Logic Models in Support of Homeland Security Strategy Development

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Abstract

From the vantage point of homeland security planning, the most important asset available in combating terrorism is the human mind. Out-thinking evil at the strategic level requires; (1) the ability to formulate complex relational models, (2) an awareness and recognition of the critical level variables, (3) an understanding of their influence and interrelation, (4) a determination of the controllable and non-controllable aspects of each variable, (5) the implicational value of such factors as applied to potential terrorist scenarios, and (6) an assessment of the potential consequences of shifts in each variable's valuation to the overall model. This paper examines the importance of visualization to the strategic planning process and offers a unique method of incorporating multivariate-multidirectional modeling in support of such endeavors.

KEYWORDS: Homeland, Security, Strategy, Planning

Logic Modeling in Support of Homeland Security Strategy Development

By

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The use of terrorism as a mechanism for securing political change has been a fact of life since the dawn of civilization. Admittedly, it's not very effective in securing political change, yet nevertheless it survives as a tactic to disrupt societal harmony. Throughout history, this form of conflict has served the needs of committed zealots as they struggled to oppose repressive regimes, fight to secure liberty, or undermine democracy. Terrorism has taken on many forms over the years and been referred to by many different names. It has been justified as a form of insurgency by many different cultures, nations, and ideological factions. Despite the different motives of such groups, the fact remains that terrorism has been routinely viewed as the only viable option available for those committed few who desire change, but who do not possess the military might necessary to secure absolute victory through conventional forms of conflict.

As we have seen over the past several years, major terrorist attacks are normally followed by a concomitant level of target-hardening and increased vigilance in response to the escalated threat. As a countermeasure, such reactive approaches for combating this international affliction garner only marginal benefit. For the most part, these methods rely almost exclusively on the fortification of potential targets and the deployment of expensive defensive technologies to deter attack and increase security. Such measures typically may make us feel more secure and do provide a sense that we are taking positive steps to thwart further attacks, yet such measures are (regrettably) significantly limited in their level of effectiveness.

As viewed by the strategist, such approaches to combating terrorism are akin to building a mote around the fort in hopes that it provides heightened security, yet such measures clearly fail to address the larger issues that predicated the dispute and which fostered the insurgency. Tactically oriented responses such as these are often seen as near-sighted solutions or reactionary measures that fail to adequately address the complexities of the terrorist challenge. Strategically speaking, they are of little value.

Homeland security strategy development is, in fact, a comprehensive endeavor that must take into consideration a significant number of seemingly disassociated variables in order to maximize strategic options and foster the creation of an indomitable public policy. Accordingly, strategic level security planners must possess the ability to develop complex logic models that incorporate multivariate reasoning sequences, in order to produce effective plans and operational response scenarios that adequately address the problem. The best defense against terrorism is offensive action, but knowing how and where to act is also of extreme importance.

From the vantage point of national and homeland security planning, the most important asset available in combating terrorism is the human mind. Out-thinking evil at the strategic level requires; (1) the ability to formulate complex relational models, (2) an awareness and recognition of the critical level variables, (3) an understanding of their influence and interrelation, (4) a determination of the controllable and non-controllable aspects of each variable, (5) the implicational value of such factors as applied to potential terrorist scenarios, and (6) an assessment of the potential consequences of shifts in each variable's valuation to the overall model.

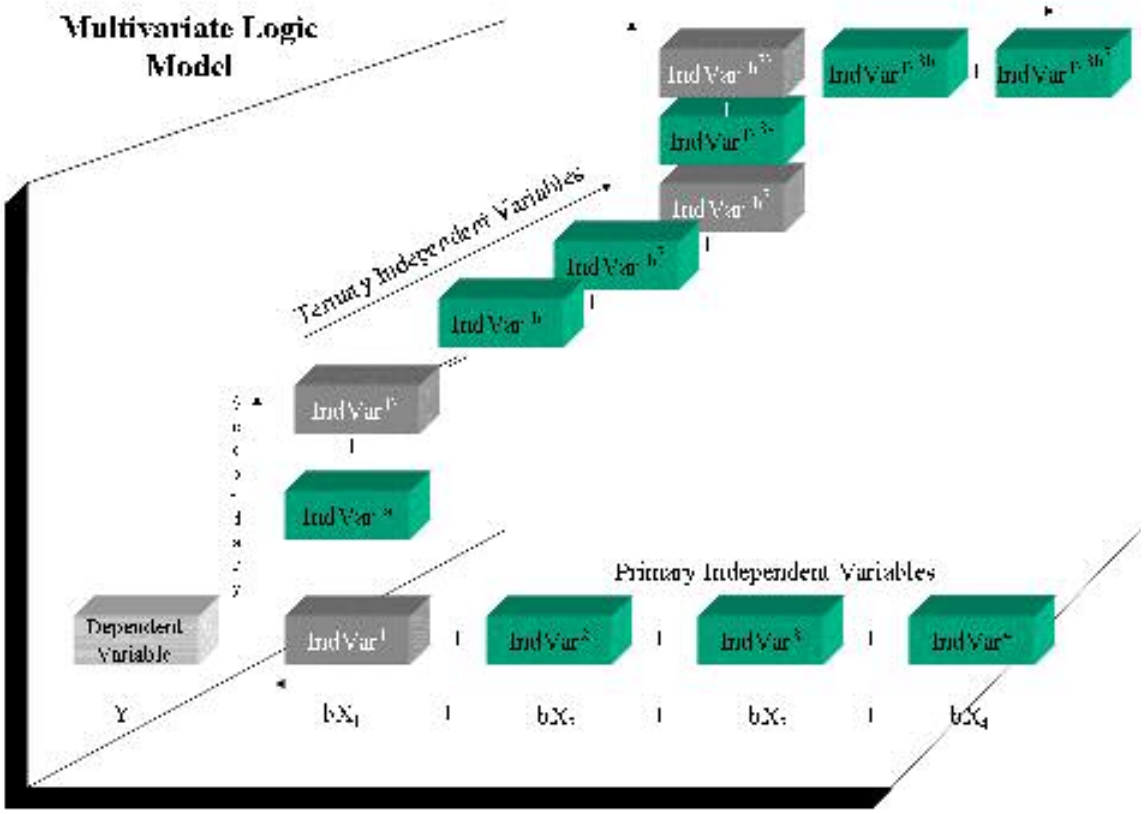
The most difficult aspect of security strategy formulation [at the strategic level] is not the acquisition of a comprehensive familiarity with the different issues, but rather the ability to visualize the enormity of this situation and also the interrelation of critical factors deemed pertinent to the conflict. Visualization is a vital component to such enterprises, because it affords security planners with the ability to apply the "minds-eye" to disclose how all of the pieces fit together and how alterations in one variable are likely to cascade through the logic model and affect changes in related variables. The ability to visualize the entire scope of the problem and to recognize the interconnection of seemingly disassociated factors is what empowers strategic planners with the ability to anticipate threats, determine consequence, and envisage response alternatives.

Simply put, strategic level security planners must see the entire battle field and understand the complexities and interrelations of all the factors, if they are to anticipate the enemy's next move. Like a Grandmaster in chess, the strategic security planner must be able think twenty moves ahead in the game and have contingencies in place that serve to counter any moves made by their adversary or strike before the enemy is ready to act.

The most effective method that I have found to support the strategic visualization process is adapted from the empirical sciences and has been extended to incorporate the consideration of perpendicular correlations. This is not a form of analysis that most people have ever considered, but it can be extremely effective in helping strategic security planners in developing complex interrelation models that illustrate the complexities of the conflict. In its purist form, such a process utilizes Discriminant Function Analysis and the derived predictive equations are used to provide a probability estimate of changes in the dependent variable based on shifts in the value of any independent influence. DFA equations are based on the quantification and analysis of historical events and examine fluctuations in any of the primary, secondary, or tertiary independent variables. Consequently, the results of the DFA are then used to provide a probability estimate of anticipated changes in the dependent variable.

Fortunately for all of us, this article will not attempt to explain in detail the intricacies of DFA. That level of explanation and depth of coverage is well beyond the scope of this particular paper, so you can breath easy. The modeling process used to support DFA is however, directly relevant to security planning and can be of significant assistance in helping homeland security professionals visualize the complexities of the conflict.

The graphic below illustrates how the strategic visualization process works. At the lower left corner of the chart is the dependent variable, which could represent something as finite as bridge and tunnel vulnerability or something as nebulous as the frequency of hostile enemy attacks. Connected to the dependent variable are a variety of independent factors, which extend both horizontally, as well as vertically, in the equation. These lines of association represent those measured influences and factors that correlate to changes in the dependent variable and alter its valuation.



As mentioned earlier, the proper way to construct such complex models is through the use of DFA that employs a sophisticated quantification methodology that provides for the analysis and confirmation of correlations between variables in order to derive a predictive equation. For purposes of this explanation however, we will assume that all the variables in the array have been deemed relevant and contributive. As can be seen, there exists a traditional multivariate equation along the horizontal axis that contains the primary independent variables and subsequent equation (Y' = a + bX1 + bX2 + bX3…..). For those familiar with statistical analysis methods, this equation typically represents the measured influence between the dependent variable and those primary influential factors that cause it to change value. In DFA, a z score is substituted in place of Y prime in order to represent the probability of group association, but the process is roughly the same. What is most interesting to note in this type of visualization methodology is that, in addition to the main horizontal equation, we extend the model to include several perpendicular axes to represent those secondary and tertiary factors that directly

contribute to changes in the primary independent variables. This process makes it possible to consider and account for any form of change in subtle variables that exert influence over the dependent variable. In other words, this visualization strategy presented here exceeds the typical multivariate equation paradigm and affords security analysts with a mechanism that takes into consideration that nothing (no variable) exists purely independently and changes to the value of any secondary influence ultimately cascades through the logic model, causing related changes to occur in the principle dependent variable.

From the vantage point of homeland security planning, this approach affords strategic planners with several direct benefits. First and foremost, it forces planners to consider the complex interrelations that exist between all variables in a terrorism scenario and also makes it possible to take into consideration how these secondary and tertiary factors relate in the overall model. Additionally, it makes it a plausible for planners to identify those variables that we might be able to exert control over from those that we cannot control, in order to use them to our advantage in formulating strategic alternatives.

A prime example of this can be seen in recent events that unfolded in Iraq, when the President of the United States significantly elevated the variable [provocation] by suggesting that the members of the insurgency should "bring it on" (issuing a direct challenge for them to step up terrorist operations and which may well have been done intentionally to draw them out into the open). This elevated level of provocation then radically changed the value of a primary dependent variable [resolve on the part of the terrorists], who then felt compelled to demonstrate their devotion to the cause. This increased resolve took the form of escalated assaults against coalition forces and civilian targets in advance of the national election.

Provocation serves as an indirect variable in such an equation, which then directly influences the primary independent variable [opposition resolve]. An elevated level of resolve then, in turn, exerts influence over the primary dependent variable, which can be quantified as the frequency of terrorist actions committed against coalition forces. In this case, the Commander-in-Chief's elevated rhetoric altered the provocation level, which then changed the degree of resolve on the part of terrorists, and resulted in stepped up acts of aggression. This serves as a classic example of why such complex models need to be developed by strategic level security planners so that they can isolate causation and determine response alternatives.

From the strategist's perspective, the consequences of such a shift in the value of the independent variables [provocation and resolve] can be anticipated and then used to formulate response alternatives. A logical scenario that might have been used based on the elevated provocation variable that resulted from the speech and which manifested itself in the form of the increased resolve and aggression by the opposition, could have been to counter its effect through manipulation of one of the "controllable" factors in the equation. Such a factor might have been the manner in which the national election was conducted. If the statement was intentional then it served its purpose in bringing terrorists out into the open where they could be dealt with militarily. If however the

statement was unintended, the effect might have been countered through manipulation of a controllable variable and eliminating a point of focus for the terrorists such as conducting the national elections in Iraq by mail. Such a countermeasure may have assured broad participation among all factions and mitigated a significant terrorist point of focus. Instead, the insurgency succeeded (in part) at discouraging broad Sunni participation in the election through fear and intimidation, consequently resulting in Shia and Kurdish victories and success in gaining political control. This situation may well set the stage for either a civil war between factions or result in the establishment of yet another radical Islamic nation, which is an entirely different multivariate model.

Visualization methodologies, such as that prescribed in this article, can be of significant assistance and applied to a wide variety of strategic and tactical level planning scenarios. Visualization and multivariate modeling can be applied to such matters as estimating target vulnerability, casualty estimation, determining survivability, political event assessment, and hostile attack frequency computations. Admittedly, the development of such complex multivariate equations is a difficult task for most people, but this should not deter professional planners and administrators from employing advanced multivariate designs within their overall planning models. Whether such models are based on quantitative protocols or they are derived from a qualitative perspective, they can be of enormous benefit to strategic level security planning. The process of building such logic models forces planners to visualize the primary, secondary, and tertiary influences, as well as to examine the complexity of any security situation. Whether they are built to support defensive scenarios or offensive strategy formation, these models serve the interests of security planners and can be of significant value to the ongoing fight against terrorism.

About the Author

Dr. Hal Campbell has been affiliated with the armed forces, law enforcement, and higher education for over thirty years. He presently serves as Professor of Computing Science for the California State University and as an adjunct member of the Criminal Justice faculty for several nationally accredited universities. Professor Campbell earned his Ph.D. from Claremont Graduate University in 1983 and specializes in the areas of criminal justice, crime analysis, and computer science. He is a veteran of the Los Angeles County Sheriff's Department, holding both sworn and civilian management positions during his affiliation with the LASD including those of Law Enforcement Planning Coordinator, Head Statistical Analyst, and Deputy Sheriff. Professor Campbell has an extensive list of publications within related professional journals including Police Chief Magazine, the Academy of Criminal Justice Sciences, California Peace Officer Magazine, the Journal of GIS Development, and the Armed Forces Journal.