods, especially financial incentives. Nevertheless, the effects of those methods have not been determined or proven yet. It is hard to say that they really succeeded in retaining the "right" individuals in the military. In most cases, they did not address the reasons personnel were separating, but merely raised the price of someone who was in the market for other reasons. This decision situation indicates that the multi-criteria decision analysis with VFT is a good methodology to answer the research question.

DA provides effective methods for organizing a complex problem into a structure that can be analyzed. The method applied in this research is VFT which is a multi-objective DA technique that focuses on what an individual or organization values.

1) Lecturer, Department of Mathematics, Korea Military Academy, Seoul 139-799, KOREA

2. Assumption and Application Procedure

The main assumption of this analysis is that *"There are unique value trends about their jobs in each USAF officer group"*. Officers are separating from the military for different reasons their value weights and score measures in the model differ according to the characteristics of their jobs. As a result, an alternative that satisfies the value set of a certain officer group may not coincide with the one for another officer group. Based on the assumption, this research categorizes the USAF officers into several groups according to their job characteristics. Then it uses group data to reflect the value trends of each officer group. Finally, it determines the effective retention alternatives for each officer group.

3. VFT Approach

3.1 Pre-Analysis Procedures

This research picked two subject groups for which data is available in published reports: Company Grade Pilots and Company Grade Non-Pilots. These groups are used in an example of the application of this methodology. It ends up with the final set of values shown in Figure 1 to assess alternatives for the USAF officer retention problem: 4 values in the first tier and 10 values in the second tier. This model has 14 measures. Each measure is mutually exclusive from other measures and captures independent information.

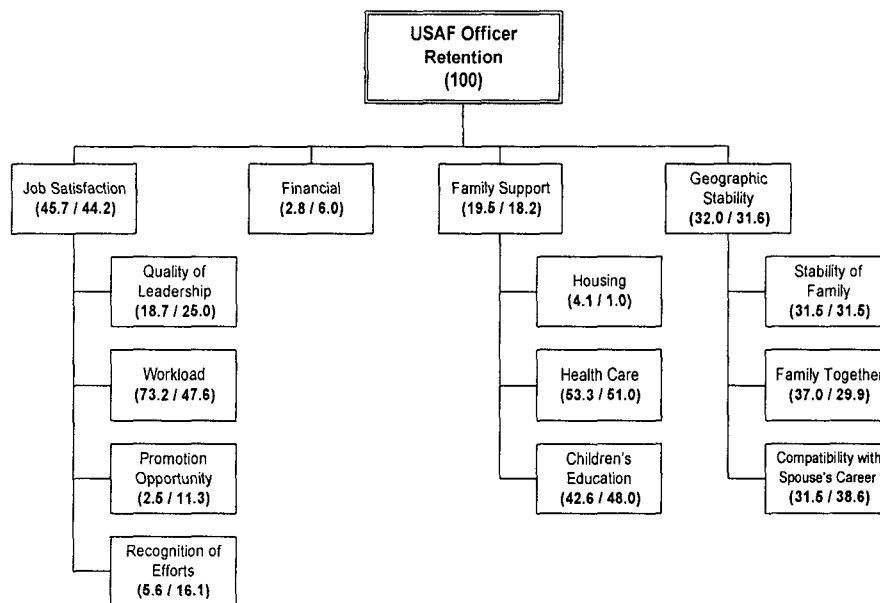


Figure 1 Value Hierarchy for USAF Officer Retention

To analyze alternatives, Single Dimensional Value Functions(SDVF) are used to convert individual evaluation measure scales to common scores with a value between 0 and 1. Since this model uses the group averaged data, all of the SDVFs are continuous with exponential curves. This analysis uses a top-down approach to weigh the hierarchy, and weighs each branch locally. Figure 1 shows the value hierarchy with the local weights of the two officer groups.

The first alternatives are those that have been used before in similar situations and those that are readily available. Table 1 shows the general idea about the possible alternatives which can improve the values in the hierarchy. These alternatives can be used as targeted alternatives as well as across-the-board ones. The implementation of the AF Officer Critical Skill Retention Bonus(CSRB) is one of the typical examples of a targeted one. In reality, the Air Force needs to do cost-benefit analysis to minimize the expenditure and create more detailed alternatives, which can be induced from Table 1. To score the alternatives, this research uses the available data as much as possible. Some are assumed due to the lack of specific data.

Table 1 Possible Alternatives for AF Officer Retention

1 st Tier Value	Alternative
Job Satisfaction	<ul style="list-style-type: none"> · <i>Develop Chain of Command Feedback</i> · <i>Increase Resources (personnel)</i> · Realign Duty Location to Minimize TDY · <i>Raise the Promotion Rate</i>
Financial	<ul style="list-style-type: none"> · Increase Basic Pay · <i>Increase Special Pay/Bonus</i>
Family Support	<ul style="list-style-type: none"> · <i>Increase Basic Allowance for Housing</i> · Modify Health Care System · <i>Increase Federal Impact Aid Program Fund</i>
Geographical Stability	<ul style="list-style-type: none"> · <i>Manipulate PCS Duration/Timing</i> · Increase Family Separation Allowance · <i>Close Down Rural/Overseas Bases</i>

3.2 Post-Analysis Procedures

As a single alternative, *Increase Resources* is a dominant alternative for pilots achieving 25.9% total potential value as shown in Figure 2. *Close Down Rural/Overseas Bases* is the best one for non-pilots achieving only 12.2% as shown in Figure 3. However, *Close Down Bases + Manipulate PCS + Develop Feedback* is the best alternative for both officer groups achieving 26.7% and 26.2% as shown in Figures 4 and 5 respectively.

Decision Analysis with Value Focused Thinking as a Methodology
to Access Air Force Officer Retention Alternatives

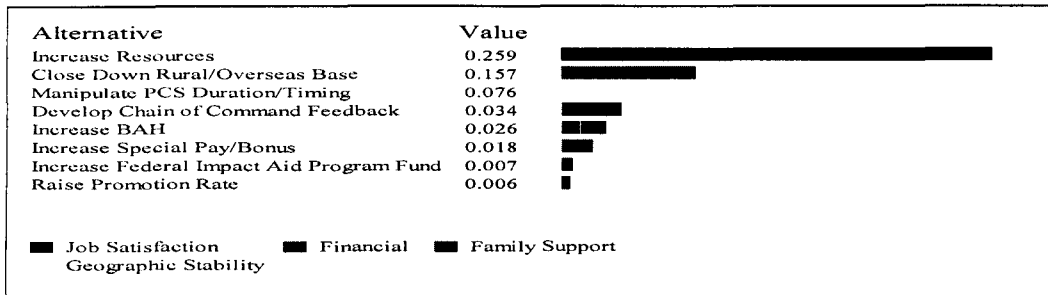


Figure 2 Stacked Bar Ranking of Alternatives for Pilots

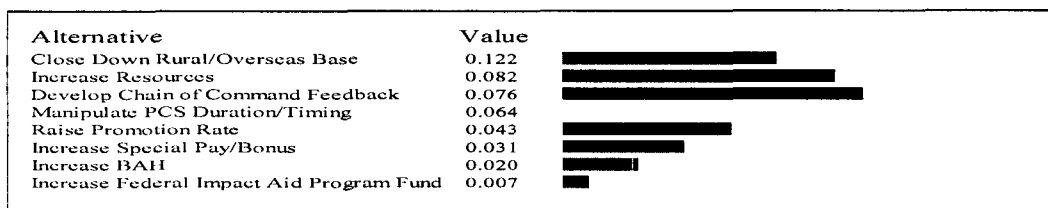


Figure 3 Stacked Bar Ranking of Alternatives for Non-Pilots

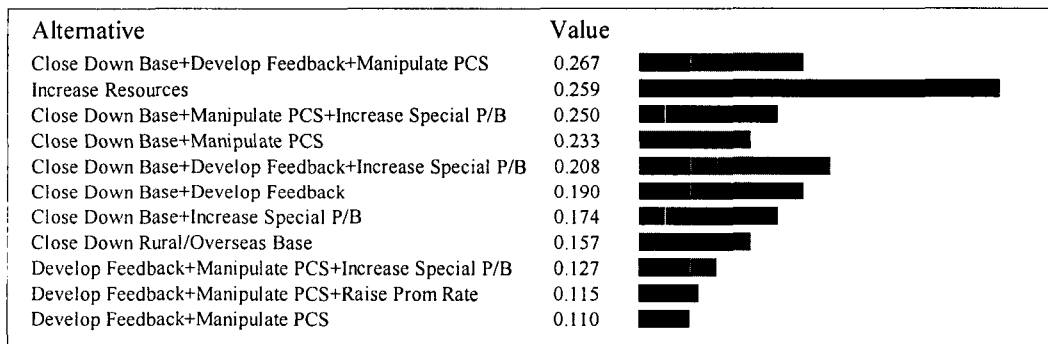


Figure 4 Ranking of Alternative Combinations for Pilots

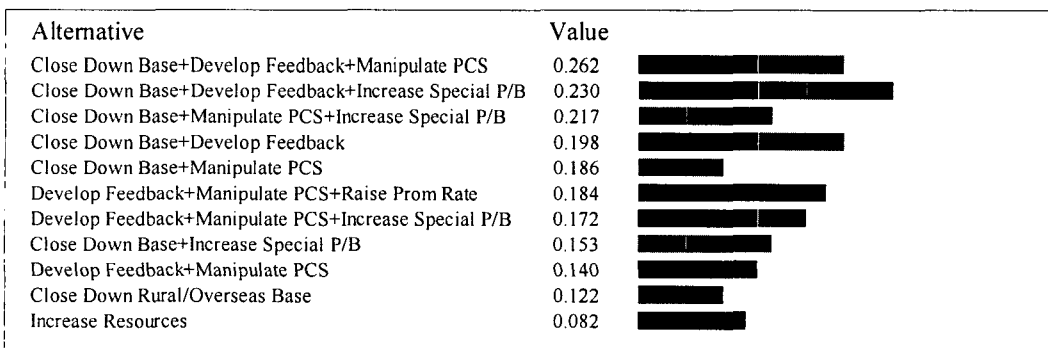


Figure 5 Ranking of Alternative Combinations for Non-Pilots

The previous section considered all eleven alternatives. Five of these alternatives are dominated, however, and will never be the preferred alternative. This section considers only the six alternatives whose total values make them possibly the best retention choices as shown in Figure 6. For pilots, alternative ranking is very sensitive to the changes in all value weights, since the gap in total value between the first and second alternatives is very small and the total value lines of alternatives intersect close to the current evaluation point. Therefore, a small shift in value weight away from the current one would result in a different preferred alternative. However, a little change in weight on each value makes **Increase Resources** the best one. For non-pilots, alternative ranking has nothing to do with the weight changes of **Family Support** value. The weight changes of the other values make other alternatives the best ones.

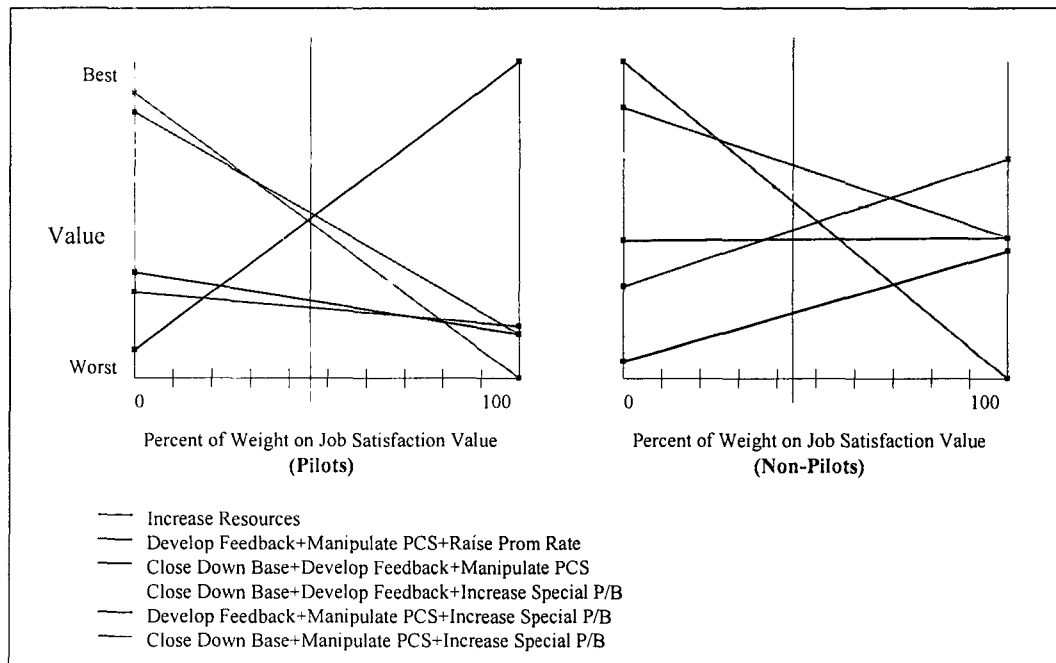


Figure 6 Sensitivity Graph for Job Satisfaction

4. Conclusions and Recommendations

The Air Force is using various financial incentives to retain officers, but no one knows whether or not they have really succeeded in keeping the right people. Financial incentives are more likely to show quick response, but those are not the ultimate ones. If the Air Force employs targeted alternatives for each officer group, based on the research results of combining a VFT methodology and cost-benefit analysis together, they could deal with the retention problem more effectively.

References

- Asch, Beth, James R. Hosek, Jeremy Arkes, C. Christine Fair, Jennifer Sharp, Mark Totten, "Military Recruiting and Retention After the Fiscal Year 2000 Pay Legislation, Summary", Santa Monica CA.: RAND, MR-1532-OSD, 2002.
- Buddin, Richard J., Carole Roan Gresenz, Susan D. Hosek, Marc N. Elliott, Jennifer Hawes-Dawson, "An Evaluation of Housing Options for Military Families, Chapter Five", Santa Monica CA: RAND, MR-1020-OSD, 1999.
- Chambal, Stephen P. Class notes, OPER 643, Advanced Decision Analysis: Multiple Objective Decision Analysis. School of Engineering and Logistics, Air Force Institute of Technology, Wright-Patterson AFB OH, Summer Quarter 2002.
- Clemen, Robert T. and Terence Reilly, MAKING HARD DECISIONS with DecisionTools, DUXBURY, Pacific Grove CA, 2001.
- Hamilton, Charles H. and Louis M. Datko, "Report on Career Decisions in the Air Force: Results of the 2000 USAF Careers and Now Directions Survey." Unpublished report. Air Force Military Personnel Center Survey Branch,
- Johnson, Peter, John Guilfoyle, Cassandra Cameron, "Retention of Military Personnel: Australian Defence Force", Australian National Audit Office, 2000.
- Keeney, Ralph L. VALUE-FOCUSED THINKING: A Path to Creative Decisionmaking, Harvard University Press, Cambridge MA, 1992, 23-28.
- Office of the Auditor General of Canada, "Report of the Auditor General of Canada to the House of Commons, Chapter 5.
- Pruitt, Christopher A. A MODELING HOMELAND SECURITY: A VALUE FOCUSED THINKING APPROACH, Chapter 4, MS thesis, AFIT/GOR/ENS/03M. School of Engineering and Management, Air Force Institute of Technology (AU), Wright-Patterson AFB OH, March 2003. Randolph AFB TX, Nov 2000, 35.
- Sample Results, In Uppsala Symposium on Psychological Factor Analysis, Number 3 in Nordisk Psykologi Monograph Series, pp. 35-42, Uppsala: Almqvist and Wiksell.
- McCabe, G. P. (1984), Principal Variables, Technometrics, 26, 137-144.
- Tipping, M. E., Bishop, C. M. (1997), Probabilistic Principal Component Analysis, Journal of the Royal Statistical Society, Series B, 61, 611-622.
- Vines, S. K. (2000), Simple Principal Components, Applied Statistics, 49, 441-451.
- Whittle, P. (1952), On Principal Components and Least Square Methods of Factor Analysis, Skandinavisk Aktuarietidskrift, 36, 223-239.
- Young, G. (1940), Maximum Likelihood Estimation and Factor Analysis, Psychometrika, 6, 49-53.