Value-Focused Thinking: Providing Structure in Soft Personnel Problems to Enhance Mentoring, Discussion, and Decisions

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MAJ Sam Huddleston

Task: Provide a tutorial in the leading methodology for making decisions with multiple competing objectives, demonstrate usefulness for modeling of preferences in soft problems requiring structure, and describe recent successes in the personnel arena.
Value-Focused Thinking: Providing Structure in Soft Personnel Problems to Enhance Mentoring, Discussion, and Decisions

United States Military Academy, Department of Systems Engineering, West Point, NY, 10996

The Components of Our Approach

- A Qualitative Value Model: Identifying the Performance Attributes That Our Leaders Value

- An End-State Metric of Performance: Measuring the Demonstrated Performance of Those We Have

- Strategic Applications
  
  "What I want is to improve the quality of the Soldiers we have while reducing the dollars we spend to get that quality"
  
  LTG Freakley, Accessions Command

- Statistical Learning: Linking Demonstrated Performance to Performance Attributes and Profiles of Potential
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♦ Statistical Learning: Linking **Demonstrated Performance** to **Performance Attributes** and **Profiles of Potential**
Philosophy and Motivation

Basic Philosophy from Keeney’s Book:

✓ “Values are what we care about. As such, values should be the driving force for our decision-making.”
✓ “Decision-making usually focuses on the choice among alternatives.”
✓ “Alternatives are the means to achieve the more fundamental values.”
✓ “Value-Focused Thinking essentially consists of two activities: first deciding what you want and then figuring out how to get it.”

Motivation from Respected Thinkers:

✓ “The perfection of means and confusion of ends seem to characterize our age.” -Albert Einstein
✓ “When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely in your thoughts advanced to the state of science.” -Lord Kelvin
✓ “There is no greater impediment to the advancement of knowledge than the ambiguity of words.” -Thomas Reid

Motivation for use in “Soft” Personnel Decisions:

✓ “Many hiring decisions start off on the wrong foot because the company hasn’t clarified exactly what it wants from the new hire.” -Hiring and Keeping the Best People, Harvard Business Essentials
Current Military Application Areas

✓ Major acquisition decisions
✓ Evaluate courses of action
✓ Improve current systems
✓ Evaluate future concepts
✓ Analyze force mix
✓ Justify resource allocation
✓ Reduce risk
✓ Allocate training time
✓ Strategic assessments

Why not personnel decisions?

Benefits of Value-Focused Thinking

We need these benefits in soft personnel problems.

Alternative vs. Value-Focused Thinking

Alternative-Focused

Alternatives

Attributes

Objective Mapping

Value-Focused

Criteria

Subjective Mapping

TEACHING FUTURE ARMY LEADERS TO SOLVE COMPLEX PROBLEMS
Difference of Approach

**Longitudinal Study**
- High Cost
- Long Duration
- Collect massive amounts of data on what we think might solve the problem, and see if something useful is revealed over time.
- “We’ll see in the end.”

**Value-Focused Study**
- Low Cost
- Short Duration
- First determine “what we want.”
- Collect focused data and make inferences on the larger population.
- “Begin with the end in mind.” - Stephen Covey

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**“Many hiring decisions start off on the wrong foot because the company hasn’t clarified exactly what it wants in the new hire.”**


**“The perfection of means and confusion of ends seems to characterize our age.”** - Einstein

Both are needed, but value-focused studies or “what we want” should inspire longitudinal studies.
Methodology

1. We face a problem with multiple, competing objectives and develop a **qualitative value model** (value hierarchy).

Fundamental Objective

Functions

Objectives

Value Measures

Direct – profit using dollars earned
Proxy – morale using survey results
Natural – no mathematical manipulation
Constructed – some alteration of original measurement
The Mission of the United States Military Academy:

To educate, train, and inspire the Corps of Cadets so that each graduate is a commissioned leader of character committed to the values of Duty, Honor, Country and prepared for a career of professional excellence and service to the Nation as an officer in the United States Army.
Methodology

1. We face a problem with multiple, competing objectives and develop a **qualitative value model** (value hierarchy).

   **Fundamental Objective**

   **Functions**
   - Verb, Object

   **Objectives**
   - Min, Max, or Optimize

   **Value Measures**
   - Direct, Proxy, Natural, Constructed
     - Direct – profit using dollars earned
     - Proxy – morale using survey results
     - Natural – no mathematical manipulation
     - Constructed – some alteration of original measurement

TEACHING FUTURE ARMY LEADERS TO SOLVE COMPLEX PROBLEMS
Affinity Diagramming
Identifying the functions that matter

- “Silent brainstorming”
- List a single system function on a “sticky”
- Post the function on a board
- Rearrange functions as you see natural groups appear
- When complete, label the groupings

PRACTICAL EXERCISE: Officer Performance at Company Level
Methodology

1. We face a problem with multiple, competing objectives and develop a **qualitative value model** (value hierarchy).

2. For every value measure in our value hierarchy, we develop **screening criteria** that indicate our minimum acceptable and ideal levels.

3. For every value measure, we develop **swing weights** to reflect the relative importance of value measures across their ranges of variation. These swing weights must sum to 1, or account for 100% of value.

4. For every value measure, we develop **value functions** that reflect returns to scale between our minimum acceptable and ideal levels.

Methodology

Single dimensional value functions set a “common currency” for all value measures and reflect our preferences across the possible range for each value measure.

• Four shapes are common
• Value functions may be continuous or discrete.
• Value functions are usually scaled from
  • 0 to 1
  • 0 to 10
  • 0 to 100
**Methodology**

1. We face a problem with multiple, competing objectives and develop a qualitative value model (value hierarchy).

2. For every value measure in our value hierarchy, we develop screening criteria that indicate our minimum acceptable and ideal levels.

3. For every value measure, we develop swing weights to reflect the relative importance of value measures across their ranges of variation.

4. For every value measure, we develop value functions that reflect returns to scale between our minimum acceptable and ideal levels.

5. The additive value model is the most commonly used to evaluate and compare alternatives:

   \[ V(x) = \sum_{i=1}^{n} w_i v_i(x_i) \]

   where \( V(x) \) is the total value for an alternative,
   
   \( w_i \) is the swing weight of the \( i^{th} \) value measure,
   
   \( v_i(x_i) \) is the value function for the \( i^{th} \) value measure,
   
   \( x_i \) is the measure score of an alternative on the \( i^{th} \) value measure.
10 Minute Break
Results of Affinity Diagram Exercise
The Components of Our Approach

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♦ An End-State Metric of Performance: Measuring the *Demonstrated Performance* of Those We Have

♦ Strategic Applications
  “What I want is to improve the quality of the Soldiers we have while reducing the dollars we spend to get that quality”
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♦ Statistical Learning: Linking *Demonstrated Performance* to *Performance Attributes* and *Profiles of Potential*
WholeSoldier Performance Model

**Purpose:**
Selfless Service
Sacrifice
Commitment
Loyalty
Duty

**Interaction:**
Respect
Empathy
Compassion
Humor

**Knowledge:**
Job Tasks/Skills
Education
Trainability
Learning

**Judgment:**
Common Sense
Logical Decisions
Understanding
Anticipation
Insight/Filtering
Adaptive/Flexible

**Motivation:**
Will to Win
Endurance
Resilience
Stick-to-it-iveness
Heart / Drive
Determination
Work Ethic

**Application:**
Planning
Communicating
Executing

**Medical Health:**
Illness Resistance
Nutrition
Body Composition

**Character:**
Honor
Integrity
Justice
Candor
Personal Courage

**Conduct:**
Maturity
Discipline
Bearing
Coolness

**General Fitness:**
Cardio Endurance
Cardio Strength
Muscular Endurance
Muscular Strength

**Cognitive Domain**

**Physical Domain**

**Self-Esteem:**
Confidence
Self-Worth
Self-Efficacy

**Athletic Skills:**
Coordination
Agility
Balance
Power
Speed
Accuracy
Flexibility
Reaction Time

TEACHING FUTURE ARMY LEADERS TO SOLVE COMPLEX PROBLEMS
WholeSoldier Model in Action

TEACHING FUTURE ARMY LEADERS TO SOLVE COMPLEX PROBLEMS
**“WholeSoldier” Sample Performance Report**

*Infantryman #24*

**Moral Performance** = 44/59 = 5.22/7
- **Character** - Totally trustworthy, and always sticks up for what is right.
- **Purpose** - Displays commitment and self-sacrifice to the team 95% of the time.
- **Motivation** - Soldier puts forth max effort and only rarely gives less than his all.
- **Interaction** – Shows respect and is compassionate, but sometimes is awkward in interpersonal interactions.
- **Self-Esteem** - Doesn’t display confidence or view himself as a valuable member of the team.
- **Conduct** – Soldier displays maturity and discipline by completing tasks without supervision, but sometimes loses his cool when under stress.

**Cognitive Performance** = 15/25 = 4.20/7
- **Knowledge** - Soldier demonstrates total knowledge of MOS tasks and studies to learn next level up.
- **Judgment** - Makes logical decisions, but has problems filtering irrelevant information.
- **Application** - Sometimes unable to plan effectively to implement decisions.

**Physical Performance** = 12/16 = 5.25/7
- **Fitness** - Scored 263 last APFT.
- **Athleticism** - Displays better than average coordination, agility in combat-focused tasks.
- **Health** - Maintains body better than average.

**“WholeSoldier” Performance** = 71/100 = 4.97/7

*We can better mentor...*
### WholeSoldier

#### Sample Population Data

<table>
<thead>
<tr>
<th>4 Infantry Platoons</th>
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#### Method:

1. Assess sub-domain performance (1-7).
2. Evaluate performance holistically (1-100).
3. Use correlation analysis to infer weights.

#### Finding / Insight:

- **a. WholeSoldier** “tells the story” of individual areas of relative strength and weakness and allows us to “see” the entire population.

#### Conclusion:

- **a.** We can provide many levels of distinction on WholeSoldier Performance.
- **b.** WholeSoldier Performance assessment is useful feedback to subordinates for use as a developmental counseling tool.
- **c.** WholeSoldier Performance is a good “endstate metric” and will provide information for sound decision-making in many areas.

#### The Following Insights are Only Possible Because We Have Clearly Defined Our Desired Endstate!
Finding: There is no apparent relationship between “Cognitive Performance” as evaluated in units (different from academic definition) with AFQT score.

Insight: “Sir, I care a lot more about common sense than I do about book smarts.”

Conclusion: AFQT may not be a good predictor of what we want (quality) in terms of performance, but has been shown to be related to retention (quantity).

Data Source: Performance Data, USAREC Data, & Questionnaire Results as analyzed by ORCEN & CDAS
2) Which of the following is second most important to you about joining the Army?

1) action & adventure
2) steady paycheck
3) service to Nation
4) college benefits
5) tough challenges
6) health benefits
7) good people/friends
8) a fresh start in life

Finding: Reasons for joining the service are statistically significant.
Insight: “Marines ‘issue a challenge’ / ‘sell it on service.’” –Dozens of interviewees
Conclusion: Pay and benefits may do a good job of impacting quantity as recruiting and marketing tools, but we would desire to inspire people to join for service, challenges, and the camaraderie of other good people when considering quality...

Data Source: Performance Data, USAREC Data, & Questionnaire Results as analyzed by ORCEN & CDAS
**Insight** (future)  

**Geographic**

- **Finding:** 80% confidence that average Soldier Performance is higher for West South Central than for Middle Atlantic...Moral Performance drives this finding.

- **Insight:** More data will allow us to see differences at state, county, and smaller levels...

- **Conclusion:** With more performance data, we can better focus our recruiting efforts!!!

**Data Source:** Performance Data, USAREC Data, & Questionnaire Results as analyzed by ORCEN & CDAS
These insights are now quantifiable beyond anecdote because we have defined our endstate with WholeSoldier Performance.

**AFQT**: AFQT does not predict cognitive performance as defined in this study; it has been shown to predict retention.

**HS Graduation**: HS Graduation appears to somewhat indicate a level of “stick-to-it-iveness,” but not statistically significant in our data.

**Reason for Joining**: Soldiers that joined for service to the Nation, tough challenges, and the camaraderie of good people perform better than those that joined for a steady paycheck, college benefits, or a fresh start.

**Athletic Participation**: Soldiers that participated in more than 9 seasons of Varsity or Junior Varsity team sports perform better than others.

**Seeking/Sought for Help**: Soldiers reporting that they seek help during difficulty or are frequently sought out for help to discuss personal problems perform better than those that don’t/aren’t.

**Thankfulness**: Soldiers that report feeling pretty thankful for the people and things in their lives with high frequency perform better than those that don’t.

**Attitude Towards Authority**: Soldiers reporting that their teachers/bosses frequently told them to do stupid things performed worse than those who didn’t.
Similar System...Marine FITREP

- Provides 7 levels of distinction on desired attributes.
- Only lowest “block” is adverse; majority of levels focus on success.
- Provides clear verbal definitions of levels.

### E. INDIVIDUAL CHARACTER

1. **COURAGE.** Moral or physical strength to overcome danger, fear, difficulty or anxiety. Personal acceptance of responsibility and accountability, placing conscience over competing interests regardless of consequences. Conscious, overriding decision to risk bodily harm or death to accomplish the mission or save others. The will to persevere despite uncertainty.

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<thead>
<tr>
<th>ADV</th>
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<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
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<tbody>
<tr>
<td>Demonstrates inner strength and acceptance of responsibility commensurate with scope of duties and experience. Willing to face moral or physical challenges in pursuit of mission accomplishment.</td>
<td>Guided by conscience in all actions. Proven ability to overcome danger, fear, difficulty or anxiety. Exhibits bravery in the face of adversity and uncertainty. Not deterred by morally difficult situations or hazardous responsibilities.</td>
<td>Uncommon bravery and capacity to overcome obstacles and inspire others in the face of moral dilemma or life-threatening danger. Demonstrated under the most adverse conditions. Selfless. Always places conscience over competing interests regardless of physical or personal consequences.</td>
<td>N/O</td>
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2. **EFFECTIVENESS UNDER STRESS.** Thinking, functioning and leading effectively under conditions of physical and/or mental pressure. Maintaining composure appropriate for the situation, while displaying steady purpose of action, enabling one to inspire others while continuing to lead under adverse conditions. Physical and emotional strength, resilience and endurance are elements.

<table>
<thead>
<tr>
<th>ADV</th>
<th>B</th>
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<th>F</th>
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<th>H</th>
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<tbody>
<tr>
<td>Exhibits discipline and stability under pressure. Judgment and effective problem-solving skills are evident.</td>
<td>Consistently demonstrates maturity, mental agility, and willpower during periods of adversity. Provides order to chaos through the application of intuition, problem-solving skills, and leadership. Composure reassures others.</td>
<td>Demonstrates seldom-matched presence of mind under the most demanding circumstances. Stabilizes any situation through the resolute and timely application of direction, focus and personal presence.</td>
<td>N/O</td>
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3. **INITIATIVE.** Action in the absence of specific direction. Seeing what needs to be done and acting without prompting. The instinct to begin a task and follow through energetically on one’s own accord. Being creative, proactive and decisive. Transforming opportunity into action.

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### JUSTIFICATION:
Formally provides guidance on inflated reports.

Evaluates “Rater Courage.”

**COMMANDANT'S GUIDANCE**

The completed fitness report is the most important information component in manpower management. It is the primary means of evaluating a Marine’s performance and is the Commandant’s primary tool for the selection of personnel for promotion, augmentation, resident schooling, command, and duty assignments. Therefore, the completion of this report is one of an officer’s most critical responsibilities. Inherent in this duty is the commitment of each Reporting Senior and Reviewing Officer to ensure the integrity of the system by giving close attention to accurate marking and timely reporting. Every officer serves a role in the scrupulous maintenance of this evaluation system, ultimately important to both the individual and the Marine Corps. Inflationary markings only serve to dilute the actual value of each report. Reviewing Officers will not concur with inflated reports.

**H. FULFILLMENT OF EVALUATION RESPONSIBILITIES**

1. **EVALUATIONS.** The extent to which this officer serving as a reporting official conducted, or required others to conduct, accurate, uninflated, and timely evaluations.

<table>
<thead>
<tr>
<th>ADV</th>
<th>Prepared uninflated evaluations which were consistently submitted on time. Evaluations accurately described performance and character. Evaluations contained no inflated markings. No reports returned by RO or HQMC for inflated marking. No reports submitted late. No reports returned by either RO or HQMC for administrative correction or inflated markings. No subordinates’ reports returned by RO or HQMC for administrative errors. Section Cs were void of superlatives. Justifications were specific, verifiable, substantive, and where possible, quantifiable and supported the markings given.</th>
<th>N/O</th>
</tr>
</thead>
</table>

A | B | C | D | E | F | G | H |

**JUSTIFICATION:**
Similar System...Marine FITREP

- Provides senior raters with 8 block levels in profile.
- Profile weighted such that only bottom level is “adverse.”
- Top 5 blocks equivalent to our single top block.

**Key Attributes**
- More distinction on levels of performance (A Distribution)
- Quantifiable evaluation facilitates analysis to support decisions
- Enforcement of profile and culture of “truth telling”
End-State Metrics
How Do You Reflect Performance?

The Army OER

A Utility Approach

The Marine FITREP

Pairwise comparison for order

<table>
<thead>
<tr>
<th>Asset</th>
<th>Asset A</th>
<th>Asset B</th>
<th>Asset C</th>
<th>Asset D</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset A</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Asset B</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Asset C</td>
<td>2</td>
<td>1</td>
<td></td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Asset D</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

Bonus assignment for value

FAIL!
HARD!
SUCCESS!
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- **Strategic Applications**
  
  "What I want is to improve the quality of the Soldiers we have while reducing the dollars we spend to get that quality"
  
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- Statistical Learning: Linking *Demonstrated Performance* to *Performance Attributes* and *Profiles of Potential*
Given “WholeSoldier” Performance implementation, we can better:

Recruit:  Develop holistic model of “WholeRecruit” Potential longitudinally and:

» Quantify risks/opportunities involved in adjusting enlistment policies/standards.
» “Screen in” during times of recruiting difficulty and “screen out” in times of recruiting richness.
» Offer individual incentives for various MOS based on WholeRecruit Potential, desires of the candidate, and needs of the Army.
» Continually consider various “entry metrics” for updates to the WholeRecruit model.
» Adjust target market and allocate assets based on both quantity and quality.
» Adjust marketing message to target “who we want.”
» Issue recruiting missions to reflect a distinct quantity vs. quality balance.

NOTE: Only for discussion of possibilities; not intended as a conclusive result for use in current decisions.
Given “WholeSoldier” Performance implementation, we can better:

**Train:**
- **Offer individual training/education** to those that are “best qualified” or “most needy.”
- **Measure performance ROI** of training/education programs.
- **Design unit training/education** to address performance trends.

**Retain:**
- **Offer individual targeted incentives** to retain “who we want.”

**Promote/Assign:**
- **Understand attributes desired in next grade** and promote “best qualified.”
- **Assign** the right individual to the right job or officer career field.
Given “WholeSoldier” Performance implementation, we can better:

**Accomplish the Mission:**

» Relate WholeSoldier to WholeUnit performance by determining effects of differing portfolios of individual performance attributes combined to maximize unit performance through Systems Dynamics.

**Allocate Resources:**

» Investigate best allocation of budgetary resources across the DOTMLPF(EE) spectrum.

**Warfighting Power:**

\[ W = (D+O+M+F) \times (LP)^{TEE} \]

- **W** = Warfighting Power
- **L** = Leadership
- **D** = Doctrine
- **P** = Personnel
- **O** = Organization
- **T** = Training
- **M** = Materiel
- **E** = Experience
- **F** = Facilities
- **E** = Education

- Modified from GEN Schoomaker/GEN Boykin discussion
Given “WholeSoldier” Performance implementation, we can better:

**Develop and Counsel Soldiers:**

+ Provide Strategic Situational Awareness:

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**Policy Decision** + **Business Model** = **Measured Effect**

Google + Amazon = Situational Awareness
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♦ Statistical Learning: Linking Demonstrated Performance to Performance Attributes and Profiles of Potential
Soldier Potential to Performance Model

Client: Accessions Command

Reverse Engineering Soldier Performance

Purpose
Develop an application to predict the future performance of a recruit based upon attributes we can observe about that recruit upon their indication of interest in service.

Objectives
- Identify pre-existing attributes that indicate the potential for a high performing Soldier
- Develop predictive models that leverage the known attributes of a recruit to predict performance in an operational unit
- Improved ability to screen soldiers who are unlikely to perform well in units

Technical Approach
- Identify Data Shortfalls: Officer Candidate vs. Enlisted Soldier
- Surveys for Additional Data Collection
- WholeSoldier Performance Assessment
- Data Mining (Regression, Neural Networks, LDA, SVM etc.) to link Performance to Potential

Deliverables
- QRR Presentation on Methodology (JAN 09)
- OSUT Success Prediction Model (MAR ‘10)
- In-Unit Success P2P Model (JUL ‘10)
- Final Briefing (JUL’10)
- Technical report (AUG 1’0)
A Performance Classification Model

WholeSoldier Performance Assessment

Poor Performance “Screen Out”

- Character < 1.5
- Conduct < 2.5
- Physical Fitness < 4.5
- 5.466
- 28.66
- 36.98
- 87.33

Acceptable

- Conduct > 4.5
- Capability > 5.5
- Motivation > 4.5
- 33.75
- 57.31
- 62.96

Excellence “Screen In”

- Character > 4.5
- Conduct > 4.5
- Medical Fitness > 4.0
- 49.37
- 81.77
- 71.52
- 79
- 97.02

Teaching future Army leaders to solve complex problems
Classification Model Performance

**Excellence**
- Accuracy = 45%
- Precision = 100%

**Poor Performance**
- Accuracy = 36%
- Precision = 100%

TEACHING FUTURE ARMY LEADERS TO SOLVE COMPLEX PROBLEMS
## Soldier Record Development

<table>
<thead>
<tr>
<th>Predictors</th>
<th>TAPAS Score</th>
<th>Soldier Survey</th>
<th>Responses</th>
<th>WholeSoldier Evaluation</th>
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<tbody>
<tr>
<td>Accessions</td>
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<td>Unit Record</td>
<td>Positive</td>
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<td>Database</td>
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<td>ASVAB/AFQT</td>
<td>• “Can Do”</td>
<td>SOM / SOQ</td>
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<td>• “Will Do”</td>
<td>Promotion</td>
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<td>HS Diploma</td>
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<td>APFT/Rifle Qual</td>
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<td>Negative</td>
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<td>Moral Waiver</td>
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The Research Question

♦ What attributes are statistically linked to poor performance?
  ♦ Failure to complete OSUT
  ♦ WholeSoldier Performance Assessment Model (Character and Conduct)
  ♦ Unit Recommendation of Removal (WholeSoldier Counseling)
  ♦ APFT/Marksmanship Failure
  ♦ Article 15/UCMJ Action in Unit

♦ What attributes are statistically linked to excellence?
  ♦ Special Recognition in OSUT
  ♦ Special Recognition in Unit (Soldier Boards, Promotion etc.)
  ♦ APFT/Marksmanship Excellence
  ♦ WholeSoldier Performance Assessment Model (Character, Motivation, Thought, Purpose)
Hypothetical WholeSoldier Application

- The outcome of this analysis is a series of profiles.
- Because of measurement error (accuracy/precision) on the response variables, it is **not possible to calculate the probability of poor performance** for a given profile.
- It is possible to calculate a **lower bound** of that probability using the **presumption of competence**.
- We can use that lower bound as a **profile risk score**.

**Profile X**
- Data Set of 1000
- 95 observations
- 45 “Poor Performers”

\[
\text{Lower Bound of } P(\text{Poor} \mid X) = 47\%
\]

**Profile Y**
- Data Set of 1000
- 150 observations
- 20 “Poor Performers”

\[
\text{Lower Bound of } P(\text{Poor} \mid Y) = 13\%
\]
Hypothetical WholeSoldier Application

- The outcome of this analysis is a series of profiles.
- Because of measurement error (accuracy/precision) on the response variables, it is not possible to calculate the probability of poor performance for a given profile.
- It is possible to calculate a lower bound of that probability using the presumption of competence.
- We can use that lower bound as a profile risk score.

Profile X
- Data Set of 1000
- 95 observations
- 45 WholeSoldier Failures

Lower Bound of $P(\text{Poor} | X) = 47\%$

Profile Y
- Data Set of 1000
- 150 observations
- 20 WholeSoldier Failures

Lower Bound of $P(\text{Poor} | Y) = 13\%$

The hard part is identifying statistically significant profiles.
Hypothetical WholeSoldier Application

- The outcome of this analysis is a series of profiles.
- Because of measurement error (accuracy/precision) on the response variables, it is not possible to calculate the probability of poor performance for a given profile.
- It is possible to calculate a lower bound of that probability using the presumption of competence.
- We can use that lower bound as a profile risk score.

**Profile X**
- Data Set of 1000
- 95 observations
- 45 WholeSoldier Failures

**Profile Y**
- Data Set of 1000
- 150 observations
- 20 WholeSoldier Failures

Lower Bound of \( P(\text{Poor} | X) = 47\% \)

Lower Bound of \( P(\text{Poor} | Y) = 13\% \)
Questions/Discussion

1. WholeSoldier Performance Study (MAJ Dees)
   Problem: The Army needs a holistic model of Soldier performance in the moral, cognitive, and physical domains.

2. WholeOfficer Performance Study (Cadets)
   Problem: The Army needs a system to accurately assess the performance of officers in a holistic manner that provides significant distinction.

3. WholeCadet Performance Study (Cadets)
   Problem: USMA needs a system to accurately assess the performance of cadets in a holistic manner that provides significant distinction.

4. WholeRecruit Potential to Performance Study (MAJ Huddleston)
   Problem: The Army needs a holistic model of recruit potential to predict WholeSoldier Performance. The Army can establish automated data-basing of WholeSoldier Performance data that facilitates longitudinal modeling of WholeRecruit Potential to provide strategic situational awareness and leading indicators.