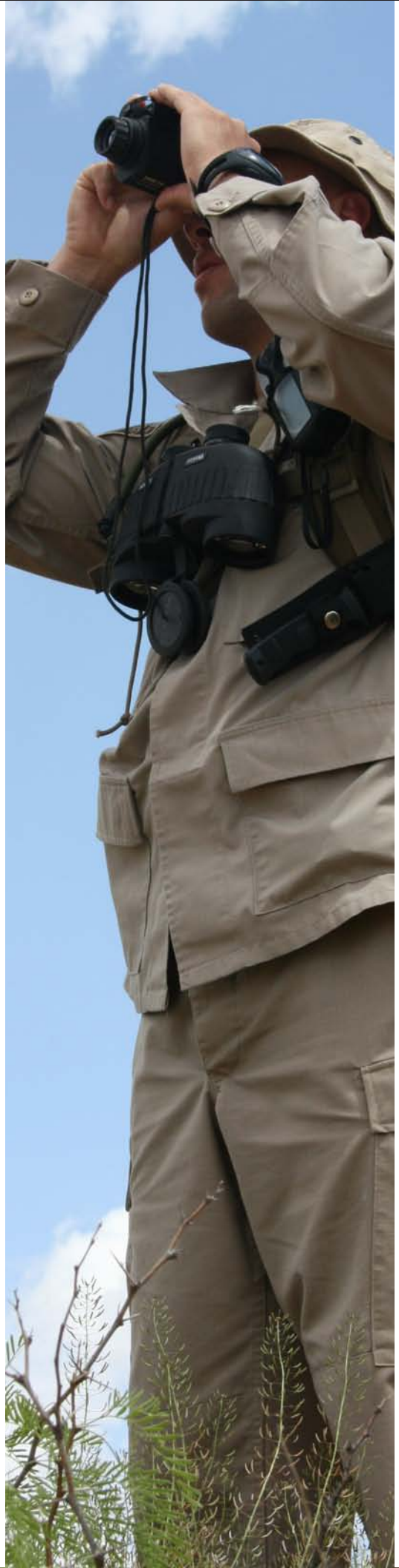

Border Hunter Research Technical Report

July 2010

Border Hunter Research Technical Report

This technical report was compiled by David Fautua and Sae Schatz, with support from David Kobus, V. Alan Spiker, and William Ross, with peer evaluation from Joan H. Johnston and Denise Nicholson, and with organizational assistance from Emilie A. Reitz.

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14. ABSTRACT

The Combat Hunter training program was first conceived in 2007 to meet a training gap in small unit close combat warfighting. This US Marine Corps (USMC) program of instruction (POI) trains the fundamentals of combat profiling, tracking, and optics-based observation, helping students become successful "combat hunters" in an irregular warfare battlespace. This report describes the "Border Hunter" training event, which took place in April 2010. Border Hunter may be best characterized as a one-off, "graduate level" version of the Marine Corps' Combat Hunter course. The authors attended the Border Hunter course in order to (1) capture the course content and package it for greater deployability, (2) assess the instructional outcomes of the course, and (3) explicitly articulate the linkages between the course content and underlying scientific principles. This report details the results of these endeavors.

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DEPARTMENT OF DEFENSE
JOINT TASK FORCE NORTH
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REPLY TO
ATTENTION OF

14 June 2010

Joint Task Force North's (JTF-N) mission is to provide "multi-domain military support to law enforcement agencies…in order to anticipate, detect, deter, prevent, and defeat transnational threats to the homeland." In this capacity, JTF-N provides military capabilities; relevant best practices; and innovative tactics, techniques, and procedures to law enforcement personnel. The Marine Corps' Combat Hunter training effort represents one of those military unique cutting-edge capabilities that needed to be shared with law enforcement personnel.

In my 26 years of experience, Combat Hunter is the most unique and essential military training for frontline warriors that I have witnessed. It evolved from lessons learned in the two ongoing conflicts in the Middle East and provides our service men and women cognitive skills rather than a material solution to not only survive, but thrive in today's irregular wars.

"Border Hunter" is based upon that training because the skills learned by Marines in Combat Hunter for irregular warfare in Afghanistan apply equally as well for law enforcement personnel operating in the chaotic environs such as along the southwest border of the United States. Border Hunter is a systematic approach designed to improve cognitive skills, training personnel to read the environmental and human terrain, establish a baseline, detect an anomaly, and make decisions "left-of-bang" or before the event happens. In other words, Border Hunter trains our service and law enforcement men and women to anticipate danger and meet it proactively. In an irregular conflict, or in the complex environs of the US-Mexico border, this training enables our personnel to be the "hunters"—not the "hunted."

Border Hunter could not have been possible without the leadership of the Commander of JTF North, Brigadier General Sean MacFarland US Army, and the hard work of the JTF North team. I am also grateful to Colonel Chris Cavoli, Commander of 3rd Brigade, 1st Armor Division, for the support from his Brigade and to Commanders Tony Porvaznik and Scott Bryan for the United States Border Patrol's support. Additionally, JTF-N has long been partnered with the US Border Patrol's Special Coordination Center and I'm extremely grateful to Chief Bill Hirzel and his superb staff that supported the Border Hunter training from inception through to final police of the ranges. Last, but not least, I am grateful to US Joint Forces Command. It is through their efforts, as the Joint integrator of training, that this important instructional content can reach the wider Joint and interagency community.

Semper Fidelis,

John L. Mayer

Colonel John L. Mayer USMC,
Deputy Commander
Joint Task Force North

DEPARTMENT OF DEFENSE
UNITED STATES JOINT FORCES COMMAND
JOINT WARFIGHTING CENTER
116 LAKE VIEW PARKWAY
SUFFOLK VA 23435-2697

June 14, 2010

An important role of the Joint Warfighting Center is to determine best of breed ideas in training, build upon them, and bring them to the attention of the Joint community. The Marine Corps' Combat Hunter initiative represents just such a program.

Acting as a Joint integrator of training, US Joint Forces Command led a team of researchers, who were invited to the Border Hunter course in order capture its content, assess the instructional outcomes, articulate the underlying scientific principles, catalog the expert skills, and package this knowledge into a set of academic and instructional products for the joint community. In short, Border Hunter was a unique opportunity to observe, record, and analyze every aspect of the training and to measure if, how, and why it works—so that the training can become measurable, repeatable, scalable, and exportable. The training builds upon the Marine Corps' Combat Hunter program and is unique in training for cognitive decision making. It promises to add value for the Joint and Interagency partners.

Every effort was made to make this study the most comprehensive assessment of Combat Hunter-like training; still, we fully accept that more research is needed to integrate a wider community of interest, iterate the knowledge, and institutionalize measurable training standards for combat observation and decision-making in irregular and ambiguous conflicts.

I would like to first thank Joint Task Force North for conducting this unique training experience and inviting USJFCOM's research team to participate. Certainly the training (as well as the study of it) could not have been possible without the expertise and counsel of the two extraordinary "outliers," Combat Hunter subject matter experts Greg Williams and David Scott-Donelan. Lastly, I also want to thank the research team, who designed, executed, and completed this ambitious effort in fewer than 6 months—from conception to deliverables. In particular, I owe a great debt to our chief scientist, Dr. Sae Schatz (University of Central Florida's Institute for Simulation and Training), who organized the research effort, constructed the high-level research design, integrated our results, and compiled the finished products.

We hope that the Joint community can use these baseline results, metrics, and instructional products to help advance their respective training programs.

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Research Coordinator
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Table of Contents

PREFACE

Executive Summary

The Border Hunter training exercise may be best characterized as a one-off, "graduate level" version of the Marine Corps' Combat Hunter course, which consists of combat tracking, combat profiling, and enhanced observation instruction. The training is unique in that it provides a systematic approach to understanding key factors of the physical and human terrain; it enables trainees to anticipate danger and make decisions proactively. At the request of US Northern Command, US Joint Forces Command (USJFCOM) supported the training, which was conducted by Joint Task Force North (JTF–N) over a 20-day period in April 2010 at Fort Bliss, Texas.

Acting within its role as a joint integrator of training, USJFCOM was also invited to lead a team of 13 researchers, who attended the course in order to conduct scientific observation, experimental testing, and a formative evaluation. The investigators' goals were to (1) capture the course content and package it for greater deployability, (2) assess the instructional outcomes of the course, and (3) explicitly articulate the linkages between the course content and underlying scientific principles. The researchers additionally attempted to catalog the experts' skills, identify common traits of the best performing trainees, and observe how tacit knowledge was transferred from the instructors to the trainees.

Border Hunter Training

The course was divided into two sections. The first was dedicated to combat tracking instruction, and the second section concerned enhanced observation and combat profiling. Mr. David Scott-Donelan and his team taught the tracking portion. An internationally recognized tracker with over 40 years of experience in Africa and around the world, Scott-Donelan assembled a team of five hand-picked experts to assist in the training. Together, they boast more than 180 years of collective experience. Instruction in combat profiling and enhanced observation was led by Mr. Greg Williams, a highly-decorated former undercover police officer from Detroit with more than 30-years experience. Williams assembled a team of eight others to assist in the training.

Forty-three trainees—comprising a mix of experienced US Army, Border Patrol, and other Law Enforcement personnel—received the Border Hunter training at Fort Bliss. All trainees were highly experienced, with an average of 9 years in the military/law enforcement sectors.

In addition to the primary training, 22 Soldiers were recruited from Fort Bliss to play key roles during the combat profiling exercises. These Soldiers received training in human behavior patterns, insurgent tactics, and Middle Eastern culture from Greg Williams' team.

Research Study 1 (Field)

For the first study, the research team collected data during the Border Hunter course from enrolled trainees, role-players, and the instructor Subject Matter Experts (SMEs). The 43 Border Hunter trainees completed, or were assessed by the experimenters, on the following measures:

- Demographics survey
- Cognitive attributes battery
- Declarative knowledge pre/posttest
- Photo vignettes pre/posttests
- Situated judgment pre/posttests

- Perceptual aptitude pre/posttests
- Heart-rate monitoring (level of awareness)
- Behavioral observation during field exercises
- Reactions surveys

The 22 role-player trainees completed:

- Demographics survey
- Profiling declarative knowledge pre/posttest
- Profiling photo vignettes pre/posttests
- Profiling daily reactions surveys

In addition, the six tracking instructors and nine profiling instructors completed structured interviews, as well as the same cognitive battery that the trainees received.

Trainee Individual Differences

Trainees completed standard demographic questionnaires as well as cognitive batteries that included scales related to attention to detail, critical thinking, and creativity. These data were collected in order to examine whether any particular trait correlated significantly with trainee performance in the class.

Performance data were obtained from the trainees' Situated Judgment Tests (SJTs), and a regression analysis was run in order to determine if any of the above mentioned variables could successfully predict success in the course as measured by the SJT. None of the variables approached significance for predicting success. Demographic variables (age, service type, and length of service) were investigated for relationships to the criterion but none were significantly related to trainees' combat profiling or tracking performance.

However, this inability to parse out "what success looks like" may be attributed to the small population size and/or reliability issues with the SJT. Further, data from the instructors (discussed below) suggests that predictors of performance success may exist; thus, future studies may consider further pursuing this line of inquiry.

Trainee Reactions

Trainees responded very positively to the exercise. Their daily overall reactions ranged between 6.3–6.9 (on a 7-point scale). Also, on the final day of the course, trainees were asked to provide additional details on their perceptions. They overwhelmingly reported that, if they were in a supervisory position, they would send their personnel to a similar course. Many of the trainees indicated that they felt the Border Hunter course material would save lives, make personnel harder targets, or increase their survivability. Similarly, most of the trainees indicated that they planned to teach the Border Hunter material—either formally or informally—to their teammates at their home stations.

As for which aspects of the instruction they found most valuable, many trainees indicated that learning about human behavior through the combat profiling instruction was key. Other popular answers included learning to act left-of-bang, combat tracking (in general), and being able to articulate their tacit knowledge.

Finally, the trainees most often suggested that the following should be changed: trainees wanted days off (the course comprised 20 contiguous days), they requested that more time be dedicated to hands-on exercises, and some requested more law enforcement examples and scenarios.

Trainee Learning Outcomes

Trainee learning outcomes were measured via the pre- and posttest administrations of a declarative knowledge questionnaire, photo vignette assessment, and SJT. Overall, the results show strong, significant evidence of learning.

Declarative Knowledge Tests. The declarative knowledge questionnaires were written tests that emphasized key terminology and concepts for each of the major topic areas. Within each topic area, identical pre- and posttests were administered in order to assess knowledge gained during the course. For tracking, the mean pretest score was 27% correct, and the mean posttest score was 76% correct. This result represents a statistically significant increase in scores between pretest and posttest ($p < .01$), indicating an increase in declarative knowledge following the tracking instruction. Similarly, the combat profiling declarative knowledge scores represent a statistically significant increase in scores be-

tween pretest and posttest ($p < .01$), indicating an increase in declarative knowledge following the profiling instruction. The mean profiling pretest score was 32% correct, and the mean posttest score was 84% correct.

Overall, these data suggest that trainees gained significant declarative knowledge for both the tracking and profiling portions of the course.

Photo Vignette Assessments. Pictures were taken of possible tracking and profiling situations. For both the tracking and profiling assessments, the pictures selected were presented on multiple large screens one-at-a-time in front of the class. Trainees were required to write a report describing each of the scenes (three tracking scenes and three profiling scenes). In both cases, pre- and posttests were administered.

For the combat tracking pre/posttest, responses were tabulated for the amount of information that was *descriptive* and *meaningful*, and for the use of *terminology*. Trainees' ability to create meaningful responses while using combat tracking terminology significantly increased after receiving the training ($p < .05$). Similarly, responses for the combat profiling were evaluated for the amount of information that was *descriptive* and *meaningful*, and for use of profiling *terminology*. These results show a significant increase in the use of descriptive and meaningful information, as well as for terminology use ($p < .05$).

Overall, these results suggest that trainees learned how to apply their knowledge and that they developed more robust vocabulary sets following the training.

Situational Judgment Tests. SJTs were administered to trainees both prior to the initial field scenario (pretest) and following the final scenario (posttest); this was done separately for combat tracking and combat profiling course segments. Higher scores on the posttest compared to the pretest are an indication that learning (in the areas of judgment and decision-making) occurred over the course of the field training. For combat tracking, statistically significant differences in favor of the posttest—and hence supporting learning—were obtained. For combat profiling, the posttest scores were also higher, and suggestive of learning, although they failed to reach statistical significance.

Trainee Behavioral Measures

Structured observation forms were used by the field researchers as they observed trainees engaging in the various field scenarios for both combat tracking and combat profiling. Separate observation forms were constructed for the two segments, and they were patterned after the behavior observation checklists (BOCs) that had been used in recording trainee and instructor behavior during Combat Hunter.

The BOC observations provided strong evidence for learning during both course segments. In combat tracking, statistically significant improvement was observed in basic tracking behaviors, such as marking the initial commencement point, sending starting point data, and avoiding walking on the spoor line—despite experiencing more difficult terrain and more complex training objectives over time. All higher-level behaviors also exhibited significant improvement, including adopting a quarry mindset, tactical decision-making, reading the dynamics of the footprint, communication, situation awareness, and team control.

For combat profiling, the evidence for skill acquisition over time was equally compelling. This included statistically significant increases for distributed observer/recorder duties, maintaining sector discipline, and using cue clusters to make a positive identification. For the higher-level behaviors, statistically significant improvements were found for adopting an insurgent mindset, detecting basic events, interpreting complex events, external communication, and tactical patience.

Overall, considerable evidence suggests that the trainees learned a variety of practical skills consistent with the stated training objectives of the various field scenario exercises.

Role-Player Reactions

Like the trainees, the role-players completed daily reaction surveys for the three days during which they participated in classroom-based instruction. The results indicate that the role-players judged their training as *very useful* and *very enjoyable*. They did not feel

that their perceptions of the training were biased by the quality of the instructors. Overall, the role-players rated the classroom instruction very high, between *good* and *extremely good*.

Role-Player Learning Outcomes

In order to assess role-players' knowledge gain, they completed the same profiling declarative knowledge and photo vignette pre- and posttests as the trainees.

Declarative Knowledge Tests. Across role-players who completed both the pre- and post- declarative knowledge tests (n = 19), the mean pretest score was 26% correct, and the mean posttest score was 55% correct. This is a significant increase in knowledge, and supports the notion that the role-players were learning the Border Hunter knowledge. However, the role-players clearly gained less knowledge than the enrolled (who scored an average of 84% correct on their posttests).

Photo Vignette Assessments. Like the enrolled trainees, role-players completed pre- and posttest photo vignette assessments for the combat profiling domain The role-players' responses revealed results similar to those observed for enrolled trainee responses. That is, there was a significant decrease in merely *descriptive* information and a significant increase in more *meaningful* information from pre- to post-training. In addition, there was a significant increase in use of profiling *terminology*. Further, ratings from an intelligence analyst revealed that the *intelligence value* of the information provided increased significantly from pre- to post-training.

Instructor Testing – Expertise Identification

A combination of cognitive task analysis interviews, observations, and psychometric instruments was used to obtain an understanding of Combat Hunter expertise.

Expert Model. The Combat Hunter expert model is made up of both tracking and profiling expertise. An integration of tracking and profiling allows the Combat Hunter to define a baseline in any setting, from there take on the perspective of the quarry/adversary, and then apply technical and tactical skills to influence the quarry or adversary. Continually updating his/her mental model of the situation allows the Combat Hunter to develop an integrated view of the situation, promoting action "left of bang."

Psychometric Findings. Comparison of scores between the participants indicated that there two areas where the instructors performed better than the trainees. One such area was in innovative thinking. These results suggest that when problem solving, trackers are more open-minded, curious, and are willing to consider unconventional ideas and solutions more so than combat profilers or trainees in this sample. The second area where instructors were high performers was in creativity. Instructors—particularly the combat profiling trainers—scored higher on average than the trainees in this dimension. This suggests that the instructors are better able to make sense of associations among various sets of data in order to assess a situation.

Research Study 2 (Longitudinal)

The second study involved a longitudinal analysis of twelve trainees, who were followed for approximately two months in order to assess their training retention and retrospective reactions to the Border Hunter experience. Knowledge application, recall, and recognition were tested, and retrospective reactions were collected.

Although the results from this study show a slight negative trend, which indicates that refresher training may be warranted over longer periods of time, no significant degradation of knowledge was found. This suggests that the participants were effectively retaining their Border Hunter knowledge after the course.

Also, in examining the longitudinal participants' retrospective reactions to the training, it is clear that the respondents still regard the training experience favorably. They rated all aspects of the training very highly and acknowledged that they were using the skills they had gained in their own operations.

Taken together, these results suggest that the Bor-

der Hunter skill set is operationally relevant, has utility, and can be retained.

Research Study 3 (Organizational Transfer)

Finally, the third study examined the organizational impact of the Border Hunter training. Its purpose was to evaluate whether any organizational impact could be quantitatively detected after Border Hunter attendees returned to their home stations following training. Specifically, 40 personnel from the Army or Border Patrol were divided into Experimental and Control Groups. The Experimental Group included those individuals who work closely with one of the Border Hunter attendees, and the Control Group included those who did not. The aim of this study was to determine whether any informal transfer-of-training occurred between the course attendees and their peers at their home station. Statistical analyses revealed a moderate improvement in the Experimental Group at Time-2.

When the groups were further subdivided by Agency, it became clear that the improvement from pretest to posttest came primarily from the Border Patrol contributions. Most likely, this is due to the inclusion of the El Centro Border Patrol trainees, who are receiving direct mentorship from one of the Border Hunter attendees (who personally told the researchers that he wanted to try to teach his personnel some of the Border Hunter concepts).

The Soldiers results between Time-1 and Time-2 did not show a significant increase. However, the Soldier cohort showed a selection bias effect; the Experimental participants performed better than the Control group, regardless of Administration Time. This may reflect a simple confound. Or, since the pretest was administered approximately three weeks after the Border Hunter trainees had returned to their units, it may suggest that the Experimental Group had already acquired some basic knowledge of Combat/Border Hunter skills before Time-1.

Although this was a small study, that was somewhat confounded by selection bias and complicated by the logistical realities of such an investigation, the results are promising. They suggest that at least some of the Border Hunter trainees, despite having no materials or formal training support, were able to transfer some of their knowledge to their organization.

Videography

USJFCOM also sponsored a video crew, who documented the training (both from the trainees' and from the role-players' perspectives). The team included two professional cameramen and two professional audio technicians, as well as a director of videography. Overall, this crew captured more than 120 hours of video, which was later edited into compact training clips.

Deliverables

The research team developed several deliverables. First, with input from all 13 researchers, the team produced this integrated technical report, which includes sections on the course execution, experimentation, study results, and recommendations for future work.

Second, led by the researchers from the University of Central Florida, the team developed a high-level program of instruction (POI) that includes a detailed syllabus, divided into nine instructional units, as well as supplementary materials included in a resource DVD. Video clips captured during Border Hunter, and associated with various modules in the POI, are included on the DVD. Finally, an easy-carry trainee pocket guide of key instructional points was developed to correspond with the instructor POI.

Contributions

This endeavor helped advance the science and research of irregular warfare training in several ways. Specific contributions include:

1. **Establishment of a baseline:** The results from the investigation established a baseline of qualitative and quantitative data against which other Combat Hunter-style training can be compared.
2. **Prototype metrics:** Original measurement ap-

paratus were created and formatively evaluated during this study. In the future, these apparatus can be used by other researchers and/or trainers to assess similar courses.

3. **SME "gold standard" course of instruction:** The two primary Combat Hunter experts were able to administer the 20-day program of instruction that they considered ideal, with full logistical support (e.g., range access, billeting), in an attempt to deliver the optimal training experience.
4. **Mental models of the SMEs:** With no guarantee of indefinite access to all the subject matter experts involved in the development and teaching of the Border Hunter Course, as well as no existing tasks, conditions, or standards for performance, the development of an expert model of performance was a substantial contribution.
5. **Assessment of role-players:** Anecdotal remarks had suggested that the role-play trainees benefited from the experience. However, these comments had not previously been empirically tested. This study evaluated role-play trainees on both Kirkpatrick's levels 1 and 2 (i.e., reactions and performance).
6. **Individual differences:** To our knowledge, before this study no attempt had been made to identify the traits that differentiate high performing trainees from others. This experiment takes a first step towards cataloging those attributes.

Recommendations for the Joint Community

The spirit of these recommendations is to leverage the findings of this report in order to determine best of breed ideas, build upon them, and bring them to the attention of the Joint community in a way that reinforces the Services' best products, insights, and capabilities on a Joint "shelf." These recommendations are offered writ large.

Although this endeavor already addressed several of the previously identified gaps (e.g., by the Kobus et al. and Spiker & Johnston reports), the current researchers observed new opportunities for expansion and improvement. In summary:

1. **Expand Combat Hunter-like training:** The results from this experience suggest that the Joint and law enforcement communities can benefit from Combat Hunter like training. The research team developed a Program of Instruction (POI) and an assortment of complementary instructional materials that we feel can support this expansion.
2. **Develop train-the-trainer instruction:** The POI that we developed is designed for trained instructors to use to deliver "undergraduate" training; however, those ideal instructors must still be identified and trained up to a "graduate" level so that they are qualified to teach the curriculum.
3. **Develop a full curriculum:** Again, although we developed a POI and accompanying materials, those resources meet only the "during" training needs. Additional effort is required to identify and develop appropriate pre-training experiences (e.g., read-ahead materials) and sustainment instruction.
4. **Validate the training materials:** The POI and complementary instructional materials created by the research team should be formally validated, their usability assessed, and their effectiveness measured against the data collected during the Border Hunter exercise.
5. **Investigate alternative delivery methods:** Use of various modes of instruction (such as blended learning, mobile learning, or simulation-based training) may enhance the efficiency, or even the effectiveness, of Combat Hunter-like training. These alternative and innovative instructional approaches should be explored and assessed, and their effectiveness should be compared against the data collected during the Border Hunter exercise.

6. **Continue to develop tasks, conditions, and standards:** This research effort helped articulate the knowledge, skills, attitudes, and behaviors (KSABs) associated with Combat Hunter expertise. The next steps include transforming these KSAB into formal tasks, conditions, and standards, as well as expanding the metrics to support measurement of the formal standards.
7. **Establish a resource center:** We recommend that a resource center be established in order to support the range of Combat Hunter-like training, to answer trainee questions, to maintain and distribute the instructional materials, and to ensure ongoing content viability.
8. **Seek opportunities to support cognitive skills development:** Combat Hunter-like training should be integrated with other cognitive skills training curricula, such as Adaptive Stance, Think Like a Leader, stress resilience, cross-cultural competency, and moral/ethical decision-making. In this way, Combat Hunter-like training can support, and be supported by, the other programs of instruction.
9. **Expand use of military role-players:** Using US Soldiers as role-players was shown to have significant benefits for those personnel—in terms of acquisition of Combat Hunter knowledge as well as adopting an "insurgent mindset." Additionally, the use of military personnel (in lieu of contracted foreign-national actors) as OPFOR promises to increase the cost-effectiveness of live scenario-based training.
10. **Continue long-term evaluation:** Combat Hunter-like training effectiveness should continue to be assessed, not just during a course, but long-term (e.g., in theater).

Recommendations Summary

1. Expand Combat Hunter-like training to the Joint community and law enforcement.
2. Develop "graduate" level train-the-trainer instruction.
3. Develop a full curriculum, including pre-training and sustainment instruction.
4. Validate the effectiveness and efficiency of newly developed training materials.
5. Investigate alternative and innovative ways to deliver the training.
6. Develop explicit tasks, conditions, and standards, as well as metrics for these standards.
7. Establish a resource center that can support the range of training.
8. Seek opportunities where Combat Hunter-like training supports/enables cognitive skills development efforts.
9. Expand use of military role-players during the practical applications and scenarios.
10. Continue long-term evaluation of Combat Hunter-like training effectiveness.

Conclusion

In conclusion, Border Hunter was an outstanding collaborative endeavor. The experience benefited the 43 trainees and 22 role-players who participated, but more than that, the research conducted on the training will, we hope, be a substantial contribution to the Joint and Interagency training communities for many years to come. Every effort was made to make this study the most comprehensive assessment of Combat Hunter-like training; however, as listed in the "recommendations," we fully accept that more research is needed to integrate a wider community of interest, iterate the knowledge, and institutionalize measurable training standards for combat observation and decision-making in irregular and ambiguous conflicts.

SECTION

1 Introduction

In 2008, *Department of Defense (DoD) Directive 3000.07* was published, requiring that the Services place greater emphasis on concepts and capabilities relevant to irregular warfare. US Joint Forces Command (USJFCOM) and Team Orlando addressed this directive, in part, by hosting the Irregular Warfare Training Symposium in September 2009. During the symposium, subject-matter experts participated in working groups in order to identify specific requirements for training team decision-making under stress, assessment, evidence-based training, mission rehearsal, and joint enabling capabilities (USJFCOM, 2009).

This impetus was further echoed by a demand signal from Joint Task Force – North (JTF-N) for high-level cognitive training on behavioral and environmental cues. This demand signal presented the opportunity to begin addressing some of the gaps the symposium identified. USJFCOM and JTF-N partnered on the creation of a hybrid Combat Hunter-like course at Fort Bliss to train decision-making through enhanced observation, tracking, and human behavior observation. Controlled execution of this course also provided the opportunity to conduct extensive research into the underlying training, taking a step towards closing the gaps identified earlier in this paper.

"Border Hunter"

JTF-N arranged for a special 20-day "Border Hunter" course to be delivered at Fort Bliss from 5-25 April 2010. This course, an initial attempt at expanding the original USMC Combat Hunter concept was delivered to 43 trainees from the Army and Law Enforcement Agencies. The course was dubbed "Border Hunter," because many of the law enforcement participants were from the Border Patrol and because of the close proximity of Ft. Bliss to Juárez, Mexico.

Course Administrators

Organizers

JTF-N led the course creation effort. Brigadier General Sean B. MacFarland, then Commanding General of JTF-N, oversaw the effort, and Colonel John Mayer, then Deputy Commander of JTF-N, conducted the day-to-day operations. Numerous other personnel from Fort Bliss and JTF-N also assisted.

Fort Bliss Facilities

JTF-N provided outstanding facilities for the course. Lectures were carried out at the Ft. Bliss Battle Command Training Center (BCTC), a new classroom facility equipped with projectors and wall-to-wall whiteboards. The practical exercises were held at the Ft. Bliss ranges. Tracking exercises were conducted across several different terrains, from soft sand to rocky mountains. JTF-N also secured permission to conduct the Combat Tracking final exercise (15 April) at the Bureau of Land Management's Mount Franklin state park, located just outside of El Paso in New Mexico.

For the combat profiling exercises, JTF-N reserved Ft. Bliss ranges Golf and Foxtrot. Range Golf was transformed for the course—changing from a basic room-clearing facility to a "cognitive range" where trainees could apply their combat profiling decision-making skills (see Figures 2.1-2.3). To achieve this, Ft.

Bliss provided dozens of additional CONEX boxes (i.e., large, metal freight containers), which became one- and two-story homes and businesses. They also used heavy equipment to create new roads and clear vegetation. Greg Williams and his team dictated the placement of each of building and prop; they even planted the decorative bushes around the "well" in the center of the new "village" and personally painted graffiti in the "bad" section of town.

Figure 2.1. Range Golf was transformed for Border Hunter

Course Instructors

Tracking Instructors

Combat Tracking instruction was led by Mr. David Scott-Donelan, an internationally recognized tracker with over 40 years of experience in Africa and around the world. Scott-Donelan assembled a team of five hand-picked experts to assist in the training. Together, these experts boast more than 180 years of collective experience. The instructors included: Carl Norton, Michael Hull, Jim Grasky, Mike Vaught, and operations officer Cornelius Nash (see Figure 2.4).

Figure 2.2. Army personnel assisted in the range transformation effort

David Scott-Donelan

David Scott-Donelan is renowned human tracker, whose extensive experience in counter-guerilla warfare contributes to his status as an "outlier." During his military tenure, he served and led various regular and unconventional units, such as the Seleous Scouts and the Special Air Services (SAS). As a young lieutenant in the Rhodesian Army, he acquired the tactical savvy and resilience while fighting active insurgencies throughout Africa. He demonstrated an uncanny ability to get in the mind of his quarry and to track them relentlessly. He is a natural leader who inspires, teaches and bleeds with his followers. To those who see him today, David stands out as an individual who lives and breathes the ethos of the warrior class.

David is vital and fit for someone who has passed his 70th birthday. He is a lifelong learner and a passionate reader who consumes a steady diet of non-fiction

Figure 2.3. The completed range resembled a generic Middle Eastern village

materials. He is also a trainee of human nature, which he believes gives him the advantage when tracking or analyzing evidence. Today, he is surrounded by a cadre of protégés who practice the craft of tracking. He is an effective storyteller, who integrates his lived experiences with lesson materials to inform listeners on how and why tracking works. He and his team are painstaking attention-to-detail men. Like David, they are intellectually curious, always trying to explain why things happen.

When asked, David speaks proudly about his military roots. He comes from a long line of professional soldiers. This lineage begins with a great grandfather who spent 57 years in the service, which culminated in serving as the Yeoman of the Guard for Queen Victoria.

David's own service spanned nearly three decades in several war zones. His expertise as a tracker was refined throughout that period. For nearly 30 years, David has applied the tactical, technical and decision making skills of a tracker. Perhaps more importantly, he has mentored hundreds of others as role model and coach. His protégés are throughout law enforcement and military organizations. David is a lateral thinker, who possesses a natural ability to interpret human spoor and apply his understanding in high risk problem settings. He is inner directed, which gives him the ability to retain details and focus on tracking tactics and techniques. As a combat tracker, David was invariably dealing with dangerous situations where he was required to remain vigilant and aware for long periods of time. This level of mental stamina contributes significantly to his judgment and decision making while tracking.

Combat Profiling Instructors

Instruction in combat profiling and Enhanced Observation was led by Mr. Greg Williams, a highly-decorated former undercover police officer from Detroit with more than 30-years experience (see Figure 2.5). Williams assembled a team of nine hand-picked experts to assist in the training. Many of these instructors are still active in their fields.

Figure 2.4. The Combat Tracking Instructors

Greg Williams

Greg is an outgoing individual who seems to never stop. He is in constant motion—seeking, processing, and associating the information he needs to interpret the intricacies of the patterns that immerse us all. Greg was reared in a survival situation in a large urban area. He dodged in and out of trouble, a natural fighter who honed his skills in numerous encounters where gang ethics and honor were at stake. Early on he became aware of the subtle indicators that survivors seem to notice... symbols, weapons, body language, baselines.

He survived those early street encounters, which included numerous contacts with law enforcement. Eventually, circumstances required Greg to enter the military where he served as an infantryman. He moved on to a career in law enforcement, where he gained a reputation for sensing out criminals and using his street-sense to combat crime.

Greg Williams is a transformational character, who adapted his skills and abilities to defeat insurgents on the battlefields of Asia. As a trainer and practitioner of the art and science of profiling, Greg found meaning around him. He adapted his skills as a detective to the requirements of today's infantryman. He proposed a new lexicon and added a dimension to problem solving that gave the user the advantage in time and space to kill, capture, or contact an adversary by combining his precepts about human nature with his insights

about alien cultures and his expert knowledge of weapons and warfare.

Why should Greg Williams be considered an subject matter expert? He is a master of the skills and integrated them into a new combat capability—human terrain pattern recognition. Greg's work goes beyond fluency. Many individuals possess the basic ability of reading the intentions of others, but Greg's performance goes beyond. He has a demonstrated an ability to re-calibrate his understanding and efficiently adapt his mental model to emerging situations. He has achieved a level of performance that is characterized by originality and creativity. He has effectively integrated his life experiences with understanding of human behavior to amplify the performance of small units who operate on the "edge of chaos." It is a new frontier that enables Greg and his protégés to interact and relate to their operating environments. In this sense, he has captivated the imagination and spirit of the warfighter by making them the hunter instead of the hunted in survival situations.

Figure 2.5. Greg Williams

SECTION

2 Background

The Border Hunter exercise was based on the USMC Combat Hunter training program. In this section we describe how the Combat Hunter program formed and the lessons learned that fueled the design and development of Border Hunter training.

USMC Combat Hunter

From 2005–2007, a man (or possibly a group) called the "Juba Sniper" terrorized American warfighters in Baghdad. In a series of Internet-published propaganda videos, Juba can be seen killing American warfighters. In one of his videos, released October 2006, Juba claims to have killed 645 US Soldiers and Marines. Regardless of whether these deaths were truly Juba's handiwork, the US casualty report verifies a dramatic increase in precision fire causalities during this time period.

In January 2007, the US Marine Corps (USMC) sought a novel solution. With assistance from the Marine Corps Warfighting Lab (MCWL), a diverse group of subject matter experts (SMEs) were assembled with a common goal: Turn Marines from the hunted into the hunters. From this meeting, Combat Hunter formed (Gideons, Padilla, & Lethin, 2008).

The USMC realized that certain people were better able to detect snipers and improvised explosives. After examining their backgrounds, the USMC realized that the most successful "battlefield hunters" were those who could read the environment, the physical and/or social landscape.

Combat Hunter was designed to train these skills. The program focuses on enhanced observation, combat tracking (i.e., reading the physical terrain), and combat profiling (i.e., reading the human terrain). The USMC initiated the original Combat Hunter training in February 2007. A series of limited objective experiments (LOEs) were held through July of that year, refining the concepts; tasks, conditions, and standards; and course instruction (Gideons, Padilla, & Lethin, 2008). The inaugural course opened in July 2007, and the 2nd Battalion, 7th Marines comprised the first class.

After the 2/7 Marines returned from Afghanistan, the Marine Corps Center for Lessons Learned (MCCLL) reported on their reactions to the course. Initial responses proved overwhelming positive:

> "Combat Hunter is worthwhile pre-deployment training, is viewed positively, and credited with tactical successes by those knowledgeable with the course content. The skills and techniques imparted in this training are enduring and transcend any particular theater of operations, type of operation, and seem as applicable for future military operations as today's efforts in Iraq and Afghanistan. This training is ripe for expansion..." (MCCLL, 2008: 2).

The Army began to take notice, as well. In May 2009, US Army Forces Command (FORSCOM) sent CPT Thomas Angstadt to the course. He found, "Combat Hunter was the best training I have ever received (other than Ranger School) and during the whole course I was recalling instances from engagements and situations during my last deployment in which these skills would have helped me be more successful on the battlefield" (Angstadt, 2008: 4)

Previous Research on Combat Hunter

Kobus et al. (2009)

Pacific Science & Engineering Group (PSE) conducted an assessment of the Combat Hunter Trainer Course (CHTC) held in April 2009 at SOI-West, Camp Pendleton. The intent of the CHTC course was to train Marines to teach the Combat Hunter fundamentals to personnel in their own battalion. The course contained 41 Marines ranging in rank from NCO to officer.

Authored by Kobus, Palmer, Kobus, & Ostertag, the assessment report includes focused discussions on each of the three "legs" of Combat Hunter training: enhanced observation, combat profiling, and combat tracking. The report also outlines recommendations related to the overall course. Synopses of these recommendations are listed in Figure 1.1 and short descriptions follow.

1) Use a seminar method of instruction rather than the standard Enabling Learning Objective/Terminal Learning Objectives (ELO/TLO) training method. The nature of this course is advanced training and enhancement of a mindset of skills to a level of competency to train other individuals. The course is somewhat unique and atypical of task-specific training in its content and philosophy, and should not be constrained to fit a standards-based methodology. Using a seminar format, such as in graduate education, increases trainee participation, discussion, and involvement amongst trainees and the instructor, and is critical for the development of the Combat Hunter mindset. Research has shown that using a seminar format is more effective when learning problem-solving skills and developing attitudes, both critical components of advanced Combat Hunter training.

2) Establish prerequisites for the course. It is critical that prerequisites for the Combat Hunter Trainer Course be established so that a basic understanding of Combat Hunter concepts and terminology can be assured. The intent of the Trainer course can then be achieved (potentially in a shorter period of time) by emphasizing a deeper understanding of Combat Hunter, and methods of effective delivery of the material from classroom to practical application. Prerequisites should include:

a. All prospective trainees must have satisfactorily completed the 10-day Combat Hunter course OR have successfully completed each of the online core competency requirements (proposed development) for each of the pillar areas.

b. Trainees will be senior level enlisted Marines (non-commissioned officers (NCOs) and Staff NCOs) with a minimum of one-year remaining in their current unit.

1. Use a seminar method of instruction rather than the standard ELO/TLO training method.
2. Establish prerequisites for the course.
3. Provide all reference material to all trainees the first day of class.
4. Ensure adequate logistic support for each of the pillar areas.
5. Focus course on teaching trainers how to teach, requiring trainees to meet performance based standards on content knowledge and practical ability.
6. Verify and validate all supporting science identified within the program.
7. Establish and use consistent terminology across all Combat Hunter training programs.
8. Maintain Subject Matter Experts (SME) as an integral part of the Combat Hunter Program.

Figure 1.1. Synopsis of Kobus et al. (2009) Recommendations

3) Provide all reference material to all trainees the first day of class. All classroom material (handouts, 10-day POI, course template, reference materials, copies of all Trainer course slides, and checklist for training) should be provided to the trainee on the first day of class. Providing this information at the very beginning of the course will allow trainees to review information prior to coming to class each day, to be better prepared for classes, practical application/field exercises, and evaluations (e.g. teach-backs), and to reduce the amount of content-related note taking.

4) Ensure adequate logistic support for each of the pillar areas. Marine Training Cadre (MTC) needs to ensure that all logistic requirements for the course are met and proportional to the class size. For example, sufficient quantities of optics devices need to be provided for the Enhanced Observation portion of the course, and appropriate ranges need to be available for combat profiling. Such logistical issues have particular impact on the practical application components of the course, which are key issues at this level of training. Trainer course trainees should be afforded every opportunity to practically apply and demonstrate skills within each of the pillar areas.

5) Focus course on teaching trainers how to teach, requiring trainees to meet performance based standards on content knowledge and practical ability. The intent of this course is to develop trainers of the Combat Hunter skill set. However, very little time was spent teaching Marines how to train other Marines in these areas. This was partially due to lack of prerequisites, requiring more time to be applied to presenting and discussing basic content. A major emphasis for trainees in this course needs to be developing greater confidence and expertise with a skill set that is already within each of the trainees. With prerequisites met, this course can then address successful training methods, attention getters, real-world examples to emphasize points, and lessons learned from Combat Hunter instructors regarding learning objectives trainees find difficult, types of questions to expect from Marines during the course and how best to answer them. The intent of this program is not to develop certified instructors, but trainers, yet the basic tools needed to train other Marines must be provided (teaching techniques, etc.). To best meet this objective the course needs to have formal assessment processes (graded teach-backs, written exams, etc.,) in place for each of the topic areas. In addition, a second level of assessment should be employed for Trainers to demonstrate a level of competency with the various practical applications of Combat Hunter skills prior to graduation. Without this level of preparation Trainers may lack the appropriate skill set to adequately train other Marines in Combat Hunter skills.

6) Verify and validate all supporting science identified within the program. The science behind the method is often lacking, vaguely reviewed, or incorrect. Although an understanding of the science supporting theories of observation, anomaly detection (combat profiling), decision making, and Combat Tracking are probably not required for the 10-day POI, they are important for the Trainer to understand. In the basic course Marines learn the "who & what" of Combat Hunter. Trainers need to have a deeper understanding of the "how & why". Scientific support needs to be added to the curriculum at a basic level and provided in terms that are usable to Marines, so that trainers can explain how and why the Combat Hunter skill set can lead to better decision-making. All resources used in support of this program need to be made readily available to all Trainers. Validation of the supporting science and how it may impact combat decision-making needs to be conducted for the final course curriculum.

7) **Establish and use consistent terminology across all Combat Hunter training programs.** The terminology introduced during Combat Hunter training provides a language for accurate and effective reporting, enhancing the development of "every Marine a collector". Combat Hunter training helps establish a standardized method and framework for Marines to use to describe their environment or situation.

8) Maintain Subject Matter Experts (SME) as an integral part of the Combat Hunter Program. The continued use of civilian SMEs is viewed as very valuable to the course by all trainees. The wealth of experience SMEs have with these skill sets cannot be matched by most Marines in the near term. Until select Marines complete additional advanced training and gather more personal experiences using these skills, the SMEs should be retained for the Trainer course.

Spiker and Johnston (2010)

Spiker and Johnston conducted a formative evaluation of the combat profiling training course, offered through the School of Infantry – West, Camp Pendleton. Their evaluation was based on naturalistic observations of two successive courses and supplemented by instructor interviews, reviews of course materials, and informal queries of trainees. A primary focus of the evaluation was to determine the scientific principles that underlie the instructional content, delivery, and pedagogy of this training. The goal of the analysis was to describe the unique and essential elements of the combat profiling course that should be preserved as future efforts are undertaken to expand its "footprint" on the Joint Services.

1. Conduct highly concentrated instructor training sessions to dramatically increase the number of qualified combat profiling instructors
2. Cultivate profiling "naturals" who emerge from each class
3. Encourage trainee-built profiling job aids to help train other Marines
4. Capture a representative class on DVD for wide spread distribution
5. Develop a suite of game-based training tools that can be used for bridge training of select KSAs after the course is completed
6. Capture scenario recreations from multiple camera angles and distribute as online learning
7. Hold regular combat profiling competitions
8. Have combat profiling SMEs accompany regular units on their field exercises

Figure 2.2. Synopsis of Spiker and Johnston (2010) Recommendations

To support the observations, a structured 33-item scorecard was used to quantify the extent to which cognitive principles of critical thinking and decision-making were covered by course content. This was employed while observing all academic lessons and field exercises during two successive course evolutions. A follow-up interview with the lead instructor was conducted to extract lessons learned from his recent two-months of training Marines and Army units in Afghanistan. An extensive summary of the combat profiling course content was produced for both the academics and field exercises. For the latter, a summary of the key events associated with each of the field scenarios was chronicled.

Analysis of course content identified 21 knowledge-skill-attitudes (KSAs) the authors believed are responsible for the course's success (these are provided in the Appendix). These KSAs are rooted in very generalizable, perceptual-cognitive-behavioral meta-skills such as taking someone else's perspective, shifting field of view (from wide to narrow and back), and anticipating what will happen next. A second analysis extracted essential elements of the course, i.e., those elements that should be retained as profiling instruction is expanded. These elements are supported by 28 psychological principles identified as the basis for the instructional delivery, pedagogy, and content of the course.

The report also summarizes research evidence supporting the effectiveness of combat profiling training. Trainee critiques of the course are uniformly high, including ones obtained from trainees who had deployed in Operation Iraqi Freedom (OIF) and Operation Enduring Freedom (OEF). Evidence for trainee learning is generally positive, including the controlled research of Kobus et al. as well as the results of the structured observations in the present report. While a completely controlled study of transfer of training has yet to be performed, the subjective reports from returning OIF and OEF veterans underscore the high value that course graduates attribute to their experi-

ence in combat profiling. The original After Action Report (AAR) from the 2nd battalion, 7th regiment yielded ratings in the 8-10 (maximum) range. Recent reports from the in-country (OEF) training were even more glowing, where unanimous agreement on course value is the typical finding.

The report concludes by recommending eight ways to expand combat profiling training. A synopsis of these is provided in Figure 2.2

SECTION

3 Border Hunter Training Content

Border Hunter was divided into two phases. The first 10 days were dedicated to combat tracking, and they were taught by master tracker David Scott-Donelan. Combat tracking involves conducting "follow-ups" of a quarry while operating in small, tactical teams. Trainees (see Figure 3.1) learned to read their enemies' *spoor* (i.e., footprints, human signs, environmental cues, slight ground disturbances). They were taught to build social/biometric profiles of their quarry; anticipate their targets' actions by gaining the "mind of the quarry;" and apply tactics, techniques and procedures (TTPs) to hunt down their targets. Combat tracking is a human-centric competency particularly useful in irregular warfare settings to support offensive operations, intelligence collection, clandestine movement in hostile areas, and counterinsurgency operations.

The second 10 days were dedicated to combat profiling and Enhanced Observation. Greg Williams led this instruction. Combat profiling is concerned with perceiving, analyzing, and articulating critical events within the human terrain. Its main goal is to identify pre-event indicators through humans' behavior "left-of-bang," i.e., before a destructive event occurs. Combat profiling does not use stereotyping based upon race, religion, or ethnicity. Rather, it trains individuals to look for behaviors that are anomalous, beyond the baseline of a culture or location. Through combat profiling, warfighters and law enforcers learn to be more situationally aware and to accurately interpret the subtle cues that forewarn a critical event. Along with combat profiling, Williams and his assistants taught Enhanced Observation, which involves advanced methods of using optics. The instructors trained novels ways to make the best use of optics, including binoculars, ACOGS (Advanced Combat Optical Gunsight), and Thermals (i.e., "night optics"). For instance, Thermals can be used (day or night) to detect whether someone is wearing a body-bomb under their clothing.

Figure 3.1. The trainees (with the tracking instructors)

Trainee Daily Activities

Figure 3.2 lists a brief synopsis of each day's activities. Additionally, short summaries are listed below (See *Appendix B: Border Hunter Training Topics, in Detail* for more information.)

5 April – Course Welcome: Participants began arriving around 1400, and the researchers started conducting the pretest experimentation in waves. Initial data on the trainees' background and prior knowledge were gathered by the researchers. At 1830, COL John Mayer officially kicked-off the course with a passionate overview of Combat Hunter and introduction of Scott-Donelan, Williams, Fautua, and Schatz.

6 April – Combat Tracking (Day 1): Most days the Combat Tracking training began with a classroom lecture, which was followed by hands-on demonstration or practical exercises. On 6 April, class began at 0730. After the researchers collected additional pretest data, Scott-Donelan opened the course with a discussion of real-world uses of tracking. He discussed the problems associated with drug smugglers on the border, as well as in-theater irregular warfare challenges. He then provided an overview of combat/tactical tracking, filling his lecture with photos and numerous personal stories from his Combat Tracking experience in the Rhodesian special services. Following this, the trainees exited to a spoor pit just outside the classroom. *Spoor* is a term for marks or signs left by a quarry. At the spoor pit, the combat tracking instructors led demonstrations of micro-tracking, which involves analyzing minute footprint details in order to identify the actions of a quarry (see Figure 3.3).

7 April – Combat Tracking (Day 2): Again, class convened at 0730. Scott-Donelan presented lecture on the glossary of modern combat technology, followed by presentation on Combat Tracking indicators. The indicators lecture suggested that tracking is about identifying the baseline, perceiving anomalies, and then interpreting these factors to create a cohesive story about what took place. Footprint patterns, IED materials, trash, and other spoor all tell a piece of the story. Following the classroom lectures and some basic practice

05 April 2010:	Course welcome and researcher pretests
06 April 2010:	Introduction to Combat Tracking (classroom and spoor pit)
07 April 2010:	Tracking basics: Micro-tracking (classroom and field)
08 April 2010:	The tracking team and tracking practice (classroom and field)
09 April 2010:	Rules of tracking and tracking practice (classroom and field)
10 April 2010:	Lost spoor procedures and tracking practice (classroom and field)
11 April 2010:	Tracking techniques and back-tracking practice (classroom and field)
12 April 2010:	Anti/Counter-tracking and tracking practice (classroom and field)
13 April 2010:	Challenging tracking practice (field)
14 April 2010:	Urban tracking and urban, night tracking practice (classroom and field)
15 April 2010:	Tracking FINEX, very difficult terrain (field)
16 April 2010:	Research pretests and introduction to combat profiling (classroom)
17 April 2010:	Baseline + Anomaly = Decision and terrorist planning cycle (classroom)
18 April 2010:	Six domains of combat profiling (4 of 6 discussed) (classroom)
19 April 2010:	Six domains of combat profiling (continued) (classroom)
20 April 2010:	Practical application of combat profiling concepts (classroom)
21 April 2010:	Practical application continued (classroom); observation lane training (field)
22 April 2010:	Scenarios 1-5 carried out (on the range)
23 April 2010:	Scenarios 6-10 carried out (on the range)
24 April 2010:	FINEX final scenario carried out (on the range)
25 April 2010:	AAR, completion of posttests, graduation (classroom)

Figure 3.2. Brief synopsis of the daily Border Hunter course activities

at the spoor pit, the class was transported to the range, where they practiced micro-tracking at an individual level (see Figure 3.4).

8 April – Combat Tracking (Day 3): Class began 0730, and additional data were collected. Team tracking, tracking team formations and communication, and lost spoor procedures were discussed. Following this, the trainees observed some basic tracking activities at the spoor pit. They practiced the Y-formation (i.e., the primary five-man tracking team formation) and team hand-signal communications. Then the class traveled to the range, where they practiced team tracking and basic follow-ups (i.e., following "easy" track lines).

9 April – Combat Tracking (Day 4): Class began around 0800. The morning lectures covered the rules of tracking and use of LiNDATA, an acronym that stands for Location, Number, Direction, Age, Type, and Additional. These are the key pieces of information that trackers should convey to command-and-control during a follow-up operation. After the classroom lectures, around 1130, the trainees traveled to the field where they continued to practice their Y-formations and team communications.

10 April – Combat Tracking (Day 5): Class began at 0730. First, Scott-Donelan reviewed the rules of tracking; then, the trainees took the "track reading quiz" developed by Jim Grasky. The class reviewed the quiz answers and then concluded the morning lecture with a discussion of the rules of tracking and how to use them in real field activities. The classroom activities mainly included review and discussion; however, the field activities presented some challenging new follow-up exercises out at Range Two-Delta. This was the first day that the trainees encountered difficult terrain (i.e., scree-covered hills). Their tracking skills were stretched past their comfort zones, and correct application of lost spoor procedures proved invaluable in following the quarry.

Figure 3.3. Trainees examine footprints in the spoor pit

Figure 3.4. Instructor Cornelius Nash points out footprint features to a trainee from the Border Patrol during a micro-tracking field exercise

11 April – Combat Tracking (Day 6): Class began at 0730 with Scott-Donelan leading an informal after-action review of the previous day's practical application. He then discussed ways to improve the security of a tracking team, stressing the importance of camouflage. Around 1030, Scott-Donelan led a lecture on how to determine the age of spoor, which is critical for accurately assessing the time/distance gap. After the classroom lectures, the field exercises began. The exercise focused on back-tracking, which is intelligence-gathering focused. For example, once a quarry is captured, the tracker may wish to back-track the track line to find the quarry's incriminating evidence or the initial inception point. For the back-tracking exercise, each team was assigned a trail to follow, and each trail

had a number of physical evidence clues, including the tracks and other litter. Five different scenarios were used, from following and apprehending a criminal, to collecting evidence, following insurgents' trails, and finding evidence of criminal activity.

12 April – Combat Tracking (Day 7): Class began around 745 with a discussion of tracking team command-and-control. Then Scott-Donelan led a lecture on anti-tracking and counter-tracking, as well as a demonstration of some anti-tracking techniques in the spoor pit. The practical exercise was held on Range Two-Delta, the foothill range. The trainees followed through different scenarios on the range, such as tracking an armed escapee. The squads made innovative use of their tracking techniques, and positive team dynamics were becoming evident.

13 April – Combat Tracking (Day 8): The trainees left the classroom at 0730, heading directly to the range for a full day of different, long tracking scenarios on difficult terrain.

14 April – Combat Tracking (Day 9): Class opened at 0745 with a discussion on radio security. David Scott-Donelan stressed the importance of security-minded communications and how to better convey LiNDATA via the radio. He then discussed urban tracking, and immediately following this the trainees were assigned urban tracking scenarios to carry out in the few miles surrounding the BCTC classroom. Field exercises in urban tracking ran from 0915 to 1200. Classroom training resumed at 1330 on the topic of Israeli tracking teams, how tracking has been applied in murder investigations, and night tracking. Training ended at 1600, but a night tracking lecture resumed at 1945.

15 April – Combat Tracking (Day 10): The capstone final exercise (FINEX) was held on 15 April at the Bureau of Land Management's Mount Franklin state park, located just outside of El Paso in New Mexico (see Figure 3.5). The FINEX comprised the entire day, from 0900 to 1800. This was the most challenging terrain to date, rated as 4.5 on a 5-point scale. Every team did particularly well in terms of finding their quarry in the allotted timeframe and applying their lost-spoor techniques to re-acquire the tracks of their quarry. After the FINEX the tracking instructors held an informal graduation exercise, where they shook each trainee's hand and congratulated all for a job well done.

Figure 3.5. Team-5 personnel, along with Border Patrol canine Rex, provide overwatch for their teammates during the Tracking FinEx

16 April – Combat Profiling (Day 11): April 16th began the combat profiling training. Before that instruction began, however, the researchers asked the trainees to complete a battery of tracking posttest and several profiling pretests. Meanwhile, the Soldiers who volunteered to play the opposing forces (OPFOR) also began their role-player training. Like the enrolled trainees, the role-play trainees were given a battery of pretests, in order to later assess how much value they received from their specialized instruction. Greg Williams' lecture commenced around 0945. His discussion was rapid-fire covering concepts from "left-of-bang," tactical cunning, and the Arabic language in quick succession. After lunch, Williams continued his fast-paced, engaging lecture, discussing the physiology of sight, the cognitive functions associated with perception, and the symbolic importance of colors in the Islamic world.

17 April – Combat Profiling (Day 12): At 0800 the lecture began with a demonstration of how "proximity negates skill." Williams asked the Texas Ranger to

"shoot" (with an unloaded 9mm) him as soon as he moved. Williams was able to disarm the Ranger within milliseconds. After the demonstration, Williams recapped the many vocabulary terms from the previous day, and then the discussion naturally flowed into case law and moral/ethical/legal decision-making. Following a number of examples, Williams relayed a clever metaphor about Mule Deer hunting, equating various forest animals to the types of people found on a battlefield. After this, Williams discussed the concept of Baseline + Anomaly = Decision (or "BAD"), and then led a lengthy lecture on the seven-step terrorist planning cycle. This lecture concluded with a series of examples, such as the TWA flight 847 bombing and the attack on the USS Cole. Finally, the trainees were shown a video created by the Juba Sniper, and then asked to analyze this exploitation video and try to "get into the minds" of these terrorists (see Figure 3.6). Finally, trainees were assigned group-work assignments and asked to present the results on the following day.

Figure 3.6. Trainees in the combat profiling class draw diagrams of the resources, motivations, and tactics of terrorist organizations

Figure 3.7. Trainees take on the roles of a radical terrorist organization in an attempt to "get into the minds" of their adversaries

18 April – Combat Profiling (Day 13): The day began at 0800, and each of the teams presented a demonstration on the terrorist mindset (see Figure 3.7). The teams alternatively tried to recruit new terrorists and then tried to speak to fellow warfighters about the tactics of the terrorists. Around 1030, Williams led an impromptu lecture on IEDs, which was requested by the trainees. After lunch, Williams began discussing the six domains of combat profiling, focusing on Heuristics, Proxemics, Atmospherics, and Geographics.

19 April – Combat Profiling (Day 14): The classroom instruction began with a quick teach-back of previous day's topics by each group. Then Williams resumed training on the six domains of combat profiling, discussing domains five and six: Biometrics, physical reactions and signs (e.g., nystagmus, histamine counts), and Kinesics, body language, which can be pre-event indicators. Williams then covered the "combat rule of three," with examples such as iconography, changes in appearance, atmospherics of the area, urban masking, etc. Trainees were told that when there three or more anomalies are present, then they should take action to "kill, capture or contact" their quarry. Following this, homework was assigned. Each team was required to conduct an offensive (i.e., terrorist attack) and a defensive (i.e., military security) operation.

20 April – Combat Profiling (Day 15): The trainees presented in-depth offensive and defensive plans, using course terminology and concepts. Trainees spent the afternoon discussing and identifying, as a group, the anomalies and profiles of various pictures and movies, and how to cope with those situations. Homework was again assigned. Each team was required to pick a criminal act (such as VBIED, sniping, drug running, etc.) and then build a profile for that act.

21 April – Combat Profiling (Day 16): This morning began with more in-classroom examples of pictures and movies for analysis. Then the trainees received an "intelligence update" from the "6-2-6 asset" embedded in the "Ville." This asset brought a video from the terrorist leader in the Ville, which explained his demands and warned American troops not to enter Zam Zam village. After lunch, the trainees traveled to Range Foxtrot to conduct station-based training in preparation for the following days' range-based exercises. The stations included: basic optics and terminology, clearing buildings practice at a mini-village, clearing buildings rehearsal of occupied building, optic usage on the previously cleared building with role-players in place, advanced observation training, and observation concealment techniques (see Figure 3.8).

Figure 3.8. Trainees from the Border Patrol receive instruction on enhanced observation techniques

22 April – Combat Profiling (Day 17): April 22nd marked the first day of combat profiling range exercises. The exercise commenced at 0800 and continued until 2130. The trainees experienced five scenarios. For each of the scenarios, they observed the Ville from clandestine Observation Points, the nearest of which was 300 meters from Zam Zam village (see Figure 3.9). The trainees' goal was to identify behaviors that indicated an incident was to happen and then prevent that incident left-of-bang. Meanwhile, many of the researchers and course organizers met with visitors during a special Visitor's Day.

Figure 3.9. Role-players fill the ville's marketplace

23 April – Combat Profiling (Day 18): The second day of combat profiling scenarios proved to be another long day. Five scenarios were completed, including a nighttime route clearing exercise and one-on-one mini-scenarios with the village's leader.

24 April – Combat Profiling (Day 19): Again, the trainees engaged in field exercises all day. This time they only encountered one scenario: The FINEX, which combined combat profiling and Combat Tracking to test their overall Border Hunter skills. The trainees occupied a number of Observation Points, and then pushed ground elements into the Ville. They were forced to overcome a sniper, IED attacks, and other surprises. The trainees had to conduct legal, moral, and ethical decision-making. They explained what cues signaled the threat and target's intent, and then were required to accurately call in fires or the equipment they were using to take their shot. At the end of the exercise, trackers laid four spoor that trainee teams followed.

25 April – Combat Profiling (Day 20): On the final day, the trainees completed a battery of posttests. Then Greg Williams led an after-action review of the FINEX. Following this, the instructors and course organizers led a graduation exercise. BGen MacFarland spoke, and COL John Mayer offered a passionate discussion. Greg Williams, David Scott-Donelan, and their teams shook the trainees' hands and handed out certificates of completion.

Role-Player Activities

To stage the scenarios for the combat profiling portion of Border Hunter, JTF-N enlisted the assistance of 22 Soldiers from 3rd Brigade, 1st Armored Division (BCT/1AD), in addition to the 30 professional role-players hired from Tatitlek. The 22 Army role-players received a condensed version of the combat profiling class, taught by three members of Greg Williams' team.

The role-players trainees received three days of classroom instruction, followed by two and a half days of rehearsal on the range. After that, all of the trainees came together to act-out three days of practical exercises (i.e., a total of 10 scenarios plus the final exercise). A brief synopsis of each day is listed in Figure 3.10.

Classroom-Based Training

The three instructors took turns leading the classroom lectures, and they deliberately sought to optimize the training value for the role-players. The role-players actively participated in the classroom sessions, offering their own experiences to illustrate key concepts and asking clarifying questions throughout.

In the afternoon of 18 April, the role-players participated in a small group exercise in which the team planned a terrorist attack following the seven-step terrorist planning cycle. They began by nominating potential targets and then selecting one: Bombing the Lakeview Church in Houston which televises services every Sunday and has a broad following. After agreeing on the target the four groups were each given one of four roles: surveillance, logistics, actions/plans, and exploitation. The plan was fleshed out from each of these perspectives and briefed to the larger group.

As the exercise unfolded, instructors watched each role-player, mentally identifying specific roles for each based on their behaviors during group activities. The afternoon ended with an overview of what to expect during the range exercises and assignment of key roles to individual role-players (see Figure 3.11).

Figure 3.11. Greg Williams with four Soldiers who have taken on the role of the local police force

16 April 2010:	Research pretests and introduction to combat profiling (classroom)
17 April 2010:	Six domains of combat profiling (classroom)
18 April 2010:	The seven-step terrorist planning cycle (classroom)
19 April 2010:	Scenario rehearsal in the Ville (on the range)
20 April 2010:	Scenario rehearsal in the Ville (on the range)
21 April 2010:	Scenario rehearsal in the Ville (on the range)
22 April 2010:	Scenarios 1-5 carried out (on the range)
23 April 2010:	Scenarios 6-10 carried out (on the range)
24 April 2010:	FINEX final scenario carried out (on the range)
25 April 2010:	Brief AAR and completion of researcher posttests (classroom)

Figure 3.10. Brief synopsis of the role-players' daily Border Hunter course activities

SECTION

4 Research Design and Execution

Joint Forces Command (USJFCOM) sponsored 13 researchers to attend the course in order to conduct scientific observation, experimental testing, and a formative evaluation. The investigators goals were to (1) capture the content of the Border Hunter and package it for greater deployability, (2) assess the instructional outcomes of the course, and (3) explicitly articulate the linkages between the course content and underlying scientific principles. A research design was created with these goals in mind. The researchers additionally attempted to catalog the experts skills, identify common traits of the best performing trainees, and observe how tacit knowledge was transferred from the instructors to the trainees.

Research Team

The research team was lead by USJFCOM's David Fautua and the chief scientist was Sae Schatz, from the University of Central Florida. Other research team members included Emilie Reitz, USJFCOM; Denise Nicholson, UCF; Joan Johnston, Naval Air Warfare Center Training Systems Division; David Kobus, Erica Palmer, Jason Kobus, and Jared Ostertag, Pacific Science & Engineering; William Ross, Nic Bencaz, and Laura Militello, Cognitive Performance Group; and Alan Spiker, Anacapa Sciences, Inc.

At least eight members of the research team were present at the Border Hunter training, each day, and on several days up to 12 researchers were in attendance. In addition to administering the formal experimentation, the researchers attended all class meetings and followed the trainees during their field exercises (see Figure 4.1). This enabled the team to get an intimate feel for the training and record qualative accounts of the experience, which in part, helped inform this report.

Additionally, each of the researchers led a specific portion of the experimentation and authored a section of this report.

- David Kobus and his team from Pacific Science & Engineering (PSE) created, administered, analyzed, and authored the sections on the declarative knowledge questionnaire, photo vignette test, Cooper's Color Code and engagement assessment, change detection, and field-of-view experimentation. They also provided a comparison of Border Hunter versus the traditional 10-day Combat Hunter course.
- Alan Spiker, with support from Joan Johnston, expanded the Behavioral Observation Checklists (BOC) from their previous study and led the administration, analysis, and reporting. Spiker and Johnston also developed, administered, analyzed, and authored the sections on the Situated Judgment Test (SJT), and they articulated the list of KSA.
- Nic Bencaz, with support from his fellow Cognitive Performance Group (CPG) colleagues, administered, analyzed, and reported on the cognitive battery give to trainees and SMEs.
- William Ross and Laura Militello led all of the instructor-focused experimentation, including conducting structured interviews and analyzing this qualitative data to create expert models.
- Sae Schatz and Denise Nicholson created, analyzed, and describe the results from the reactions surveys. This UCF team was also respon-

sible for overall research team coordination, integration of products, creation of the final POI and trainee guide, as well as administration and analysis of the longitudinal and organization-impact studies.

Videographers

In addition to the academic research conducted by the USJFCOM researchers, USJFCOM sponsored a video crew, who documented the training (see Figure 4.2). Eric Ortiz, UCF, led this team, which included two professional cameramen and two professional audio technicians, hired from Metro Productions. Overall, this crew captured more than 120 hours worth of video, which UCF edited into compact training clips.

Research Design

Stages of Training

The researchers created assessments for each stage of the training process, beginning with acquisition of low-level knowledge (i.e., declarative knowledge), moving into rote skills (i.e., procedures), and finally assessment of the acquisition of higher-order cognitive skills. Figure 4.3 shows a simple diagram of the training process. It highlights general stages of training from low-level (left) to high-level (right). The diagram also includes a box marked "Metacognitive Awareness," which represents the highest level of understanding, an expert degree of competency. It is colored gray because the Border Hunter course did not attempt to train-the-trainer or comprehensively impart metacognitive skills to the trainees.

Each icon in Figure 4.3 was measured by at least one apparatus. The lower-level skills were measured via traditional paper-based tests, while the higher-level abilities were assessed via essay-like exams, behavioral observation, or physiological metrics.

Kirkpatrick's Hierarchy

In addition to evaluating each stage of the training process, the researchers' attempted to assess Kirkpatrick's four-level framework of training effectiveness. This framework includes:

1. Trainee reactions to the course
2. Trainee learning during the course
3. Transfer of training to the job
4. Organizational impact of the training

Naturally, levels 1 and 2 were measured during the 20-day course. Level 3 was measured via a longitudinal study, during which a subset of Border Patrol and Army personnel were followed through June 2010. Finally, level 4 was assessed by testing certain trainees' peers at their home stations; the level-four assessment was augmented by the use of a control group.

Figure 4.1. Researchers attended each class meeting and took notes on the experience

Figure 4.2. Ryan Bedall, Metro Productions, stages a close shot with two Border Patrol Agents

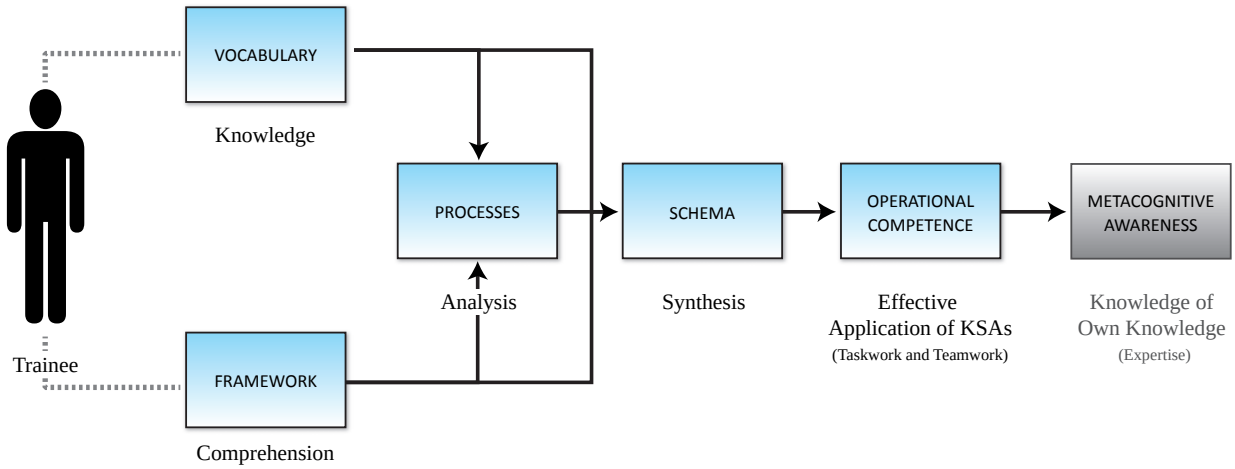


Figure 4.3. Diagram of a Generic Training Process (developed by Spiker, Schatz, Fautua, et al.)

Measures

Study 1

This field study used a "one-group, pretest/posttest" quasi-experimental design to assess the effects of the Border Hunter training intervention. That is, a single group of individuals was given the training intervention and multiple assessments, observations, and interviews were made prior to, during, and after the training to establish the effects of the intervention. The research team collected data from enrolled trainees, role-player "trainees," and the instructor SMEs. The researchers incorporated a variety of methods. Detailed results from these efforts are outlined in Chapters 5–8.

The 43 Border Hunter trainees completed, or were monitored via, the following apparatus:

- Demographics survey
- Cognitive attributes battery
- Declarative knowledge pre/posttest
- Photo vignettes pre/posttests
- Situated judgment pre/posttests
- Perceptual aptitude pre/posttests
- Heart-rate monitoring (level of awareness)
- Behavioral observation during field exercises
- Reactions surveys

The 22 role-player trainees completed:

- Demographics survey
- Profiling declarative knowledge pre/posttest
- Profiling photo vignettes pre/posttests
- Profiling daily reactions surveys

In addition, the six tracking instructors and nine profiling instructors completed structured interviews with two of the researchers, Dr. William Ross and Laura Militello. The instructors were also given the same cognitive battery that the trainees completed, with the hope of uncovering those innate traits that comprise an expert Combat Hunter instructor.

Study 2

The second study involved a longitudinal analysis of 12 trainees, who were followed for approximately two months in order to assess their training retention and retrospective reactions to the Border Hunter experience. These results are detailed in Section 9.

Study 3

Finally, the third study examined the organization impact of the Border Hunter training. Specifically, 40 personnel from the Army or Border Patrol were divided into Experimental and Control Groups. The

Experimental Group included those individuals who work closely with one of the Border Hunter attendees, which the Control Group included those who did not work with a Border Hunter attendee. The aims of this study were to determine whether any informal transfer-of-training occurred between the course attendees and their peers at their home station. Results from this study are outlined in Section 10.

Deliverables

The research team developed several deliverables, which are available through the USJFCOM:

- **Border Hunter Training Technical Report:** This integrated technical report includes sections on course content and execution, experimentation, results, and recommendations.
- **CODIAC Program of Instruction (POI):** The team developed high-level POI for *Combat Observation and Decision-Making in Irregular and Ambiguous Conflicts* (CODIAC) that includes a detailed syllabus and nine instructional units, based upon observation and analysis of the Border Hunter instruction.
- **CODIAC POI Resource DVD:** Supplementary materials are provided for the POI on an accompanying resource DVD. This DVD includes edited video clips obtained during the Border Hunter instruction and associated with specific modules in the POI.
- **CODIAC Student "Pocket Guide":** Key CODIAC instructional points are provided in a cargo-pouch friendly "pocket guide." Content and organization of the student pocket guide corresponds with the CODIAC POI.

Gaps Addressed

Earlier in this paper several recommendations for the current Combat Hunter curriculum were identified. The Border Hunter effort has taken positive steps towards addressing each of these. The products USJFCOM is developing, including the POI, resource DVD, and trainee pocket-guide, can help mitigate issues of training access, course throughput, and limited availability of take-home materials. Development of original measurement apparatus directly contributes to creating more formal performance metrics. Finally, the products, including the videos and technical report, can be used to help articulate Combat Hunter-style training to senior leaders.

Additional Contributions

This endeavor helped advance the science and research of irregular warfare training in several ways. Specific contributions include:

1. **Establishment of a baseline:** The results from the investigation established a baseline of qualitative and quantitative data against which other Combat Hunter-style training can be compared.
2. **Prototype metrics:** Original measurement apparatus were created and formatively evaluated during this study. In the future, these apparatus can be used by other researchers and/or trainers to assess similar courses.
3. **SME "gold standard" course of instruction:** The two primary Combat Hunter experts were able to administer the 20-day program of instruction that they considered ideal, with full logistical support (e.g., range access, billeting), in an attempt to deliver the optimal training experience.
4. **Mental models of the SMEs:** With no guarantee of indefinite access to all the subject matter experts involved in the development and teaching of the Border Hunter Course, as well as no existing tasks, conditions, or standards for performance, the development of an expert model of performance was a substantial contribution.
5. **Assessment of role-players:** Anecdotal remarks had suggested that the role-play trainees benefited from the experience. However, these

comments had not previously been empirically tested. This study evaluated role-play trainees on both Kirkpatrick's levels 1 and 2 (i.e., reactions and performance).

6. **Individual differences:** To our knowledge, before this study no attempt had been made to identify the traits that differentiate high performing trainees from others. This experiment takes a first step towards cataloging those attributes.

SECTION

5 Field Study – Trainees (Study 1)

The trainees participated in a range of quantitative and qualitative experimentation (see Section 4 for more detail on the experimental design). This section outlines the methodology, analysis, and results from 14 measures; it is divided into the follow subsections:

Section 5A: Participant Data

- Demographics survey
- Cognitive attributes battery

Section 5B: Reactions

- Daily reactions surveys
- Overall, culminating reactions survey

Section 5C: Learning

- Tracking declarative knowledge pre/posttest
- Profiling declarative knowledge pre/posttest
- Tracking photo vignettes pre/posttests
- Profiling photo vignettes pre/posttests
- Tracking situated judgment pre/posttests
- Profiling situated judgment pre/posttests

Section 5D: Behavior

- Tracking behavioral observation
- Profiling behavioral observation

Section 5E: Physiological Assessments

- Perceptual aptitude pre/posttests
- Heart-rate monitoring (level of awareness)

5a Participant Data

Demographics and Individual Differences

Forty-three Soldiers/Law Enforcement Agents attended the course. Of these, most were from the US Army (n = 21) and Border Patrol (n = 18). Two were from the FBI (n = 2), and both the Texas Rangers (n = 1) and Parks Services (n = 1) sent one attendee. All trainees were highly experienced, with an average of 9 years in the military and/or law enforcement sectors. To facilitate the many hands-on exercises, the trainees were divided into five 8–9 man teams. They remained in these teams for the full duration of the course. Teams 1 and 2 comprised Border Patrol Agents. Teams 3 and 4 comprised Soldiers, and Team 5's composition was mixed, including Soldiers, FBI agents, the Park Ranger, and the Texas Ranger.

Psychometric Scales

Three measures comprised a "cognitive battery" given to trainees (n = 43) as well as instructors (discussed in Section 7). The measures in the cognitive battery were selected because they were hypothesized to relate strongly to three main attributes expert Combat Hunters possess: attention to detail, critical thinking, and creativity. Participants were given 90 minutes to complete the battery.

The first measure given was the Work Personality Index (Macnab, D., & Bakker, S. 2001). The WPI as-

sesses 17 primary scales, categorized into five factors that provide a global view of personality (one of which being Attention to Detail). The second measure in the battery was the Watson-Glaser Critical Thinking Appraisal (Watson, G., & Glaser, E. 1994). This test focuses on five aspects of critical thinking, specifically: inference, recognition of assumptions, deduction, interpretation, and evaluation of arguments. The last measure in the packet was the Remote Associates Test (Mednick S, & Mednick M., 1962), which measures creativity. Creativity is measured by one's ability to find words that are distantly related to stimulus words. Participants were given a set of three words and asked to think of a fourth word that is related to all three words.

Psychometric Scales Results

Performance results were obtained from the trainees' Situated Judgment Test (SJT) (discussed later in this section), and regression analysis was run in order to determine if any of the above mentioned-variables could predict success in the course, as measured by the SJT. Unfortunately, none of the variables approached significance for predicting combat profiling or tracking success. However, tracking skills did show a positive relationship with several variables, thus indicating an increase in each variable was associated higher tracking skills. These variables were: Ambition ($r = .397$, $p < .05$); Concern for Others ($r = .42$, $p < .05$); Initiative ($r = .36$, $p < .05$); Self-control ($r = .41$, $p < .05$); Social Desirability ($r = .36$, $p < .05$), and Teamwork ($r = .48$, $p < .05$). Demographic variables were investigated for relationships to the criteria, and it was determined that neither age, service type, nor length of service were significantly related to trainees' combat profiling or tracking performance.

The main research question asked when administering these measures concerned the ability to predict what aptitudes successful trainees of the Combat Hunter program possessed in order select the best suited candidates for future training. The three aptitudes originally suspected to be associated with high performers were creativity, critical thinking, and attention to detail. At the present time, neither those attributes nor any other variable in the dataset were able to answer this question, although some trends were found in regards to tracking performance.

Figure 5.1. Trainees complete paper-based knowledge tests in the classroom

This inability to parse out "what success looks like" can be attributed to a few known factors. Firstly, having an population of fewer than 60 participants limited the statistical tests' ability to extract significant findings. Areas that approached significance may have been able to predict performance given a larger sample size. Secondly, while the tests themselves displayed high internal reliabilities, additional measures of similar constructs may have proven a fruitful pursuit in order to validate results. Furthermore, additional performance measures may aid in discovering additional relationships among the data. For instance, one added performance measure could be a training lane or exercise trainees are graded on alongside a written test. Thirdly, the scale results may have suffered from a "restriction of range" effect, since the Border Hunter trainees were advanced, experienced students. Correlations drop dramatically unless there is a true normal distribution of talent, which may have not been the case with this population.

In conclusion, though the current analyses are unable to successfully predict high performing trainees in a Combat Hunter course, adjustments to sample size, tests provided, and performance measures given may prove to show significance.

5b Reactions

Daily Reactions Surveys

Daily surveys were passed out to the trainees during the classroom instruction or field exercises, and they were collected by an experimenter at the end of each day. During the combat profiling scenarios, most trainees could not complete their reactions surveys after the long day of training in the field. Instead, trainees were given the opportunity to complete the surveys first thing on the next morning. Various numbers of trainees chose to complete the survey each day. On 25 April, the culminating reactions survey was distributed to the trainees before the graduation. Trainees were free to complete these surveys during the AAR discussion or during the two-hour down-time following the AAR. Forty-one (n = 41) trainees responded to the overall reactions survey.

Method

Reactions surveys were administered daily to the trainees, and they were also asked to complete a longer, response survey on the final AAR/graduation day. The daily reactions survey includes 12 seven-point items, which were *a priori* divided into four clusters: perceptions of utility, affective reactions, estimated bias based on the instructor, and perceptions of the instructional materials. They also included a single, seven-point item that asked about the overall quality of the day's instruction and a small space reserved for open-ended responses regarding the most and least valuable elements of the training (see Appendix D for details).

Results

First, to calculate the daily reaction scores, the reverse-scored items were rescored, so that 1 = negative reaction and 7 = positive reaction. Then, basic means and standard deviations were calculated for the four main categories of data (perceptions of utility; affective reactions; perceptions of the instructional materials such as handouts; and overall assessment of the training). In cases where a trainee failed to respond to a single answer, mean-replacement was used. Table 5b.1 lists the results of these analyses, and Figure 5b.2 shows a graph

Table 5B.1. Mean reactions, by category and day

Day	Topic	Overall	Utility	Affective	Materials
1	Intro to Combat Tracking	6.52	6.75	6.08	5.79
2	Micro-tracking	6.62	6.64	6.42	6.12
3	The tracking team	6.64	6.50	6.55	6.09
4	Rules of tracking	6.64	6.71	6.45	6.23
5	Lost spoor procedures	6.65	6.65	6.51	6.02
6	Back-tracking practice	6.69	6.59	6.28	6.14
7	Anti/Counter-tracking	6.67	6.70	6.53	5.99
8	Challenging practice	6.70	6.71	6.43	5.86
9	Urban tracking	6.90	6.87	6.60	6.20
10	Tracking FINEX	6.78	6.72	6.51	6.14
11	Intro to Combat Profiling	6.69	6.40	6.37	5.79
12	Terrorist planning cycle	6.74	6.54	6.34	5.78
13	Six domains of Profiling	6.55	6.45	6.35	5.83
14	Six domains (continued)	6.56	6.50	6.42	5.83
15	Practical application	6.54	6.64	6.35	5.79
16	Observation lane training	6.69	6.48	6.42	5.87
17	Scenarios 1-5	6.61	6.45	6.57	5.92
18	Scenarios 6-10	6.28	6.45	6.48	5.67
19	FINEX	6.77	6.51	6.58	5.84

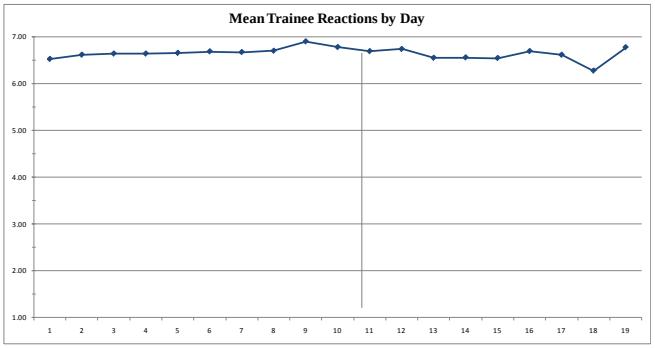


Figure 5B.2. Mean overall reaction scores, by day

of the daily overall reactions.

The daily results clearly illustrate that both military and law enforcement trainees greatly *enjoyed* (affective response to training), felt that the training was *useful* (perceived utility of the training), and overall were pleased with the instructional experience. These results hold true for both military and law enforcement participants (see Appendix D for details).

Final Reactions Surveys

Response Scales

The culminating reactions survey included five Likert-style questions for both combat tracking and combat profiling. Again, 1 = negative reaction and 7 = positive reaction. Basic means and standard deviations were calculated for these items and are shown in Table 5b.2 lists the results of these analyses and Figure 5b.3 shows depicts them in graph form.

Free-Response Questions

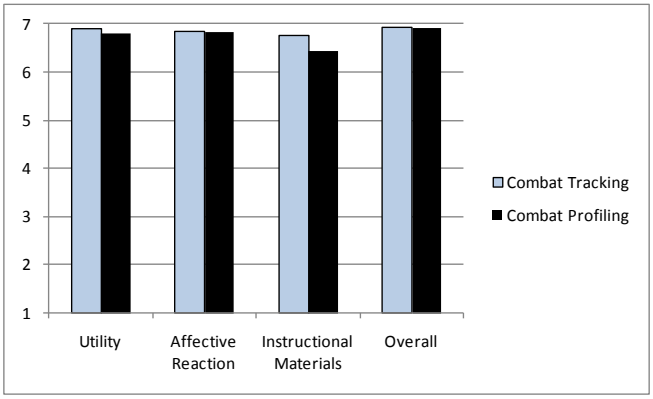


Figure 5B.3. Final comprehensive trainee reaction scores, by category and instruction

The final reactions surveys also included eight open-ended questions. They asked:

- If you could improve one logistical issue about the Combat Tracking...
- If you could improve one instructional issue (i.e., not logistical) about the Combat Tracking...
- If you could improve one logistical issue about the combat profiling...
- If you could improve one instructional issue (i.e., not logistical) about the combat profiling...
- If you could enroll your personnel in a 20-day Border Hunter course, would you do so?
- Do you intend to teach your teammates at home any of the Border Hunter content?
- What was the most useful lesson you learned during Border Hunter?
- If you could make one improvement to Border Hunter, what would you change?

The complete wording and trainee responses to these questions are provided in Appendix D. Additionally, a summary of the responses is provided below.

Results

The final reactions results indicate that the trainees judged both the combat tracking and combat profiling training as *very useful*, *very enjoyable*, and *extremely good*, overall. They also responded positively to the instructional materials.

The open-ended comments suggest that most frustrating logistical issues for entire course were:

- Trainees wanted days off
- Time was wasted driving to the range

Table 5B.2 Overall reactions to the Border Hunter 20-day course (scored out of 7)

Phase	**Utility:** The instruction was useful. I can use it in my job (at least in the field).	**Affective Reactions:** I enjoyed the instruction.	**Materials:** The instructional materials (e.g., slides, handouts) were good.	**Overall:** Overall, I would rate the course...
Combat Tracking	$M = 6.90$, $SD = 0.30$	$M = 6.85$, $SD = 0.36$	$M = 6.76$, $SD = 0.43$	$M = 6.93$, $SD = 0.26$
Combat Profiling	$M = 6.80$, $SD = 0.41$	$M = 6.83$, $SD = 0.45$	$M = 6.45$, $SD = 1.01$	$M = 6.92$, $SD = 0.27$

- Too much time was wasted waiting for the gate to be opened for range access

The comments suggest that the tracking instruction would have been improved by:

- Using more varieties of terrain
- Including more tactically focused scenarios (e.g., with role-players and engagements)
- Including additional long (or even multi-day) tracking exercises

Also, the comments suggest that the profiling instruction would have been improved by:

- Including real-world profiling exercises (e.g., at the El Paso mall)
- Improving the profiling handouts
- Including more law enforcement examples and scenarios

The trainees overwhelmingly reported that, if they were in a supervisory position, they would send their personnel to a similar course. Many of the trainees indicated that they felt the Border Hunter course material would save lives, make personnel harder targets, or increase their survivability. Similarly, most of the trainees indicated that they planned to teach the Border Hunter material—either formally or informally—to their teammates at their home stations.

As for which aspects of the instruction they found most valuable, many trainees indicated that learning about human behavior through the combat profiling instruction was key. Other popular answers included:

- Combat profiling and human behavior
- Learning to act left-of-bang
- Combat Tracking
- Being able to articulate their tacit knowledge

Finally, the trainees most often suggested that the following should be changed:

- Days off
- More time dedicated to hands-on exercises
- More training time, in general
- More law enforcement examples and scenarios

Overall, based upon these reactions, the Border Hunter experience appears to have been outstanding. In the words of one of the trainees: the course was "definitely outstanding/superb/excellent."

5C Learning

Declarative Knowledge Test

In order to directly measure what the trainees were able to learn from the Border Hunter training, tests to examine declarative knowledge about specific Border Hunter topics were created. Declarative knowledge is factual knowledge that is assertion-oriented, rather than procedural. Thus, declarative knowledge tests measure the ability to describe a process, but not necessarily the ability to actually perform the process. Identical pre- and posttests were administered for both the combat tracking and human terrain content. Forty-two trainees completed the pre- and posttests.

Methods

Materials

The declarative knowledge tests for tracking and profiling were developed by researchers familiar with the course content, and the apparatus were validated by a Border Hunter SME for each topic area. The tests included a combination of objective true/false, multiple choice, and fill-in-the-blank questions. A maximum score of 30 points was possible for each test.

Administration

For each topic area, the pretest was administered prior to the start of instruction, and the posttest was administered at the conclusion of the instruction period for each area. Trainees were given a maximum of 20 minutes to complete each test.

Results

Combat Tracking

Mean and standard deviation were computed for the tracking declarative knowledge pretest and posttest scores (measured as percent correct) across all trainees who completed both tests (n = 42). The mean pretest score was 27% correct (SD = 11.9), and the mean posttest score was 76% correct (SD = 12.5) (see Figure 5C.1). A paired samples t-test revealed a statistically significant increase in scores between pretest and posttest, $t(41) = 26.82$, $p < .01$, indicating an increase in declarative knowledge following tracking instruction.

Descriptive statistics were also computed separately by agency. Trainees were classified Army (n = 21), Border Patrol (n = 17), or "Other" (n = 4). The "Other" category encompassed all trainees who were not Army or Border Patrol and included two FBI Agents, one Texas Ranger, and a Park Ranger. Mean tracking pretest scores for Army, Border Patrol, and Other were 25% correct (SD = 13.4), 32% correct (SD = 9.8), and 23% correct (SD = 6.0), respectively. Mean track-

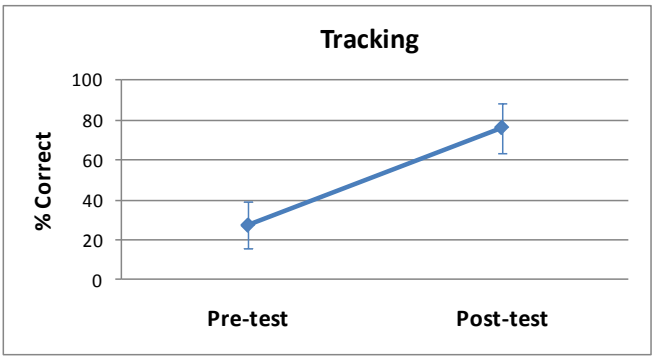


Figure 5C.1. Mean tracking declarative knowledge pretest and posttest scores for all trainees. Error bars are standard deviations.

Figure 5C.2. Mean tracking declarative knowledge pretest and posttest scores by agency. Error bars are standard deviations.

ing posttest scores were 75% correct (SD = 14.1) for Army, 77% correct (SD = 11.5) for Border Patrol, and 77% (SD = 8.9) for Other. These means and standard deviations displayed in Figure 5C.2.

In order to assess any differences between agencies, a two-way (Agency; Army or Border Patrol x Training; pre- or post-) mixed-model repeated measures ANOVA was conducted. (The "Other" category of trainees was not included in this analysis due to the small number of trainees in this group.) There was a significant effect of Training, $F(1,36) = 625.59$, $p < .01$. The effect of Agency was not statistically significant, nor was the interaction between Training and Agency. These results indicate that while posttest scores were significantly greater than pretest scores for both groups, there were no significant differences between trainees from the two agencies in either pretest or posttest scores, or in the relative change in scores.

Observation and Combat Profiling

Mean and standard deviation were computed for the combat profiling and observation declarative knowledge pretest and posttest scores (measured as percent correct) across trainees who completed both tests ($n = 42$). The mean pretest score was 32% correct (SD = 6.9), and the mean posttest score was 84% correct (SD = 15.1) (see Figure 5C.3). A paired samples *t*-test was conducted on the pretest and posttest scores. Results revealed a statistically significant difference between pretest and posttest scores, $t(41) = 24.32$, $p < .01$, indicating increased declarative knowledge following instruction.

As with the tracking declarative knowledge test results, descriptive statistics were computed separately by agency for the observation/profiling results. Mean pretest scores for Army, Border Patrol, and Other were 30% correct (SD = 6.7), 33% correct (SD = 7.3), and 29% correct (SD = 5.0), respectively. Mean posttest scores were 80% correct (SD = 18.4) for Army, 89% correct (SD = 9.4) for Border Patrol, and 84% (SD = 11.3) for Other. The pretest and posttest means and standard deviations for Army, Border Patrol, and Other are displayed in Figure 5C.4.

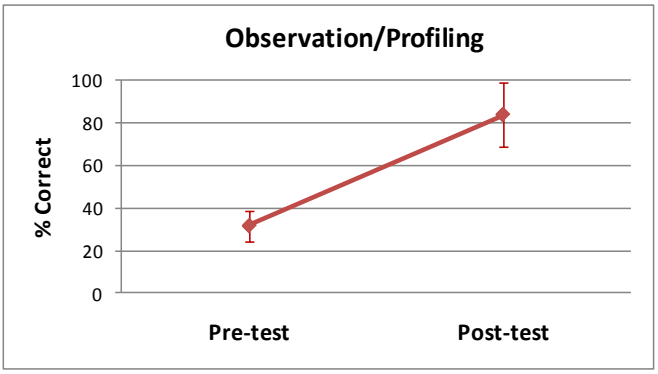


Figure 5C.3. Mean observation/profiling declarative knowledge pretest and posttest scores for all trainees. Error bars are standard deviations.

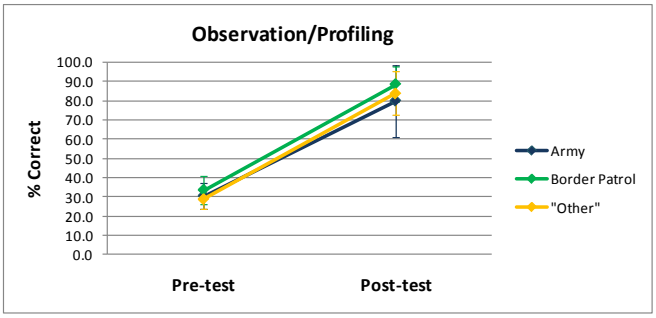


Figure 5C.4. Mean observation/profiling declarative knowledge pretest and posttest scores by agency. Error bars are standard deviations

In order to assess any differences between agencies, a two-way (Agency; Army or Border Patrol x Training; pre- or post-) mixed-model repeated measures ANOVA was conducted on these data. Again, the "Other" category of trainees was not included in this analysis due to the small number of trainees in this group. There was a significant effect of Training, $F(1,36) = 518.66$, $p < .01$. The effect of Agency was not statistically significant, nor was the interaction between Training and Agency. These results are similar to those found for the tracking declarative knowledge tests. The results indicate that while posttest scores were significantly greater than pretest scores for both groups, there were no significant differences between trainees from the two agencies in either pretest or posttest scores, or in the relative change in scores. Although mean pre- and posttest scores of Border Patrol trainees were higher

than those of Army trainees, these differences were not statistically significant.

Discussion

Border Hunter trainees' declarative knowledge test scores were significantly higher for both tracking and observation/profiling posttests than for the associated pretests. Similar gains were achieved regardless of the agency represented by the trainee. Role-players (discussed in Section 6) also showed pre- to posttest increases in test scores; however, their gains were not as large as those of the enrolled trainees. The increased declarative knowledge test scores following Border Hunter instruction indicate that individuals left the course with a greater understanding of Border Hunter terminology and concepts.

Declarative knowledge testing was also conducted as part of the Combat Hunter Trainer Course (CHTC) held at Camp Pendleton, CA in April 2009. The course included 39 Marines ranging in rank from NCO to officer, plus two civilians from the I-MEF Advisor Training Group. The declarative knowledge tests for the CHTC were similar to those used in the Border Hunter course in that they were designed to assess knowledge of key terminology and concepts, and included objective multiple choice and fill-in-the-blank type questions. However, no pretests were used in the CHTC study; declarative knowledge tests were only conducted at the end of each portion of the course.

Mean scores for the tracking and profiling tests in the CHTC were 99% correct and 94% correct, respectively. These scores are somewhat higher than the 76% and 84% correct posttest scores for Border Hunter trainees in tracking and observation/profiling, respectively. There are a number of possible explanations for this difference, including differences in trainees' experience or prior exposure to the content, differences in test items, and differences in course structure and/or instruction. Without pretests for the CHTC and an explicit comparison of the course and tests, it is difficult to determine the source of the difference in scores. However, the fact remains that test scores from both the CHTC and the Border Hunter course indicate that trainees leave the course with knowledge of terminology and concepts that are central to the topic areas.

Photo Vignette Assessment

Building upon previous findings regarding the effectiveness of Combat Hunter training of language and reporting (see Kobus et al., 2009), PSE created a photo vignette assessment for the Border Hunter program. In collaboration with the training SMEs, still images (photographs) with the appropriate characteristics for combat tracking or profiling were identified. We hypothesized that the Border Hunter training would decrease the use of descriptive language, while increasing the use of meaningful language and Border Hunter terminology for tracking and profiling. In addition, we hypothesized that the Border Hunter training would increase the intelligence value of the participants' reports.

Method

Combat Tracking

The PSE research team took photos of possible tracking situations in a variety of different environmental areas. All photos were sent to the Tracking SME to identify three that could be used for the photo vignette assessment.

During administration, the three tracking photos selected were presented one-at-a-time to trainees, on multiple large screens in front of the class. Each photo was displayed for five minutes. Trainees were required to view each photo and write a description (during the five minutes that the photo was displayed) of the scene they were observing. Trainees were instructed to include information that they would want to provide to higher command and to use any format (bullet points, paragraphs, etc.) they wished. Trainees completed reports to the three different photos in succession, and they completed the photo vignette assessment twice, with the same three photos, first prior to being ex-

posed to any of the tracking course material (pretest), and again after the completion of the tracking phase of the course (posttest).

Figure 5C.5 displays the first photo, in which tracks were made on a beach by two individuals. The gender of the tracks can be readily identified. The tracks on the left are from a male, the tracks on the right are from a female. It is also apparent that the individual on the left is heavier than the individual on the right. They appear to have walked down the beach together.

Figure 5C.6 displays the second photo used for the Tracking photo vignette assessment. Four sets of tracks are present; two of the individuals walked together, going from left-to-right. Another individual went through the first two sets of tracks, and the fourth walked across the path of the other three tracks. These tracks appear to have been made at different times—thus they are not all traveling together.

The last photo is shown in Figure 5C.7. It depicts a grassy, wooded area near a dry river bed. An individual was traveling down the hill, slid on both feet and fell to their right. Their hand hit the ground on their right (left as viewed) as they continued to slide and fell a bit more to their right, picking up their hand and then forming another hand print. The individual stood back up at the bottom of the hill.

Figure 5C.5. First photo displayed to trainees for the tracking photo vignette assessment

Figure 5C.6. Second photo displayed to trainees for the tracking photo vignette assessment

Combat Profiling

Photographs for the profiling photo vignette assessment came from a variety of sources including the Profiling SMEs' database, a UCF research team member, and from online resources. Again, a profiling SME was contacted for review, and he selected three photos to use in the assessment.

The photos were presented on multiple large screens in a large classroom; each photo was displayed for 45 seconds before the screen went blank. Trainees then had five minutes to produce a written description of the photo. (This procedural difference from the tracking photo vignette assessment was due to the fact that profiling observations often occur for dynamic situations, whereas tracking observations often involve static footprints or other spoor.) At the end of the five

5C.7. Third photo displayed to trainees for the tracking photo vignette assessment

minutes, the second photo was shown and the procedure continued until the trainees had responded to all three photos.

Just as for the tracking photo vignette assessment, trainees were instructed to include information that they would want to provide to higher command and to use any format (bullet points, paragraphs, etc.) they wished. Again, the assessment was conducted twice; once, prior to the start of the profiling/observation portion of the course (pretest), and once at the completion of the entire course (posttest).

Figure 5C.8 shows the first photo, which depicts a group of children outside of a building. The children appear to be lookouts for someone, and the boy in the middle chewing on a pencil is their leader. There are three children mimicking using binoculars suggesting they are the ones chosen to observe and report back to the leader. The boy on the top of the stairs is scared or nervous and is using the stairs as a barrier between him and the group who is taking the photo. The girl holding the child in the center is welcomed in this group, and while not a lookout, is unsure of whoever is taking the photo. This appears to be an *anchor point* for this group. The area around them is clean, suggesting that they frequent this area.

Figure 5C.9 shows a meeting between US personnel and a local of some importance in the local's home. An incident appears to have just occurred between the local and the US Major that was not positive, as can be seen by the *proxemic push* the local is displaying.

The third photo (see Figure 5C.10) shows a group of people in a marketplace. Something has occurred off-camera to the right that is creating a *proxemic pull*, drawing almost everyone's attention in that direction. The *heuristics* of the crowd and their facial expressions suggest that whatever has occurred off-camera has them concerned or wary. Two of the individuals in the crowd are not concerned with whatever is going on off-camera and instead are focused on the individual taking the photo.

Figure 5C.8. First photo displayed for the profiling photo vignette assessment (photo courtesy of Tracy St. Benoit)

Figure 5C.9. Second photo displayed for the profiling photo vignette assessment (photo courtesy of Tracy St. Benoit)

Figure 5C.10. Third photo displayed for the profiling photo vignette assessment (photo courtesy of Tracy St. Benoit)

Analysis

All photo vignette assessment responses were given to an Intelligence Analyst for a content analysis of *Descriptive* (e.g., "two tracks on a beach") and *Meaningful* (e.g., "tracks were made by two males") information, and the use of Border Hunter Terminology (e.g., quarry, spoor, proxemic push, anchor point). A decrease in purely Descriptive information and an increase in Meaningful information between the pre- and post-training responses indicates improved information quality. The number of instances of Descriptive or Meaningful information, and of Border Hunter Terminology in the trainees' responses was tabulated. A response could only be counted as Descriptive or Meaningful, but not both. If a response that was Descriptive or Meaningful and contained Border Hunter Terminology, it was then also counted as an instance of Border Hunter Terminology.

Group means were calculated for each content analysis category (Descriptive, Meaningful, or Terminology), separately for pretests and posttests for both tracking and profiling. One-way repeated-measures ANOVAs were run for each measure to determine whether information content significantly changed between pre- and post-training responses. Additional analyses (two-way ANOVAs) were conducted to determine whether there were any inter-Agency differences within the trainees' responses. This analysis included only the two largest trainee groups, US Army (n = 21) and Border Patrol (n = 17).

The Intelligence Analyst also used a seven point Likert scale (1 = Not at all useful to 7 = Very useful) to rate the intelligence value of the information provided in the tracking and profiling photo vignette assessment responses. Intelligence value was based on two factors:

1. Whether the information provided insight into what likely had occurred in the photo
2. Whether the information provided would generate further questions or follow-up actions

Participants were not informed that their responses would be evaluated using this method. Mean rating of intelligence value was computed across responses to the three tracking photos and to the three profiling photos, separately for pre- and posttest responses. One-way repeated measures ANOVAs were computed to test for differences between the pre- and posttest means for tracking and profiling. In addition, for the trainees only, two-way mixed ANOVAs (Agency X Test) were computed for Tracking and Profiling to test for differences between the trainees representing the US Army and those representing the US Border Patrol.

Table 5C.1. Tracking photo vignette assessment content analysis results for all trainees (n=42)

Response Type	Pre-Training Group Mean	Post-Training Group Mean	Statistical Significance
Descriptive	2.15	1.89	$p > .05$
Meaningful	2.97	3.56	$p < .05$
Terminology	0.29	1.37	$p < .05$

Results

Combat Tracking

The three separate one-way ANOVAs on trainees' tracking photo vignette assessment responses revealed that Meaningful information and use of tracking terminology significantly increased after the Border Hunter training. Descriptive content decreased, but the difference between pre-training and post-training responses was not statistically significant. The mean number of instances of each response type, pre- and post-training, is displayed in Table 5C.1, along with the one-way ANOVA results for pre- vs. post-training differences in responses of each type.

Two-way ANOVAs to assess inter-Agency differences revealed a statistically significant interaction between Agency and Test for the Descriptive variable $F(1, 36) = 4.68$, $p < .05$ (See Figure 5C.11). Group means indicate that the Descriptive content of the Army responses decreased, whereas the Descriptive content of the Border Patrol responses increased slightly between the pre- and posttests. None of the other effects of Agency or interactions between Agency and Test were

statistically significant. Table 5C.2 displays the mean number of responses of each type, pre- and post-training for each group of trainees, as well as the results of the ANOVAs.

Combat Profiling

The three separate one-way ANOVAs on profiling photo vignette assessment responses revealed that the Descriptive content of the trainees' Profiling photo vignette assessment responses significantly decreased between the pre- and posttests, while Meaningful content significantly increased. Use of profiling terminology also increased significantly. The mean number of instances of each response type, pre- and post-training, is displayed in Table 5C.3, along with the one-way ANOVA results for pre- vs. post-training differences

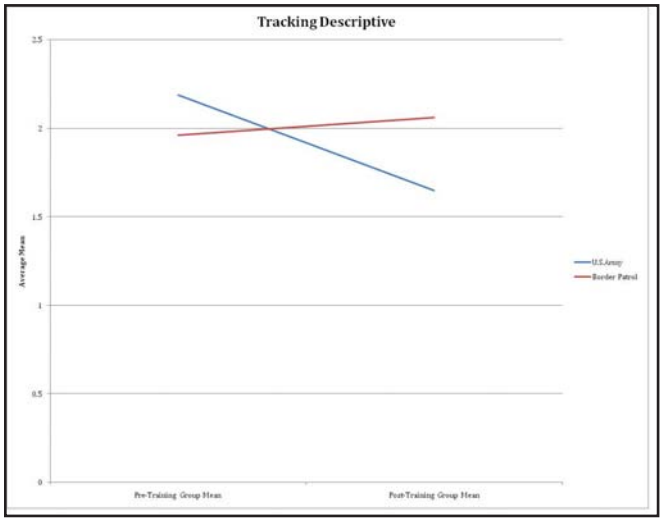


Figure 5C.11. Interaction between Agency and Test for tracking photo vignette assessment descriptive content

Table 5C.3. Profiling photo vignette assessment content analysis results for all trainees (*n* = 42)

Response Type	Pre-Training Group Mean	Post-Training Group Mean	Statistical Significance
Descriptive	2.93	1.37	$p < .05$
Meaningful	1.98	3.09	$p < .05$
Terminology	0.47	1.18	$p < .05$

Table 5C.2. Tracking photo vignette assessment content analysis results for trainee agency comparisons (n=38)

	US Army		Border Patrol		Interaction
Information Type	Pre-Training Group Mean	Post-Training Group Mean	Pre-Training Group Mean	Post-Training Group Mean	Statistical Significance
Descriptive	2.19	1.65	1.96	2.06	$p < .05$
Meaningful	2.95	3.73	3.12	3.37	$p > .05$
Terminology	0.27	1.38	0.33	1.41	$p > .05$

Table 5C.4. Profiling photo vignette assessment content analysis results for trainee Agency comparisons (*n*=38)

	US Army		Border Patrol	
Response Type	Pre-Training Group Mean	Post-Training Group Mean	Pre-Training Group Mean	Post-Training Group Mean
Descriptive	2.59	1.06	2.88	1.80
Meaningful	2.24	3.51	1.76	2.63
Terminology	0.31	1.36	0.08	0.98

in responses of each type. The results of the two-way ANOVAs testing for differences between trainees representing the US Army and trainees representing the US Border Patrol indicated that no statistically significant differences existed between the groups' pre- and post-training responses. This finding suggests that the training had similar effects in both groups and that single group did not skew the results for the group as a whole. Table 5C.4 displays the mean number of responses of each type, pre- and post-training for each group of trainees.

Intelligence Value

Tracking. The one-way repeated measures ANOVA on the Intelligence Analyst's ratings of trainees' tracking responses revealed that the intelligence value of the responses increased significantly from pre- to post-training. Mean pre- and post-training ratings are displayed in Table 5C.5, along with the results of the ANOVA.

Table 5C.5. Results of pre and post training intelligence value ratings for trainees' tracking responses

Pre-Training Group Mean	Post-Training Group Mean	Statistical Significance
4.60	6.06	$p < .05$

The two-way mixed ANOVA revealed no statistically significant difference in rated intelligence value between tracking responses of trainees in the two Agencies (see Table 5C.6).

Table 5C.6. Results of pre and post training intelligence value ratings for US Army and Border Patrol tracking

US Army Group Means		Border Patrol Group Means		Interaction
Pre-Training	Post-Training	Pre-Training	Post-Training	Statistical Significance
4.52	6.06	4.80	6.08	n.s.

Profiling. The one-way repeated measures ANOVA on the Intelligence Analyst's ratings of trainees' Profiling PVA responses revealed that the rated intelligence value of the responses increased significantly from pre- to post-training. Mean pre- and post-training ratings are displayed in Table 5C.7, along with the results of the ANOVA.

Table 5C.7. Results of pre and post training intelligence value ratings for trainees' profiling responses

Pre-Training Group Mean	Post-Training Group Mean	Statistical Significance
3.52	5.57	$p < .05$

The two-way mixed ANOVA revealed no statistically significant difference in rated intelligence value between Profiling PVA responses of trainees in the two agencies. Mean pre- and post-training response ratings for each group are displayed in Table 5C.8, along with the results of the ANOVA.

Table 5C.8. Results of pre and post training intelligence value ratings for us army and border patrol profiling responses

US Army Group Means		Border Patrol Group Means		Interaction
Pre-Training	Post-Training	Pre-Training	Post-Training	Statistical Significance
3.76	5.91	3.29	5.29	n.s.

Discussion

To evaluate whether an individual's language and reporting skills improved with Border Hunter training, a photo vignette assessment was administered. The written responses generated by trainees were assessed for Descriptive and Meaningful content, tracking and profiling terminology, and intelligence value. The results of this administration were similar to those obtained by Kobus et al. (2009) during the 2009 Combat Hunter Trainer Course. Specifically, there was a decrease in Descriptive content accompanied by an increase in Meaningful content, as well as increased use of course terminology. In addition, post-training responses were assessed by an experience Intelligence Analyst as having greater intelligence value than pre-training responses.

These findings speak to an individual's ability to

effectively communicate and report information in two ways. The first is that the increased use of tracking and profiling terminology suggests that a common language had begun to develop over the course of training. This finding is significant because language and perception are intimately tied to understanding a situation and communicating information. Without a common language between the sender and recipient, there is great risk for misinterpretation of information, or for information to be disregarded because the message is not clear.

The other evidence of increased ability to communicate and report information comes from the analysis of Descriptive vs. Meaningful content, as well as the assessment of intelligence value. Descriptive information content decreased post-training, whereas Meaningful information content increased. This was accompanied by an increase in assessed intelligence value of the information. While Descriptive information can be useful or important, it does not necessarily provide an interpretation of observations that takes into account their context and relevance. Such Meaningful information is crucial for providing good intelligence and situation awareness to adjacent forces and higher command, which don't have the benefit of baseline information about an area or situation that provides the basis for an assessment.

Situated Judgment Test

Situated Judgment Tests (SJTs) are low-to-moderate fidelity simulations or work-samples that assess preferences for appropriate behaviors in a work setting (Gessner & Klomoski, 2006). While SJTs have long been used in industrial settings for job selection or job placement, their use as a source of proficiency data from field training settings is more limited. Because SJTs have been shown to correlate moderately with performance (McDaniel, Morgeson, Finnegan, Campion, & Braverman, 2001), we elected to use this method in the Border Hunter project as a way to assess degree of learning in the field training exercises for both combat tracking and combat profiling.

Method

Each SJT was administered to the trainees as a group during academic class time. In the case of combat tracking, the pretest was administered on the morning of Day 3, where that afternoon was to be the first full-fledged field training exercises. The posttest was administered on the morning of Day 10; this followed the tracking final exercise (FinEx) on the previous day.

For combat profiling, the pretest was administered on the morning of Day 16, just prior to their afternoon observational training in the field. Thus, it was at the end of academic training and marked a clean break point for delimiting further knowledge gains due to field training. The posttest was administered on the last day of the course, Day 20, where it, too, was administered to the class as a group and interspersed with a number of other tests that were rounding out the extensive battery of assessment instruments.

Trainees received one of the two versions of the pretest, A or B, on a random basis, with half receiving each version. They received the same version of the test for the posttest. We elected to give them the same version since (a) there was no feedback given following the pretest; (b) they were taking many other tests besides the SJT, so memory was likely not to be much of a factor; and (c) having trainees receive two different versions of the test on pretest and posttest was not deemed advisable since we were not able to control for test difficulty as we did not have the SME "answer keys" until after the testing was over.

During test administration, the Anacapa researcher gave trainees a brief synopsis of the purpose and format of the test, basically paraphrasing the instructions that were printed on the front of the test. Approximately 20 minutes were allotted for completion of the six scenario items. Most trainees completed the test within 10-15 minutes, although there were typically 3-4 trainees who required the full time allotment.

SJT Scoring

To acquire the expert responses, Anacapa researchers administered each version of the SJTs to the instructor

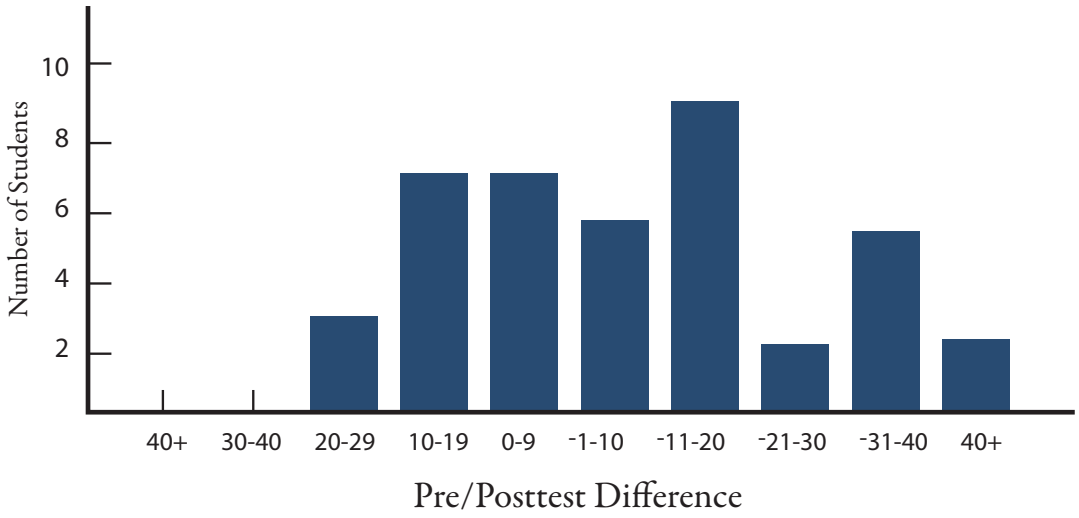


Figure 5C.12. Frequency distribution of pretest/posttest difference scores

SMEs during the instructor's down-time. For combat tracking, all six instructors completed versions A and B of the SJT. For combat profiling, we worked with Greg Williams to identify four SME instructors; these individuals then took the test and provided ratings for all of the response options.

At the conclusion of the course, we entered the SJT data for each trainee and each instructor into an Excel file, where separate tallies were maintained for versions A and B of each test. To generate the "answer key," we analyzed the data file for the response option ratings for the six tracking and four profiling instructors who took the test at approximately the same times as the trainees. To create this key, we needed to compute the SME aggregate rating for each response option for each scenario item. We used the following logic to do this:

For the tracking SJTs, we compared the ratings for the two senior SMEs, and when they agreed, we used that value. If they disagreed, we tended to go with the rating provided by the lead SME. However, if the ratings from the other four instructors tended to strongly agree with the second SME, we would go with the second SME's rating. If the two senior instructors' ratings differed by 2 points, which was rare, we would use the average rating unless there was a consensus from the other instructors that ended to favor one of the senior instructors over the other.

A similar logic was used for combat profiling, where we used the ratings from the two senior SMEs as the primary basis, with a higher weighting given to the lead instructor. As with Tracking, we used whole numbers for the aggregate rating, where the ratings of the other two instructors were used to break ties or favor one of the senior instructor's ratings when the two lead instructors' ratings differed notably. Again, marked differences between the two lead instructors was uncommon. For three-fourths of the items, they were either in complete agreement or differed by one. Of the other 25%, we used the mid-point of their two ratings virtually all of the time.

To compute a score for each subject, we used the sum of the squared deviations from the SME "answer key" as recommended by Weekley et al. (2006). For example, suppose a subject produced the following ratings to a scenario item, where the corresponding SME aggregate rating is in parentheses:

Option-1: 3 (2)
Option-2: 1 (3)
Option-3: 4 (4)
Option-4: 3 (5)
Option-5: 1 (4)
Option-6: 5 (2)

The subject's score for that item would be:

$$(3\text{-}2)^2 + (1\text{-}3)^2 + (4\text{-}4)^2 + (3\text{-}5)2 + (1\text{-}4)^2 + (5\text{-}2)^2 = 1 + 4 + 0 + 4 + 9 + 9 = 27$$

His total score would then be the sum of these option scores across all six items. With this scoring method, underestimates and overestimates of the SME rating are weighted equally, where extreme deviations are weighted more heavily (by the square). Higher scores correspond to worse performance since they are more discrepant from the SME's assessment of the problem decision options.

To determine degree of learning, or performance improvement during the field training exercises, we computed each subject's difference score as their posttest score minus pretest score. With this method, negative scores correspond to improved performance on the posttest.

Results

Combat Tracking

A complete set of pretest/posttest data were collected from 42 trainees; one trainee was dropped because he was not available for the posttest. The complete set of data for all trainees, scenarios, and response options is provided in Appendix E.

Table 5C.9 presents the average difference score, across both versions of the tests. This was -6.6, indicating that the posttest scores were lower than pretest; hence, there was evidence of learning. Statistically, this was supported by a paired *t*-test, where $t = 2.18$, $p <$ 035, df = 41. If we eliminate from consideration one response option on one of the tests where the two primary SMEs were in stark disagreement, the results are more clear-cut, with the average difference increasing to -7.8 and $t = 2.229$, $p < .011$, df =40.

Table 5C.9. Trainee scores on the combat tracking SJT pretest and posttest

Average SJT Pretest	Average SJT Posttest	Difference Score
102.2	95.6	-6.6

In any analysis of group differences it is important to determine whether the effect resides in a disproportionately large impact on a few subjects or whether it reflects a smaller but more consistent change across multiple subjects. To that end, we portray the pretest/posttest differences, by trainee, as a frequency distribution shown in Figure 5C.12. The frequencies correspond to the number of trainees who had differences in the various difference bins, starting with +40 and progressively decreasing in bins of size 10.

Examination of the frequency distribution gives us some clue about the locus of the effect in the SJT data. In particular, we see that there are no instances where trainees scored extremely high (a positive difference score of 30 or more) on the pretest relative to the posttest. On the other hand, looking at the right hand side of the distribution, we see that there were seven subjects who had large decreases in their SJT score on the posttest, producing differences of -30 or greater. Thus, the effect of the field training exercises experience seems to be to "calibrate" those trainees whose initial (pretest) judgments were extremely askew from the modal representation of the SME instructors. This would appear to be a highly desirable outcome and is something that one would want to happen over the course of the long treks during the afternoon outdoor tracking scenarios.

Combat Profiling

A complete set of pretest/posttest SJT data were collected from 40 trainees; two trainees were dropped from the analysis due to failure to follow the test instructions in one case and incomplete responses in the other. The complete set of data for all other trainees, scenarios, and response options is provided in the Appendix E.

Table 5C.10 presents the average difference score, across both versions of the tests. The average posttest score was lower, by an average of -3.7; this is a substantially smaller difference than we observed with combat tracking. Applying a within-subject (paired) *t*-test to the data, we find that $t = 1.144$, $p < .26$, df = 39. Thus,

the results, while trending in the right direction, fail to meet the test of significance. It should be noted that the average performance of trainees was much better overall in combat profiling, where the average scores were in the low-to-mid 60's compared to the mid-to-high 90's for combat tracking (this is covered in more detail in the discussion). This higher performance may have masked the impact of significant improvements in SJT performance by the time of the posttest.

Table 5C.10. Trainee scores on the combat profiling SJT pretest and posttest

Average SJT Pretest	Average SJT Posttest	Difference Score
65.2	61.5	-3.7

Limitations of the SJTs

While the SJTs worked amazingly well given the rapid ramp-up time and the time constraints on development, there are some limitations to the SJTs, both as a testing method and the specific versions used here.

First, we were not able to generate a wide mix of effectiveness options for all scenario items. Although that was our intent, examination of the aggregate SME ratings reveals that some of the items tended to have more middle-range items, i.e., ones with a rating of 2, 3, or 4, with fewer options that were rated as "1" or "5." If we take as our target goal that each scenario item should have had at least two of its six response options rated as "1" or "5" by the SMEs, then only 5 out of 12 scenario items achieved that goal for the profiling SJT. The corresponding number was 9 out of 12 for the tracking SJT. A consequence of this greater "bunching up in the middle" is a reduced chance of having extreme scores generated by subjects having assessments more askew from the instructors. Perhaps not surprisingly, because profiling had a lower incidence of extreme SME ratings, it failed to show a significant improvement in posttest performance.

Second, it was clear from feedback we received from the trainees, both from comments on the tests themselves and from statements they made, that they would have liked to have more information provided in the scenarios. While there is a fine line between putting enough information in the scenario to support evidence-based inferences and adding verbiage that begins to tax reading ability, we probably erred on the side of the former. This was especially true for the profiling SJTs, where we relied on the ville sketch to provide some of the information the trainees were to use in each scenario. While we believe we were successful in inducing judgment-based inferences, there perhaps should have been additional information included that would have helped them judge what could and could not be seen from each observation point. This undoubtedly discouraged some trainees and, we suspect, hindered their performance.

Third, it was clear that by the end of the Border Hunter course, trainees were suffering from "test-taking fatigue." We certainly saw this in the profiling SJT posttests of some trainees, who were starting to breeze through the items and failing to differentiate among the response options. When trainees reach this point, subtle phrasing differences in the options are missed, and many options are treated the same and rated accordingly. We know that in the case of at least some half dozen trainees' tests, this fatigue factor was hurting their performance, enough so that any chance of seeing a significant improvement in posttest performance by virtue of field training exercises experience was lost. In future evolutions of the Border Hunter course, and associated use of the SJT testing method, one should avoid assigning a large number of tests—four were administered in the first two hours of the last day of the course—on a given day.

Fourth, while we believe that we had fairly good coverage of key topic areas in the SJTs, we cannot conclude that all important topics were covered nor was the coverage a representative sampling of the skills required in the two portions of the course. For that determination, a more systematic decomposition of the course POI would be needed, where the selection of scenario topics and response option representations would need to be verified by a careful, iterative SME review. Rapid ramp-up of the Border Hunter course

and the on-going development of field training exercises POI prevented such detailed topic decomposition, though we do believe that our scenario specifications were technically accurate and certainly consistent with the types of situations that trackers and profilers will face in the operational environment.

Discussion

Overall, the SJTs provided a very valuable source of data with which to gauge the learning impact of the field training exercises portion of combat tracking and combat profiling. Importantly, the results of statistical testing showed that, on average, trainees exhibited significantly improved performance on the SJT tracking posttest, as indexed by a reduced discrepancy from the evaluation of scenario items by the instructors. The locus of this effect was in the elimination of any trainees having marked discrepancies from the SME instructors' assessments of the problem scenarios. It would seem that this is a major goal of any scenario-based, field training activity—to reinforce correct judgments of complex, ambiguous situations and weed out discrepant, ill-conceived inferences.

While the profiling SJT failed to achieve comparable statistical significance, it nevertheless revealed a trend in the direction of improved performance on the pretest. Unfortunately, there were several technical issues with regard to profiling testing that we believe prevented the full effect from being manifested. These include (1) confusion in the posttest over whether the ville graphic was supposed to represent the ville they had just being profiling in the field training exercises (it wasn't), (2) a disproportionate number of middle-range (vs. extreme) response options, (3) test-taking fatigue by the time of the posttest, and (4) the possibility that much of the "mind share" between trainees and instructors had already taken place over the previous days of the course, leaving little left to occur by the time the posttest was taken.

To the best of our knowledge, this is one of the first times that SJTs have been used in a pretest/posttest design to measure degree of learning in a field training environment. Although there is a considerable amount of effort required to construct, vet, and fine-tune the scenario items and the response options, the benefits from this type of testing are considerable. Not only are SJTs a reasonable proxy for job performance, they offer a controlled method to gauge trainee acquisition of complex decision-making, judgment, and inferential processes. As such, they represent a valuable tool in the researcher's behavioral science arsenal. We believe that SJTs hold enormous promise in future applications of field learning assessments in courses where complex cognitive processes underlie successful skill acquisition.

5d Behavior

Behavioral Observation Checklists

Behavioral Observation Checklists (BOCs) offer a structured method for collecting quantitative and qualitative data on individual and team performance during field training exercises. They were a primary means for collecting performance data in the Border Hunter project for both the combat tracking and combat profiling. While their main focus is on performance, particularly team performance, the BOCs also yield information concerning degree of trainee learning during field training exercises as well as the quality of training being provided during the field scenarios.

Rationale for Use in Border Hunter

While the BOC described above was not specifically designed to assess trainee performance, most of its scoreable behaviors have implications for proficiency and, as such, provide a good starting point for addressing the acquisition of skills and competencies from the field training exercises.

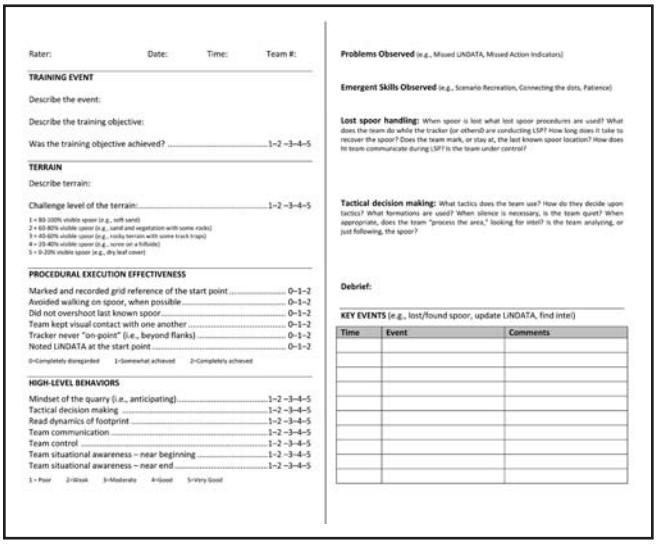
Development of BOCs

Prior to the start of the Border Hunter course, we worked to create an instrument that would be suitable for both the combat tracking and combat profiling field exercises. To that end, we started with our original Combat Hunter-focused BOC (see Spiker & Johnston, 2010a) as the basis and, upon reviewing the tracking instructional materials, added items that addressed tracking competencies. This first attempt resulted in an 11-page instrument consisting of eight categories and 50 checklist items.

While this instrument yielded a comprehensive assessment of scenario quality and training value, it did not provide a concrete basis for the field researchers to score or gauge trainee performance. Consequently, we developed a second instrument that would be used to assess individual trainee and team proficiency within each scenarios for tracking and profiling.

When the course began, we armed our field researchers with the two instruments described above. On the first day of tracking field exercises, we quickly discovered that the rigors of keeping up with a (at times) fast moving team of 8-9 trainees, coupled with the difficulty of observing the behaviors of widely-spaced individuals, made it impossible to use two multi-paged instruments simultaneously. The research team caucused after the first day and suggestions were collected for modifying the instrument on the fly. In particular, we decided to combine the observations onto a single instrument and focus it solely on tracking. In addition, it was clear that the form would need to be a single page in length since it was not physically possible to flip through pages while walking briskly (and at times, running). Moreover, it was evident that certain aspects of tracking performance could be rated with a 3-point scale, while other, more complex, behaviors would be better gauged with a 5-point scale.

With the above specifications as our objectives, we iterated toward development of a one-page instrument that would be usable under rigorous field training exercise conditions. The final version of the Tracking BOC is shown in Figure 5D.1 and provided in the Appendix. As can be seen, the instrument was created in a two-


Rater: Date: Time: Team #:

TRAINING EVENT

Describe the event:

Describe the training objective:

Was the training objective achieved? ..... 1–2 –3–4–5

TERRAIN

Describe terrain:

Challenge level of the terrain: ..... 1–2 –3–4–5

1 = 80-100% visible spoor (e.g., soft sand)
2 = 60-80% visible spoor (e.g., sand and vegetation with some rocks)
3 = 40-60% visible spoor (e.g., rocky terrain with some track traps)
4 = 20-40% visible spoor (e.g., scree on a hillside)
5 = 0-20% visible spoor (e.g., dry leaf cover)

PROCEDURAL EXECUTION EFFECTIVENESS

Marked and recorded grid reference of the start point 0–1–2
Avoided walking on spoor, when possible 0–1–2
Did not overshoot last known spoor 0–1–2
Team kept visual contact with one another 0–1–2
Tracker never "on-point" (i.e., beyond flanks) 0–1–2
Noted LINDATA at the start point 0–1–2

0=Completely disregarded 1=Somewhat achieved 2=Completely achieved

HIGH-LEVEL BEHAVIORS

Mindset of the quarry (i.e., anticipating) ..... 1–2 –3–4–5
Tactical decision making ..... 1–2 –3–4–5
Read dynamics of footprint ..... 1–2 –3–4–5
Team communication ..... 1–2 –3–4–5
Team control ..... 1–2 –3–4–5
Team situational awareness – near beginning ..... 1–2 –3–4–5
Team situational awareness – near end ..... 1–2 –3–4–5

1 = Poor 2=Weak 3=Moderate 4=Good 5=Very Good

Problems Observed (e.g., Missed LINDATA, Missed Action Indicators)

Emergent Skills Observed (e.g., Scenario Recreation, Connecting the dots, Patience)

Lost spoor handling: When spoor is lost what lost spoor procedures are used? What does the team do while the tracker (or others) are conducting LSP? How long does it take to recover the spoor? Does the team mark, or stay at, the last known spoor location? How does ht team communicate during LSP? Is the team under control?

Tactical decision making: What tactics does the team use? How do they decide upon tactics? What formations are used? When silence is necessary, is the team quiet? When appropriate, does the team "process the area," looking for intel? Is the team analyzing, or just following, the spoor?

Debrief:

KEY EVENTS (e.g., lost/found spoor, update LINDATA, find intel)

Time	Event	Comments

Figure 5D.1. Final tracking BOC

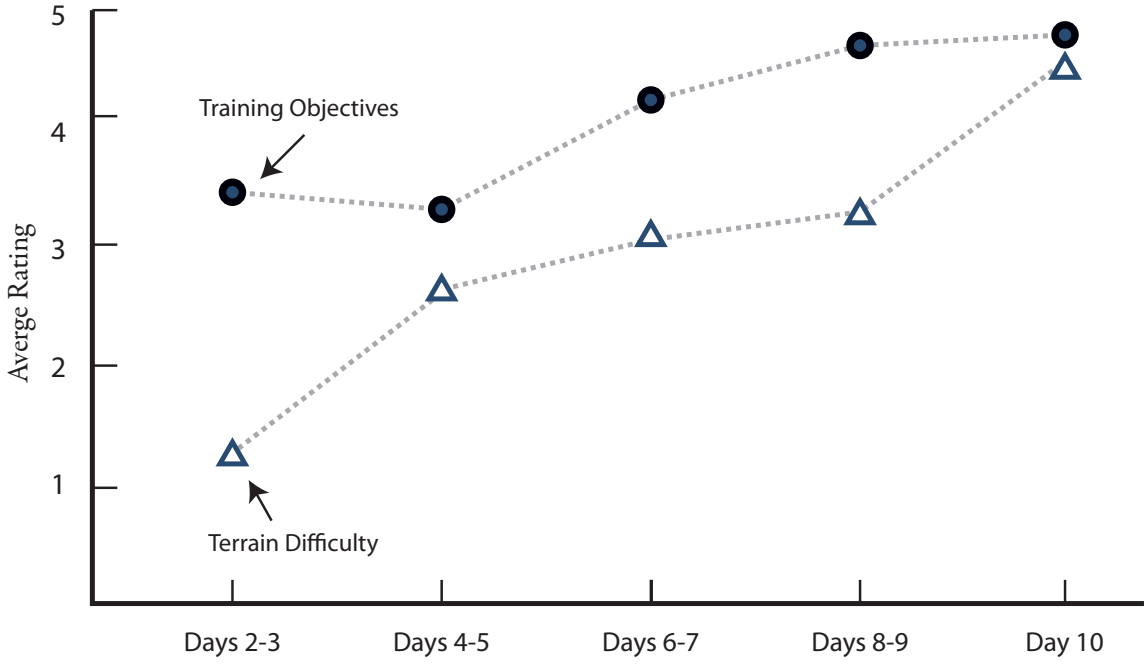


Figure 5D.2. Average Ratings for Training Objectives and Terrain across Days

column layout so it could be folded in half for greater portability. The upper left portion provides space for the researcher to describe the scenario event being observed along with the training objective for that event. A 5-point rating scale is assigned to indicate the extent to which the training objective was achieved. The anchors for this and all the other 5-point scales are listed at the bottom of the left hand page.

Data Collection

Data collection for the field training exercise phase of combat tracking began on the afternoon of Day 2 and continued daily until the FinEx on Day 10. To the extent possible, we attempted to have one researcher available to collect BOC data from each of the five teams on each day. Our pool of field researchers consisted of six individuals, all well-versed in behavioral research methods and with extensive field experience.

Empirical Results

Combat Tracking

Aggregate Quantitative Findings. First, we conducted quantitative analyses of the trends, across days and over all teams for each of the rating scales on the BOC. Figure 5D.2 shows the trend for the first two measures, achievement of Training Objectives and Terrain Difficulty.

It should be noted that, depending on the day's scenario, a researcher may have completed multiple sets of ratings, one for each discrete event. In such cases, a mean rating was calculated for a given researcher-team combination for each index. These means were then combined with the other teams' data to produce an overall, unweighted mean rating for each of the pairs of scenario days (2-3, 4-5, 6-7, 8-9) or Day 10.

Looking at Figure 5D.2, the average rating for both measures increased across days, reaching levels near 5 (the maximum) on Day 10. Thus, the teams, on average, were rated as achieving their training objective to a greater degree while the terrain on which they were tracking increased in difficulty. These increases were borne out statistically, as evidenced by a significant correlation between scenario days and rating, for both Training Objectives ($r = .926$, $t = 4.245$, $p < .029$, df = 3) and Terrain ($r = .940$, $t = 4.775$, $p < .020$, df = 3).

Average ratings for the first three procedural be-

haviors on the BOC (marking the grid reference at the start point, not walking on the spoor line, and marking the last known spoor) also show improvement over time. All of the procedural behaviors were rated on a 3-point (0–2) scale, and they each showed different patterns of change over the course of training.

Interestingly, marking the last known spoor showed virtually no increase, although it was already rated at a fairly high level (almost 1.6 out of 2) on the first two days. This lack of change was supported by a very low (r = .082), nonsignificant (t = .107, df = 3) correlation with days. In contrast, avoiding walking on the spoor line exhibited a fairly linear increase over days, though it too, began at a high level on Days 2–3 (1.40). The increase in rating over days is supported by a substantial correlation (r = .955) that was statistically significant (t = 5.554, p < .013, df = 3). Marking the initial commencement point (ICP) with a grid reference showed a mostly linear increase over days, although there was a notable inversion on Days 8-9. Even with this departure from monotonicity, the measure exhibited a substantial (r = .885) and significant (t = 3.293, p < .023, df = 3) correlation with training days.

For the second set of procedural behaviors (team maintaining visual contact with one another, the tracker never going beyond the flankers, and the team marking LiNDATA while at the initial commencement point) only the LiNDATA index exhibited a pronounced linear increase with days, despite an inversion on Days 8–9. This was confirmed with a sizeable correlation (r = .899) and significant (t = 3.552, p < .049, df = 3) correlation with days. While the other two measures showed higher ratings at the end of training than at the beginning, neither displayed a progressive, linear increase with days of training. This interpretation is consistent with the moderate (r = .562 and .509) but nonsignificant (t = 1.177, df = 3; t = 1.023, df = 3) correlations for the Maintain Visibility and Going-Beyond-the-Tracker measures, respectively.

Turning to the high-level behaviors, the BOC included seven higher-order skills. The first three of these (Quarry Mindset, Dynamics of the Footprint, and Tactical Decision-Making) showed a progressive increase in mean rating across training days. By Day 10, all three measures received an average rating of 4.0 or higher, where they started at markedly different levels on Days 2-3. This interpretation is consistent with the statistical analysis, which showed that all three had substantial and significant correlations with days of training. In particular, the following statistics were obtained: Quarry Mindset (r = .977, t = 7.894, p < .004, df = 3), Tactical Decision-Making (r = .963, t = 6.180, p < .009, df = 3), and Dynamics of the Footprint (r = .878, t = 3.181, p < .025, df = 3).

The other four high-level behaviors correspond to Team Communication, Team Control, Situation Awareness (first measure), and Situation Awareness (second measure). All four measures showed a progressive increase across days of training, though at different rates and reaching somewhat different levels. The improvement in ratings over days for all four measures was supported by the statistical analysis. In particular, the following correlations with days of training were obtained: Communication (r = .981), Control (r = .972), Situation Awareness 1 (r = .973), and Situation Awareness 2 (r = .898). All four measures' progression over days was statistically significant: Communication (t = 8.715, p < .003, df = 3), Control (t = 7.203, p < .006, df = 3), Situation Awareness 1 (t = 7.298, p < .006, df = 3), and Situation Awareness 2 (t = 3.540, p < .049, df = 3).

Team-Level Quantitative Findings. The second analysis explored whether these progressive increases in the procedural and high-level behavioral measures over days were true for all teams or only some of them. Because we have missing data for some teams on some days, we needed to construct indices that would be based on enough underlying data to produce interpretable trends. To that end, we elected to combine the data for the six procedural measures and seven high-level behavioral measures and, for each set, select a criterion level of performance on which an interpretation of skill acquisition for an individual team could be based. Specifically, for the procedural behaviors, we calculated the percentage of ratings that exceeded 1.5 (2 being maximum) for each team on each of the days for which we have data. Similarly, for the high-level behaviors, we calculated the percentage of ratings that exceeded 3.0 (5 being maximum) for each team.

The data plots in Figure 5D.3 reveal some very interesting trends, many of which were supported statis-

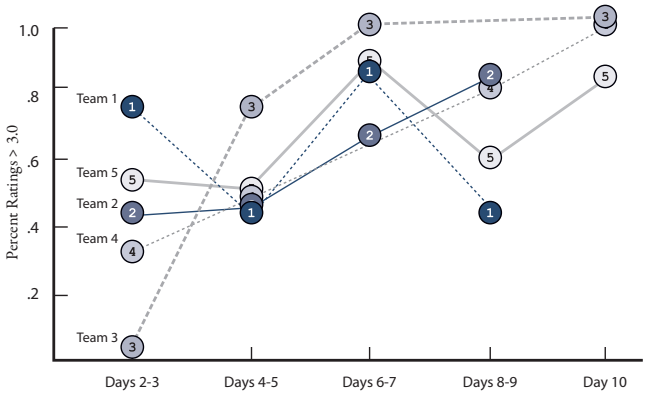


Figure 5D.3. Comparison of Team Performance on the Procedural Behaviors.

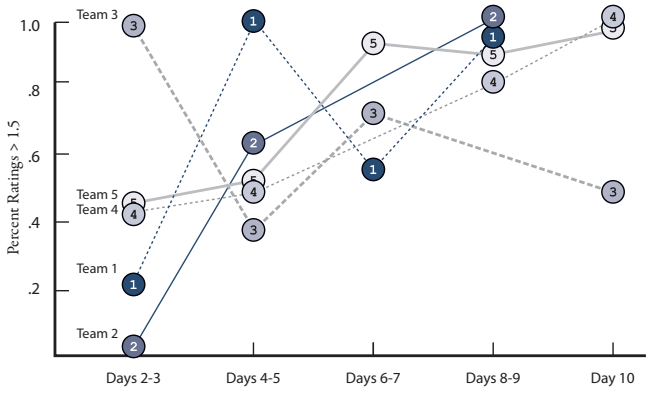


Figure 5D.4. Comparison of Team Performance on the Higher-Level Behaviors

tically. First, it is clear that the teams begin the field training exercise with very different levels of the procedural skills. Perhaps not surprisingly, the two Army teams (Teams 3 and 4), who have less practical tracking experience than the Border Control-dominated teams, start out at lower percentages of highly rated procedural behaviors. Statistically, we observed that Team 1's proportion was significantly higher ($p < .047$) than that for Team 3. Team 5's proportion, while not significantly higher than Team 3's, was trending in that direction ($p < .091$). The comparisons with Team 4, whose proportion was substantially higher than Team 3's (which was 0), did not reach significance although its difference with Team 1 was substantial.

In the succeeding days, the two Army teams' disadvantage had disappeared, and in fact by Day 10, both teams had reached proportions of 1.0. None of the team differences in the middle days of training reached significance, although interestingly, on Days 8–9 Team 4 was now ahead of Team 1 and almost significantly so ($p < .094$). That Teams 3 and 4 exhibited true learning curves was partially supported by statistical analysis, as their respective correlations with days were $r = .819$ and $r = .999$. The low degrees of freedom prevented Team 3's curve from being significant ($t = 2.018$, $p < .091$, df = 2) although it was trending in that direction. On the other hand, Team 4 exhibited a classic learning curve pattern, with $t = 26.84$, $p < .001$, df =2.

As for the other teams, Team 2 also exhibited the elements of skill acquisition across the days of training. This was supported statistically by a significant correlation ($r = .999$) with days ($t = 22.98$, $p < .023$, df = 1). On the other hand, Team 1's correlation with days was actually negative ($r = .577$) whereas Team 5's correlation, while substantial ($r = .710$), failed to reach significance ($t = 1.745$, $p < .090$, df = 3).

Figure 5D.4 provides a plot of the proportions of high-level behavior ratings that exceeded 3.0 for each of the five teams across days of training. The left side of the figure, shows that on Days 2–3, the teams spanned the entire proportion range, with Team 2 starting out with none of its higher-order behaviors exceeding 3 whereas all of Team 3's ratings did. Statistically, Team 3's proportion is significantly higher than Team 2 ($p < .001$), Team 1 ($p < .016$), and marginally higher than Teams 4 and 5 ($p < .058$). Team 2's proportion was also significantly lower than Teams 4 and 5 ($p < .038$).

If we look at the subsequent days, we see that Teams 2 and 5, in particular, exhibited systematic increases in performance as a function of training days. This is supported statistically by significant correlations with days of training for both Team 2 ($r = .930$, $t = 3.578$, $p < .035$, df =2) and Team 5 ($r = .956$, $t = 5.615$, $p < .012$, df = 3). In addition, Team 4 also showed a significant increase in higher order behavior performance over the course of training, with $r = .972$, = 5.838, $p < .030$, df = 2. On the other hand, Team 3, which began the training with a proportion of 1.0, showed an instability in the higher-order behaviors, such that its correlation with training days was actually negative ($r = -.511$). Moreover, whereas Team 1 showed an increase in higher order behaviors between the first and

last days of training (r = .610), the increase was not statistically linear (t = 1.088, df = 2), as evidenced by a nonmonotonic learning curve. Interestingly, although Team 4 began the training with a relatively low proportion of highly-rated higher order behaviors, such that its proportion was significantly less than Team 1 even on Days 4–5 (p < .023), its high proportion (1.0) on Day 10 was significantly higher than Team 3 (p < .033).

Qualitative Findings. Our analysis of the qualitative data focused on comments the researchers provided on the BOC as well as the descriptions they recorded concerning the five categories called for on the BOC: training events, notable problems, emerging skills, lost spoor handling, and tactical decision-making. Additionally, the BOC included an open space in which to record other key instructional events.

Training Events. Analysis of the content in the Training Event section gives us information concerning what was trained and how the training was conducted. This information is provided in the Appendix.

Notable Problems. The BOC had space to record notable performance problems at either the individual or team level. The compiled comments from this segment were reviewed from all the data sheets, over days, teams, and researchers, and entered into a single table. In reviewing the list, several trends are apparent.

The first is the sheer drop in the number of problems recorded over days. While the decrease in number of available researchers is certainly partly responsible, a primary reason is simply the improved performance by individuals within all teams, reflected in the increased ratings summarized above, as a result of experience and instructor feedback. A second important trend is that the types of "problems" that researchers noted for the teams increases in complexity as a function of training days. Thus, problems early in exercises include such deficiencies as "keeping head down during tracking" (and hence not seeing the track line), flankers "not keeping their heads on a swivel" (meaning not switching attention between track line and team leader), as well as missing the signs of simple action indicators (like the quarry stopping for a security check). Other early problems included having attention too narrowly focused, missing LiNDATA, and failing to keep the team in proper Y (or some other) formation.

As we move to the latter half of FTXs, not only do the problems decline in number, they reflect increasing levels of sophistication and complexity. At this point, trainees' problems stem primarily from attempting to speed up the tracking process (a goal) at the expense of maintaining tactical discipline or, at other times, walking past the last known spoor. As well, we see variations across teams where, in some cases, a given individual as team leader may be exerting weak or ineffective control over his team. From our perspective, these are actually good problems to have since they reflect the trainee teams composing themselves in such a way that the weaker (or slower learning) trainees have an opportunity to occupy the more challenging positions (team leader, tracker). In addition, the types of action indicators that the trainees in earlier days would not have picked up (e.g., walking in each other's tracks, walking backwards) are now handled easily and rarely rise to the level of a "notable problem." And importantly, all of this progression is taking place on increasingly more difficult terrain.

Emergent Skills. The researchers focused on recording instances where tracking and related cognitive skills were emerging over the course of training. The first point to note is that skill development occurred early in the field training exercise and continued throughout. The nature of the "early" skills that emerged were, as might be expected, primarily at the individual level and concerned basic aspects of tracking, such as using the sun angle to highlight the perspective view of the track. Another development focused upon being more systematic and careful in tracking, this included behaviors such as increased use of spoor cards, taking accurate measurements of footprints, and ensuring that more aspects of the surrounding area (aerial spoor, signs) are included in the tracker's "processing" of the scene.

A critical skill that develops, at different rates for individuals, is the ability to look up more often from the tracks and gaze ahead to the track line. Watching trainees acquire this skill is truly awe-inspiring, as it is evident that they are a "changed" individual since they are now able to see where the track line is going, begin

to interpret what the quarry might be doing and thinking, and importantly, it speeds up their tracking process and allows them to work with their team members more effectively.

Another important category of emergent skills that is acquired concerns teamwork and using team members effectively. This takes on different forms, depending on the team's baseline level of experience and where they are in the field training exercise curriculum. It was evident that the more experienced teams, such as Teams 1 and 5, fairly quickly learned to use the tracking techniques and integrate them into their own tactics, techniques, and procedures (TTPs). This was most evident when they used two trackers, instead of one, and modified the 360 degree crossover so that both trackers are crossing over concentrically to cover more area more quickly.

A host of advanced cognitive skills are also developing, with some seen early but most appearing in the middle of the curriculum and continuing to the end of training. These include using one's imagination to recreate possible scenario events to better get into the quarry mindset. Also, individuals and teams are able to "connect the dots" more effectively, accumulating pieces of information and evidence (spoor, signs) to "paint the picture" of what the quarry is up. Part of this development is reflected in a greater understanding of the action indicators as well as simply picking up more indicators so their overall understanding of the scenario is vastly improved.

Perhaps the most notable skill development, and one that was seen in all teams, concerns the improved pace at which tracking occurs. In part, this faster pace reflects the ability to macro-track (look up and down while tracking) discussed above. It also, however, reflects acquisition of some critical teamwork skills that greatly expedites the process. This includes using positions more flexibly, such as having the flankers help with tracking when the terrain permits and increasing use of the rear security guard (RSG) placing their binos' field of view onto the track line to help the team leader and tracker. Improved communication, particularly with the flanks, also speeds up this process. The use of track traps, especially in tough terrain, is valuable for speeding up tracking. This was most evident on Day 9, the urban tracking scenario, when all teams were rapidly tracking on concrete by sending their cut teams ahead to find track traps where the quarry had to step out onto to continue their escape route.

But undoubtedly the most important emergent skill is that of patience, particularly as it regards encountering lost spoor situations where trainees must learn to have confidence in their own ability so they can apply their lost spoor techniques to full advantage. Like the macro-tracking skill discussed above, the confidence that team members, and the team, exhibit with their lost spoor procedures is truly transforming. One particular instance, that with Team 4, is particularly noteworthy. In this case, the team was tracking two quarry where the tracks led them to a fairly rocky hillside. They were soon in lost spoor and began utilizing their various lost spoor procedures to relocate the track. The team leader was fairly inexperienced and after 30 minutes of lost spoor, it was looking dire. However, the team continued scouring the hillside for the tracks and after another 15 minutes, for a total of 45 minutes, the team picked up the tracks using a likely lines approach. While the root cause of this problem was the flanker missing the tracks early in the procedure (via a wedge procedure), the key point was that the team did finally relocate the tracks and continued the exercise. Interestingly, this experience not only resulted in stronger team bonding, but it gave all team members an opportunity to contribute. But most importantly, they left the lost spoor experience with the confidence that their "training was working." The team's skill development proceeded quite rapidly thereafter, and was revealed in very high ratings on most BOC measures for the remainder of Day 8 as well as Days 9 and 10.

Lost Spoor Handling. Because an individual and team's ability to handle lost spoor procedures is such an important aspect of combat tracking skill, we included a dedicated space on the BOC for researchers to describe instances where the team went into a lost spoor procedure (LSP) and how that was handled.

It would be a disservice to the trainees to measure their proficiency by the number and durations of lost spoor they experienced since terrain difficulty increased markedly over the course of training. Indeed, there were few instances of lost spoor early in training as the focus was on studying the dynamics of foot-

prints in which lost spoor procedures were actually not wanted. However, as we reached the middle of the field training exercise curriculum, with terrain levels of 3–5 being common, lost spoor increased in frequency and duration. The key skill development here is 1) the confidence that lost spoor procedures will work, 2) the ability to avoid frustration when it does not work immediately, 3) the effective use of all team members in recovering the spoor line, and 4) a ready recognition that the team has lost the spoor line. This latter point is key, and our own observations reinforced the point that as training days increased, trainees (serving in the tracker role) were more willing to admit when they had lost spoor.

Tactical Decision-Making. Tactical decision-making (TDM) is a complex skill that is described somewhat differently by each researcher since it is essentially a mixed bag of activities and components. Besides decision-making, TDM encompasses communication, coordination, tactics, formations, patience, leadership, and teamwork, among others.

As the trainees became more proficient at tracking, there arose an inherent conflict between wanting to speed up the tracking process at the expense of security and tactical soundness. On several scenarios, most notably Days 6 and 9, we observed that the trainee-teams tended to move faster than they could keep up with tactically, resulting in some lapses in security and susceptibility to ambush. These deficits were handled capably by the instructors, though, with timely feedback and admonitions for prudence in the future. Because the trainees came into the course with considerable tactical experience, and were there to gain tracking expertise, this imbalance is certainly not unexpected. By the end of training, though, all teams were exhibiting high levels of tactical soundness coupled with impressive levels of tracking proficiency.

Key Instructional Events. At the outset, it is important to note that all combat tracking instructors are given wide latitude in what they teach during the field scenarios and how they teach. There is no script or formal POI for this portion. All instructors are highly experienced. The least experienced instructor has 15 years of tracking experience, while several others have more than 40 years. As well, the instructors' varied experience, including military intelligence, special forces, parks and border patrol. We saw considerable evidence of their "personal touches," as some instructors would have trainees give sitreps and intel briefings while others would have trainees simulate laying passive sensors.

Because instructors were not always present with the trainees during the scenario—they were laying spoor—the debriefs became the primary time where instructional lessons were imparted to trainees. In this vein, as training progressed, the instructors focused on more complex cognitive processes in the debriefs, such as having tactical patience, trying to connect the dots, getting into the quarry mindset, and spending time recreating the scenario, especially when encountering complex or ambiguous action indicators.

In keeping with their varied backgrounds and temperaments, the six instructors used a wide range of instructional styles in the debrief and in the field, from very "hands off" to an intense almost "in your face" approach. All were effective in their own way. For example, the lead instructor was particularly effective at using the Socratic style of instruction, where he posed a series of questions to trainees in the debrief, such as: How did you start? Where did you cut? Where did you think you were headed? Was running wise? While at times stressful for the trainees who were forced to answer, this questioning style nonetheless got trainees engaged and thinking about what they would do differently in the next scenario.

Another effective technique during the debrief was to have the tracking team describe their own rationale for what they did during the scenario and why they did it. Most instructors would try to get as many team members to contribute to the discussion as possible, which was usually not difficult since most trainees were highly motivated to begin with. Having trainees talk through the "story" of what they thought was happening was very effective in instilling lessons learned. Also, having the team discuss higher level issues, such as team control and coordination, and what they thought they could have done better, is effective pedagogy.

Invariably, all instructors would emphasize the importance of being aware of the role of ALL team members, such as having an "aware" rear security tracker and what that individual can do for the team. For this rea-

son, all instructors would require that trainees rotated positions across events within a scenario to ensure that this awareness was coupled with field experience. Another useful technique involved getting the team to describe what they were feeling, such as "I felt real exposed moving that fast." These heartfelt testimonials tended to promote marked behavior change in the next scenario event.

Not surprisingly, the topic that received the most attention from instructors was lost spoor procedures. In particular, "likely lines" were discussed extensively by several instructors, who described the conditions and situations under which they work.

As a final topic, we observed that all instructors often laid spoor rather than staying with the trainees, particularly by the middle and late field training exercises. On the one hand, this was done so that a more complex pattern of action indicators and counter-tracking techniques—that only the instructor would know—could be used to challenge the trainees. On the other hand, with this approach the trainees did not receive the immediate feedback they would have gotten from instructors accompanying them on the trail. Of course, the ideal would be to have two instructors at each field training exercise, one laying spoor and one instructing. This is labor-intensive, however, and not very practical with a 40-person class, like we had.

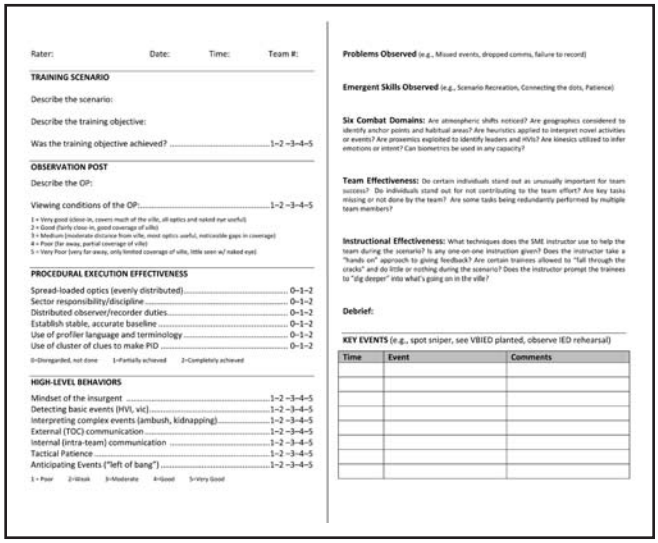
Combat Profiling

Quantitative Findings. As with the tracking portion of the course, our quantitative analyses for Profiling were based on 3-point and 5-point rating scales (see Figure 5D.5). This analysis mirrors the tracking analysis, in which we looked for evidence of learning by combining the rating data across teams for each measure and plotting that over scenarios. We then made comparisons between the teams (in this case, only Teams 3 and 4 and the TOC), using composite measures derived from the procedural behaviors and high-level behaviors.

As with the tracking, in each case we have combined data from adjacent scenarios in order to produce more stable data plots. To that end, we combined the data for Scenarios 1 and 2, 3 and 4, 6 and 7, 8 and 10, and the FinEx. We excluded Scenario 5, a night mission, since it was "off line" from the main scenario plotline and the teams were combined in ways that made data collection difficult. In addition, we excluded Scenario 9 since that was the 20-minute "mini *shura*" that each team performed with the role-players. The BOC was not suited for this activity since it entailed more *in-situ* stressful decision-making rather than profiling per se.

Figure 5D.6 presents the average ratings for the Training Objectives measure across scenarios. The values represent the mean rating received by Teams 3 and 4, as well as the teams occupying the TOC for those scenarios. It is evident that the average rating starts fairly high (almost 4) and increases across scenarios. The relationship was fairly strong, with $r = .865$, and the increase trended towards statistical significance ($t = 2.984$, $p < .058$, df = 3).

Next, turning to the procedural skills, the first three of these include: having the optics spread-loaded, adhering to sector discipline for viewing assignments, and distributing the observer/recorder duties across the team. All of the procedural behaviors were rated on a 3-point (0–2) scale, and they all showed similar though not identical patterns of change over the course of field training. Distributing observer/recorder duties was strongly related to scenarios, with $r = .947$, where the increase with scenarios was statistically significant ($t = 5.117$, $p < .016$, df = 3). Sector discipline exhibit-


Rater: Date: Time: Team #:

TRAINING SCENARIO

Describe the scenario:

Describe the training objective:

Was the training objective achieved? ..... 1–2 –3–4–5

OBSERVATION POST

Describe the OP:

Viewing conditions of the OP: ..... 1–2 –3–4–5

1 = Very good (close in, covers much of the ville, all optics and naked eye useful)
2 = Good (fairly close in, good coverage of ville)
3 = Medium (moderate distance from ville, most optics useful, noticeable gaps in coverage)
4 = Poor (far away, partial coverage of ville)
5 = Very Poor (very far away, only limited coverage of ville, little seen w/ naked eye)

PROCEDURAL EXECUTION EFFECTIVENESS

Spread-loaded optics (evenly distributed) 0–1–2
Sector responsibility/discipline 0–1–2
Distributed observer/recorder duties 0–1–2
Establish stable, accurate baseline 0–1–2
Use of profiler language and terminology 0–1–2
Use of cluster of clues to make PID 0–1–2

0=Disregarded, not done 1=Partially achieved 2=Completely achieved

HIGH-LEVEL BEHAVIORS

Mindset of the insurgent ..... 1–2 –3–4–5
Detecting basic events (HVI, vic) ..... 1–2 –3–4–5
Interpreting complex events (ambush, kidnapping) ..... 1–2 –3–4–5
External (TOC) communication ..... 1–2 –3–4–5
Internal (intra-team) communication ..... 1–2 –3–4–5
Tactical Patience ..... 1–2 –3–4–5
Anticipating Events ("left of bang") ..... 1–2 –3–4–5

1 = Poor 2=Weak 3=Moderate 4=Good 5=Very Good

Problems Observed (e.g., Missed events, dropped comms, failure to record)

Emergent Skills Observed (e.g., Scenario Recreation, Connecting the dots, Patience)

Six Combat Domains: Are atmospheric shifts noticed? Are geographics considered to identify anchor points and habitual areas? Are heuristics applied to interpret novel activities or events? Are proxemics exploited to identify leaders and HVIs? Are kinesics utilized to infer emotions or intent? Can biometrics be used in any capacity?

Team Effectiveness: Do certain individuals stand out as unusually important for team success? Do individuals stand out for not contributing to the team effort? Are key tasks missing or not done by the team? Are some tasks being redundantly performed by multiple team members?

Instructional Effectiveness: What techniques does the SME instructor use to help the team during the scenario? Is any one-on-one instruction given? Does the instructor take a "hands on" approach to giving feedback? Are certain trainees allowed to "fall through the cracks" and do little or nothing during the scenario? Does the instructor prompt the trainees to "dig deeper" into what's going on in the ville?

Debrief:

KEY EVENTS (e.g., spot sniper, see VBIED planted, observe IED rehearsal)

Time	Event	Comments

Figure 5D.5. Final profiling BOC

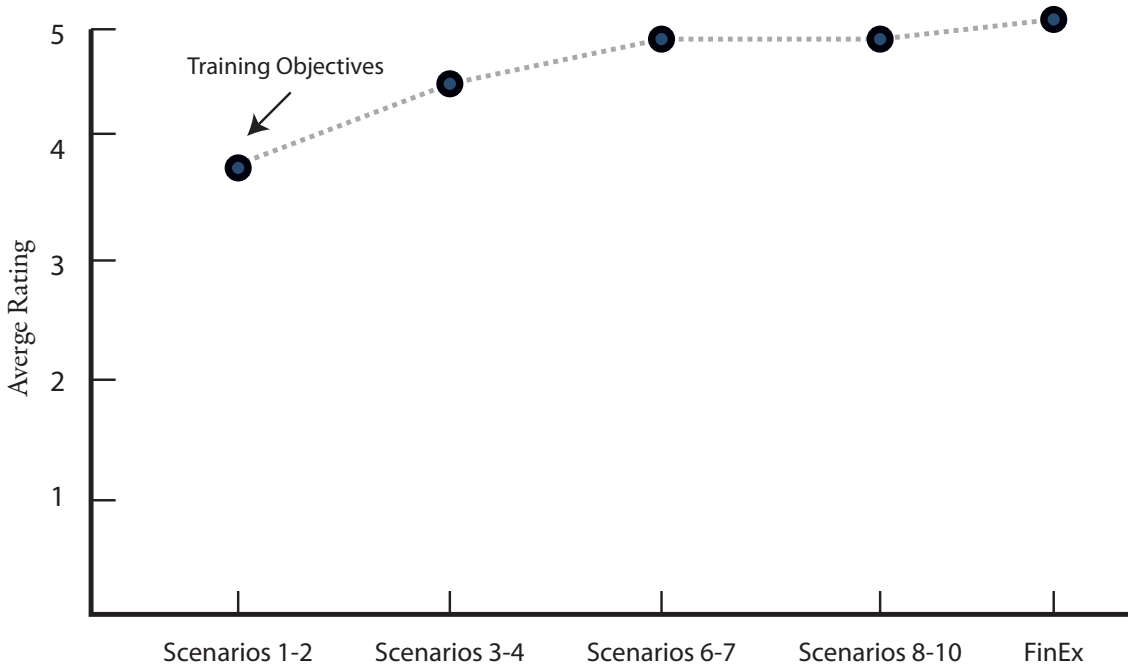


Figure 5D.6. Average rating for the combat profiling Training Objectives across Scenarios

ed a similar relationship, with $r = .922$, and $t = 4.130$, $p < .031$, df = 3). Ratings for Spread-Loaded Optics exhibited a dip mid-training, though the correlation was still substantial ($r = .725$). However, the relationship with scenario number was not significant ($t = 1.821$, $p < .166$, df = 3).

The second set of procedural behaviors include: achieving a stable baseline, using profiler language, and using cue clusters to make a positive identification (PID). These behaviors exhibit similar patterns to the ones above, where all show substantial relationships to scenario, though only one behavior achieved statistical significance. Specifically, use of a cue cluster to make a PID was very strongly related to scenario, with $r = .951$ and $t = 5.305$, $p < .015$, df = 3). The other two behaviors were less strongly related, though still substantially so. Thus, achieving a stable baseline was correlated with scenario number at $r = .854$, and though trending toward significance, it did not achieve it ($t = 2.846$, $p < .065$, df = 3). On the other hand, use of profiler language exhibited a weaker relationship to scenario, in part because of a decline in the average rating on the FinEx. Nevertheless, its correlation with scenario was still sizeable, with $r = .764$, although that did not achieve statistical significance ($t = 2.052$, $p < .133$, df = 3).

Turning to the high-level behaviors, seven measures were collected on the BOC instrument. All were rated on a 5-point scale. The average ratings for the first three behaviors (adopting an insurgent mindset, detecting basic events, and interpreting complex events) showed a progressive increase in mean rating across scenarios, where by the end of training, they were at the maximum value of 5. This interpretation is

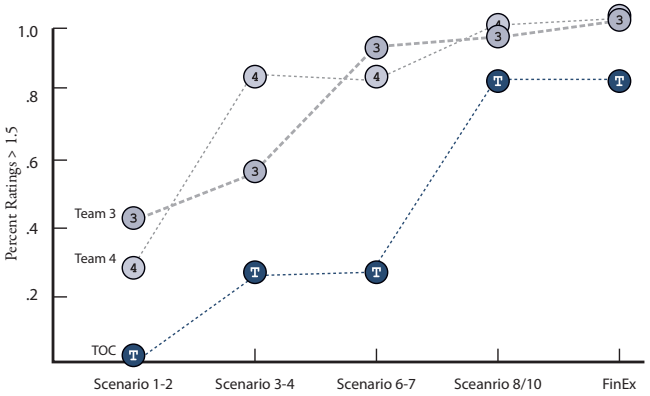


Figure 5D.7. Comparison of Team Performance on the Procedural Behaviors for combat profiling

consistent with the statistical analysis, where all three showed substantial and significant correlations with scenario: Insurgent Mindset (r = .942, t = 4.859, p < .019, df = 3), Basic Events (r = .942, t = 4.846, p < .019, df = 3), and Complex Events (r = .974, t = 7.373, p < .006, df = 3).

The other four high-level behaviors scored on the BOC (external communications with the TOC, internal [intra-team] communications, exhibiting tactical patience, and anticipating events) exhibited an increase in average rating with scenarios, but the strength of the relationship and the degree of monotonicity varied across the measures is weaker. External Communication and Tactical Patience showed the strongest relationship to training, with r = .951 and .908, respectively. Both achieved statistical significance, where t = 5.299, p < .015, df = 3 for External Communication and t = 3.742, p < .042, df = 3 for Tactical Patience. The other two measures, Internal Communication and Anticipating Events, manifested slight declines in the middle of training, resulting in somewhat lower correlations with scenario. Yet, both were still substantial, with r = .861 for Anticipating Events and r = .741 for Internal Communications. However, despite trending in the right direction, neither measure achieved statistical significance, with t = 2.934, p < .061, df = 3) for Anticipating Events and t = 1.193, p < .152, df = 3 for Internal Communications.

Figure 5D.7 presents the percentage of procedural behavior ratings that exceeded 1.5 as a function of scenario. Visual inspection suggests that both teams exhibited a progressive improvement in performance across the scenarios. The trend was quite powerful with Team 3, as indicated by a correlation of r = .981 with scenario that was statistically significant (t = 7.098, p < .020, df = 2). The trend for Team 4 was not quite as strong, although its correlation with scenarios was still high, with r = .856, although it did not quite reach significance (t = 2.871, p < .064, df = 3). Even though the teams started out at different performance levels, and showed somewhat different rates of improvement, none of the differences approached significance, including the difference on Scenarios 3–4 (binominal comparison, p < .178).

Keeping in mind that the percentages for the TOC

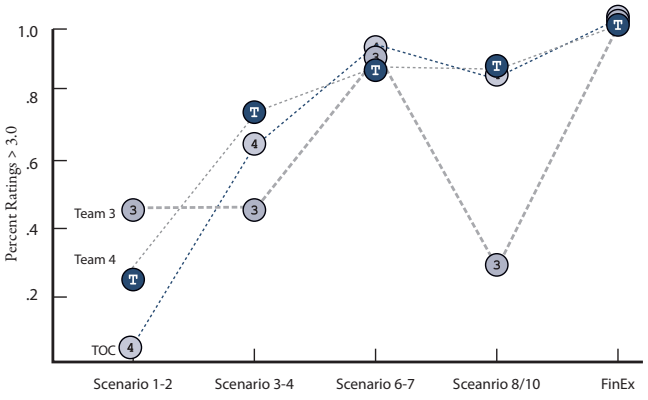


Figure 5D.8. Comparison of Team Performance on the Higher-Level Behaviors for combat profiling

reflect contributions from different teams across the scenarios, we see that it, too, exhibited a progressive improvement with training. Thus, team performance within the TOC exhibited a correlation of r = .944 with scenario, a relationship that reached statistical significance (t = 4.976, p < .018, df = 3).

Figure 5D.8 plots the proportions of high-level behavior ratings that exceeded 3.0 for the two teams and the TOC participants across the scenarios. Visual inspection reveals that Team 4 exhibited the typical linear progression of performance improvement across scenarios, with r = .865. This relationship trended toward significance, just failing to meet the .05 criterion level (t = 2.986, p < .058, df = 3). Similarly, the teams that were rated in the TOC also exhibited a systematic improvement in high-level behaviors across scenarios, with r = .877, that just missed the .05 level (t = 3.158, p < .051, df = 3).

On the other hand, Team 3 showed a marked decline in performance on Scenarios 8–10, where the composite percentage declined to only .29. As a result, the correlation with scenarios was virtually zero, with r = .053. Inspection of the contributing data indicates two reasons for the decline. First, data were only collected on Scenario 8, with data unavailable on Scenario 10. This reduces the base rate for the percentage and eliminates the last scenario before the FinEx—which is often the highest level of performance a team achieves —from contributing to the measure. Second, the ratings on four of the high-level measures declined from 4 (on Scenario 7) to 3 (on Scenario 8), where these

declines have a particularly major impact given that the composite was based on the percentage of ratings that exceeded 3.0. Consequently, the decline, while inconsistent with an indication of training progress, has several mitigating factors that, on balance, reduce its importance.

Qualitative Findings. As with the tracking segment, our analysis of the profiling qualitative data focused on the comments the researchers provided on the BOC as well as the descriptions they recorded concerning six categories called out on the instrument: training scenario, notable problems, emerging skills, six combat domains, team effectiveness, and instructor effectiveness. In addition, our content analysis included notations researchers put into the chronological table of events at the end of the instrument; these have been briefly summarized in a subsection entitled 'significant events.'

At the outset, it should be noted that the following descriptions of the qualitative data are based primarily on observations of the two Army teams, Teams 3 and 4, along with some supplemental observations of the various teams as they occupied the TOC. As such, we do not have BOC data on the other three teams when they occupied the OPs. We do not know, therefore, whether or how representative our observations are for the other three teams, which are mostly composed of non-military BORSTAR and BORTAC trainees. With these caveats in mind, the following paragraphs summarize the results of our content analysis of the data we were able to collect during the three days of Profiling field scenarios.

Notable Problems. Notable problems were recorded by the researchers during the 11 scenarios, including the FinEx. Several trends are apparent from their inspection. First, as we saw with tracking BOC, a drop in the absolute number of noted problems occured across scenarios. In addition, we observed that the nature of the problems became more involved later in training. Thus, early in the scenario, researchers noted problems associated with missing events, failing to connect events, failing to pass on information, or not having a good distribution of assigned duties. However, later in training, the problems tended to involve teamwork and communication. A particularly vexing problem, at least for Team 4, was the lack of a consistent vocabulary for describing buildings in the ville; this was most evident in communications with the TOC and other teams.

Emerging Skills. We also compiled a set of emerging skills. During the initial scenarios, some of the primary skills that were apparent to the researchers included the ability to identify HVIs, synthesize events (or "connect the dots"), interpret complex events, and predict complex events from early signs (such as the stages of the terrorist planning cycle). In the later scenarios, even more complex skills were emerging, such as scenario recreation, trust building, anticipation and prediction to get even more "left of bang," and adopting the mindset of other cultures.

Six Combat Domains. All six domains were noted at one time or another, depending on the events that were occurring in the ville. Taking a step back, it is apparent that there is a fundamental logic to how the domains can be applied when profiling the ville. In particular, it is evident that heuristics and geographics play a major role during the baselining phase of each scenario, when the objective is to create a general (rather than specific) picture of activities in the ville. Next, the trainees learn that atmospherics and proxemics help to produce a more detailed depiction of areas within the ville. Finally, trainees are given feedback concerning kinesics and biometrics that help delineate the activities and motivations of individual actors within the ville.

Significant Events. This final subsection represents a compilation of miscellaneous observations pulled from the researcher's tabled chronology of key events and descriptions noted elsewhere on the BOC. Several points are evident. First, there are clear signs of the teams identifying precursor events (to attacks, complex ambushes, bombing) much earlier in time, indicating they are truly operating "left of bang." This is seen for both Army teams in virtually all the scenarios. Second, it is clear that, across scenarios, the trainees were making more extensive use of the six combat domains. Although there is greater reliance on geographics early in training, after several scenarios, we find that the trainees are detecting shifts in ville atmospherics as a sign of impending danger as well as discerning biometric cues to infer emotional state of the ville's occupants.

Third, the trainees became quite adept at determining the HVIs in the various subgroups of the ville, which included identifying the IP police chief as well as the leader of the Bedouin village. Fourth, there is ample evidence of teamwork building up across the scenarios, such as when two of the OPs work together to identify a van where one OP could only observe the top half of the vehicle with the other OP getting the license number. Development of inter-team coordination and communication was especially valuable during the second night exercise (Scenario 9) as well as the FinEx.

Limitations of the BOC Data

The field data reported in this section gave a reasonably clear picture of the extent and type of skill acquisition that accrued during the combat tracking and combat profiling segments of the Border Hunter course. Between the quantitative rating data and the qualitative comments, we were able to compile a fairly comprehensive account of trainee performance from the standpoint of critical behaviors, cognitive processes, and dimensions of teamwork. However, despite these empirical "successes," we would be remiss in our reporting if we did not enumerate some of the limitations of the BOC as a source of data and indicate areas ways that the instruments and data collection methodology should be improved for future applications.

Conclusions

In this section, we have presented fairly compelling evidence for skill acquisition of core tracking and profiling skills based on researcher observations using the BOCs. Improvement as a function of training days and/or scenarios was evident during both segments of the course, based on both quantitative (ratings) and qualitative (comments, observations) data from the instruments. While this was most notable at the team level, it was clear that this was in no small part due to improved performance of individual trainees who were occupying key roles, particularly team leaders and trackers for combat tracking and squad leaders for combat profiling.

Combat Tracking

Considering first combat tracking, we found statistically significant improvement in basic tracking behaviors—such as marking the ICP, sending LiNDATA, avoiding walking on the spoor line—despite experiencing more difficult terrain and more complex training objectives. Though the higher-level behaviors started at different levels and exhibited different rates of increase, all of them displayed significant improvement over days. Thus, there was consistent improvement in the behaviors that reflect Adopting a Quarry Mindset, Tactical Decision-Making, Reading the Dynamics of the Footprint, Communication, Situation Awareness, and Team Control.

On the qualitative side, content analysis of the BOC-recorded observations yielded ample evidence of improved individual and team performance in combat tracking. This included a reduction in the number of simple, notable problems such that, by the end of training, researchers were observing only a small number of more complex-rooted problems. On the flip side, the research team noted the emergence of a number of important skills, at both the individual and team levels. At the individual level, these included macrotracking (i.e., being able to glance up and down at the track line), better "processing" of track signs, more accurate reporting, and more effective employment of lost spoor procedures. In terms of team skills, we found evidence for the emergence of a faster pace of tracking while maintaining SA, greater confidence, more efficient use of cut teams, incorporation of tracking techniques into the team's own unit-specific SOPs, and tighter control of team member positions. With regard to higher order cognitive processes, the research team recorded improvement in such areas as patience, confidence in one's own tracking skills (as evidenced by sticking with lost spoor procedures), and more effective use of optics (e.g., using binos to pick out tracks farther up the trail).

With regard to between-team comparisons, several interesting trends emerged. First, using our derived, composite measure of procedural behaviors, we observed that the two Army teams, Teams 3 and 4, began training at a lower level than the other three teams, a finding consistent with the two teams' less

practical experience at tracking relative to the other teams. However, by the middle and end of training, these differences had disappeared, such that the Army teams were performing at levels at least comparable to those of the other teams. For the higher level behaviors, our composite measure yielded a somewhat more complex pattern of performance growth. Focusing on our less experienced Army team, Team 4, we found that despite starting out at a relatively low level, their final performance level was actually higher than that of Team 3. The other three teams exhibited rates of high-level behavior improvement somewhere between those of Teams 3 and 4. Whereas the trend in improvement was linear for Teams 2 and 5, Team 1 exhibited an increase that contained a non-linear component.

Combat Profiling

Shifting to the Profiling part of the course, the rating data indicated improvement across scenarios in most of the procedural behaviors that were measured on the BOC, at least for the teams we were able to observe. This included statistically significant increases for distributed observer/recorder duties, maintaining sector discipline, and using cue clusters to make a PID. Though not statistically significant, sizeable improvements in performance were noted for spread-loaded optics, achieving a stable baseline, and using profiler language to describe events.

With regard to high-level behaviors, most exhibited statistically significant or at least substantial improvements across scenarios. Statistically significant improvements were found for adopting an insurgent mindset, detecting basic events, interpreting complex events, external communication, and tactical patience. While internal communication and anticipating events displayed some dips in the middle of training, they did show growth between the beginning and end of training.

Turning to the content analysis of the qualitative observations, as with the Tracking data, we found a decline in notable problems across scenarios during the Profiling field training exercises. By the end of training, the remaining problems concerned teamwork, communication, and having a consistent vocabulary to describe building locations. In addition, we saw evidence of the emergence of a number of key skills over the scenarios. These include the ability to identify HVIs, predict complex events from early signs, synthesize events (connect the dots), and recreate scenarios. By the end of training, we saw evidence of such complex skills as trust building and adopting the mindset of other cultures.

Another area of improvement was the teams' use and appreciation of the six combat domains for describing and explaining events. Interestingly, we found evidence of a pattern of improvement, beginning with geographics and heuristics, followed by atmospherics and proxemics, and culminating in more reliance on the kinesics and biometrics domains.

The research team also noted various instances where individual trainees contributed to team effectiveness, which often reflected the influence of the squad leaders. These unit leaders had a major impact on such behaviors as sector viewing responsibility, spread loading the optics, as well as keeping the TOC informed about what they were seeing from their OP. With regard to differences in team performance, we were only able to cover the two Army teams consistently across the scenarios. In terms of procedural behaviors, we found that although the two teams started at different levels, with Team 3 higher, and exhibited different rates of improvement, these differences were not statistically significant, though their improvement with training was. For high level behaviors, Team 4 and the teams rotating through the TOC exhibited near-significant improvements across scenarios whereas Team 3 did not. The drop in performance for Team 3 at the end of training is, we believe, an anomaly that was likely due to a combination of loss of data and some idiosyncratic aspects of the composite measure we used to index performance.

In closing, it should be kept in mind that while we believe we were successful in collecting concrete evidence of performance improvement during both sets of field training exercises, we experienced gaps in our ability to collect field data. These were considerably greater during Profiling, where we could only cover approximately 60% of the field scenarios compared to almost 90% for Tracking. Accordingly, while our quantitative and qualitative assessments of Tracking behavior are representative of what occurred throughout the

Tracking field training exercises, the above accounts concerning individual and team performance during Profiling are only representative of the Army teams that received training. Extrapolations to the trainees from the Border Patrol and other non-military organizations that attended Border Hunter training can only be made by inference until additional empirical data are collected.

5e Physiological

Cooper's Color Code and Engagement

Border Hunter training continuously emphasizes the importance of maintaining vigilance or level of engagement. The course highlights Cooper's Color Code (CCC; Cooper, 1989) as a guideline to classify levels of engagement, and stresses individuals should stay in the "Yellow" for optimal performance during observation tasks.

Previous research has demonstrated the utility of recording heart rate and relating it to CCC levels as a measure of engagement during operational training (Kobus, Palmer, Kobus, & Ostertag, 2010). Thus, heart rate (HR) data were obtained during Border Hunter scenario-based observation post (OP) field exercises to assess the feasibility of collecting this type of data in the field. It was hypothesized that participants' heart rates would indicate that they remained primarily within the "Yellow" category of the CCC throughout all observation exercises. In addition, it was hypothesized that kinetic scenarios, involving dynamic actions, would result in higher heart rates.

Methods

During the observation/profiling portion of the Border Hunter course, HR data were collected from a single training team of trainees (n = 9). This team was comprised of five US Army Soldiers, two FBI agents, one Texas Ranger and one National Park Ranger. HR was monitored continuously throughout each of the profiling field exercises. Exercises consisted of teams of trainees placed at one of four OPs (Conex boxes placed 460–1000 meters from a "village") or at the Tactical Operations Center. Trainees were assigned to one of the OPs, where they sat or lay prone and observed the village using various optics, such as scopes, binoculars, and thermals.

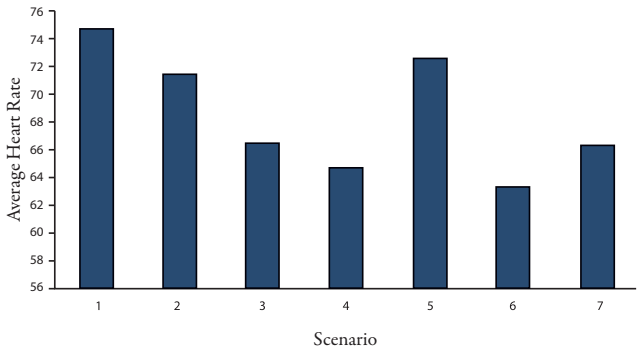


Figure 5E.1. Average heart-rate (bpm) across participants for each of the scenarios

The village was constructed specifically for the Border Hunter exercises and had role players that populated the village to carry out scenarios. Trainees were to observe the scenarios and report to the TOC events worth noting from an intelligence perspective. Team members changed positions for each of the scenarios. Heart rate data was collected during seven of the scenarios.

Apparatus

In order to monitor HR, Suunto Dual Comfort Belts were issued to participants. The belts and data collection system are minimally invasive, requiring the user to only wear a lightweight strap around their chest. The belts use Suunto wireless technology to transmit HR to the Suunto Team Pod receiver connected to a laptop through a USB port. A Lenovo® ThinkPad™ T60 laptop running the Windows XP® operating system was used as the data collection platform. The laptop ran the Suunto Monitor version 1.1.2 software and the Suunto Team Manager Version 2.3.0 software. The Suunto Monitor software provides real-time monitoring of HR and allows time stamping of significant events as they occur during exercises. All data files saved to the Suunto Team Manager were then exported to Microsoft Excel to complete the analysis.

Analysis

Due to conditions within the training environment, data collection was severely limited. There were a vari-

ety of issues (space, high wind, cold, sound levels) that affected the data collection effort. Therefore, post-exercise analysis was limited to computing average HR across participants for each scenario. To assess level of engagement during each of the scenarios, HR data were related to CCC. CCC is broken into four conditions that indicate an individual's level of engagement or readiness; White, Yellow, Orange and Red. A fifth condition, often referred to as Black, has been adopted by the USMC but not officially endorsed by Cooper himself. Heart rate zones have been postulated for each level of CCC (Grossman & Christensen, 2004). The heart rate zones are: White: < 80 beats per minute (bpm); Yellow: 81-100 bpm; Orange: 101-120 bpm; Red: 121-140 bpm; Black: >140 bpm. It should also be noted that individuals rarely went higher than Yellow in any of the field exercises for which HR data were collected.

Results

A one-way repeated measures ANOVA of average HR revealed a statistically significant main effect, indicating HR differences among scenarios $F(6, 62) = 11.1$, $p < .01$. Figure 5E.1 displays the average heart rate (in bpm) for each of the scenarios.

Table 5E.1. Pairwise comparisons for HR data between all training scenarios

		Scenario					
Scenario		2.0	3.0	4.0	5.0	6.0	7.0
	1.0	ns	**	**	ns	**	**
	2.0		**	**	ns	**	*
	3.0			ns	**	*	ns
	4.0				**	ns	ns
	5.0					**	*
	6.0						ns

* = $p < .05$, ** = $p < .01$, ns = not statistically significant

Table 5E.1 shows pairwise comparison results between scenarios. Scenarios 1, 2, and 5 demonstrated significantly higher heart rates than scenarios 3, 4, 6, and 7. Interestingly, the scenario that produced the highest average heart rate was scenario 1, when the team played the role in the TOC, which was in a tent and was sheltered from the environment.

While average HR differed between scenarios, HR levels stayed relatively low overall, rarely rising above the level of White in CCC. This is likely due to cold temperatures in the field, as well as the fact that participants remained stationary, and often in the prone position, during the scenarios.

Discussion

Unfortunately, collection of informative HR data was limited by environmental conditions and other aspects the Profiling scenarios. For example, participants were often in the prone position for several minutes at a time, during which the HR sensor was covered and no data could be collected. In addition, the observation posts were set at a wide range of distances (460 m – 1000 m) from the center of the village under observation, which channelized what the trainees could see from each viewing area. Also, visibility was limited due to the blowing sand from extreme high winds (gusts up to 60 mph), and trainees had difficulty communicating (hearing) even within a team, much less between teams. The challenges in viewing and communicating events in the village may have decreased situation awareness and engagement during the scenarios, which likely contributed to the heart rates being lower than previously observed (Kobus, Palmer, Kobus, & Ostertag, 2010). In fact, HR was highest when the team served as the Command Center and was stationed within the command tent that provided shelter and allowed the team to receive information from all the other observation posts, enhancing their situation awareness. This provided the most controlled environment and the best data collection. Yet, even under these conditions heart rate data from the team rarely exceeded condition White. The results of the HR data collection and the issues discussed in this section suggest that the feasibility and utility of assessing HR in relation to CCC during field exercises may be limited. However, this work has provided insight re-

garding some of the potential confounds and problems incurred when collecting this type of data in the field. Further research needs to be conducted under a variety of operational conditions to fully explore the utility of these measures for operational training.

Change Detection Task

A goal of the Border Hunter course is to enhance trainees' ability to observe people, their behavior and the environment. Attendees are trained to detect changes from an established baseline. The change detection task was designed to assess whether the Border Hunter course increased participants' ability to identify a change in a scene. Participants completed the task at the start of the course to establish baseline skill level, and completed a similar task following course completion. It was hypothesized that after completion of the Border Hunter course, trainees would be faster and more accurate in detecting changes in a scene.

Method

The change detection task required participants to view two rapidly alternating photographs on a screen (a flicker paradigm), and to identify the difference between the photos as quickly as possible. The difference was either the addition or the removal of a single item in the picture (e.g., a car, a bucket, etc.). Participants were seated 21.5 inches from a 19 inch computer screen. A chin rest was used to ensure all participants viewed the screen from the same distance. Pre- and posttests consisted of 10 original photographs of a scene (A) and 10 photographs modified with the addition or removal of a person or object from the original (A'). A and A' photograph pairs were alternated, each displayed for one second with a black screen (B) shown in between for 500 ms (A B A' B A, etc.). This sequence continued until the participant responded or until 90 seconds had elapsed without a response. In the event of a time out, a pop-up window indicated "Maximum time elapsed. Click OK to continue". Once OK was selected the program would advance to the next photograph. Participants were instructed that this was a timed task and to press the space bar as soon as they detected the change. Pressing the space bar stopped the display. Participants then used the mouse to click on the location on the photo where they detected the change. A change occurred on every trial. Once the participant clicked on the location, the next photograph was displayed. This procedure continued until the session was complete.

Results

Mean percent correct for the pretest was 79%, with a slight increase to 81% correct for the posttest. The mean response time to correct responses for the pretest was 22.4 s, while the mean response time for the posttest was only slightly faster at 21.4 s. One-way repeated measures ANOVAs revealed that differences between pre- and posttest were not statistically significant for percent correct or for response time (both $p > .05$).

Discussion

No statistically significant differences between pre- and posttest measures were found. A likely explanation for these results is that there was a restricted range due to the limited number of trials. Both tests consisted of only 10 items, due to time limitations for assessments. Regardless of the limited range of scores, performance was almost identical between both tests. Another possible explanation is that participants were highly experienced members of their respective agencies, and may have already developed the skills and abilities in detecting changes/anomalies in their environment (i.e., they were near ceiling in their performance).

Functional Field of View

The Functional Field of View (FFOV) test examines perceptual field of view and visual attention by measuring the ability to efficiently extract information from a briefly viewed scene. The test was adapted from Ball & Sekuler's (1986) work on FFOV and is made up of three separate subtests which are designed to mea-

Figure 5E.2. Target stimuli for the FFOV test were smiling and/or frowning faces

sure the speed of visual processing, the ability to divide attention, and selective attention abilities throughout the field of view.

The ability to perceive and process as much information as efficiently as possible is critical across a variety of tasks. Research suggests that by training people in the FFOV task, they are able to attain a larger FFOV, and that this increased FFOV is maintained for at least six months after the initial training period (Ball et al, 1988). These increases in FFOV appear to translate to relevant real world performance as well. Pringle, Irwin, Kramer and Atchley (2001) found that people with a larger FFOV were able to detect changes in a scene much faster than people with a smaller FFOV. These findings are in line with the earlier results of Ball et al (1988), since a person with a large FFOV would have a larger window of attention than someone with a small FFOV, and would thus be capable of gathering more information from a scene in a more rapid and efficient manner.

In the Border Hunter course, trainees are trained to detect objects within complex real-life scenes by learning what to attend to and how to better focus their attention. The development of these skills might be measurable by changes in the FFOV, demonstrating an increased ability to efficiently gather useful visual information from a cluttered scene. FFOV tests were conducted at the start of the Border Hunter course and again upon completion of the course to determine whether enhanced observation skills were manifested as increases in FFOV. It was hypothesized that FFOV would increase and response times would decrease between pre- and posttests.

Method

Complexity of a scene inversely affects the size of FFOV. Therefore, simple stimuli were used in the present study to maximize FFOV. Each subtest used simple line drawings of smiling or frowning faces as the target stimuli (see Figure 5E.2). The faces had a diameter of 2° visual angle and were displayed in black and white within a 1000 x 1000 pixel box which was centered on the screen of a 19 inch LCD monitor.

During the testing sessions, all participants used a chin rest to ensure they maintained a distance of 21.5 inches from the screen, which kept all stimuli at the appropriate visual angle. Participants responded to all of the subtests using the number pad on a standard computer keyboard. All participants completed three subtests in the same sequential order; focused attention, divided attention and selective attention.

Focused Attention

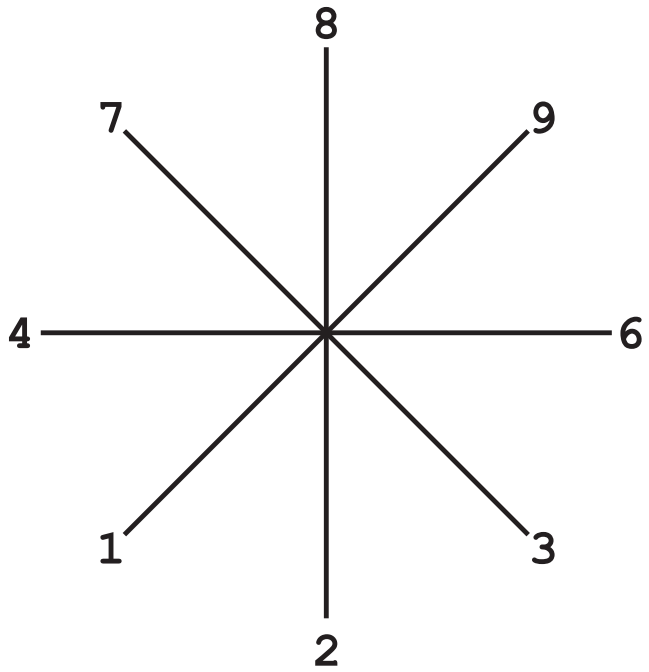


Figure 5E.3. Screenshot showing the eight radial lines along the cardinal and oblique axes in which stimuli could appear at any of three eccentricities (10°, 20°, or 30° visual angle). Numbers denote associated key pad response to indicate direction of the peripheral stimulus

During the focused attention task participants focused on a fixation cross located in the center of the screen. After a random period of 1-3 seconds the fixation cross was removed and target stimuli (see Figure 5E.3) were displayed. The stimuli consisted of two faces that either had the same expression (both faces smiling or frowning) or each face displayed a different expression (e.g. one smiling and one frowning). The order of presentation was random. Immediately following the presentation of the faces an array of vertical and horizontal lines was presented on the screen for 500 ms in order to mask (remove) any afterimage that may have been stored in visual memory. The participant's task was to press the "4" key on the number pad if the faces shared the same expression and to press the "6" key if the expressions were different. The initial stimulus duration was 50 ms, but was then varied as a function of accuracy on the task. A staircase method was used so that when participants responded correctly twice in a row, the display duration of the stimuli would decrease by 10 milliseconds. However, if the participant responded incorrectly the display duration would increase by 10 milliseconds. A reversal was counted whenever a participant responded incorrectly after getting two or more correct responses in a row, or if they responded correctly two times in a row after responding incorrectly. Dependent variables collected during the focused attention subtask were response time, accuracy, and the final stimulus display duration.

The conclusion of the subtask was determined in one of three possible ways: a) the participant responded correctly to 16 trials in a row, b) there were 12 reversals in the staircase, or c) the test "timed out" after five minutes. This procedure was used for each of the three subtests, and ensured the data collection period for the FFOV would not exceed the 15 minutes allotted in keeping with the limited assessment time.

Divided Attention

To measure the ability to divide attention, this subtask added a simultaneously presented peripheral target to which participants were required to respond. The participant still was presented with the two faces in the center of the screen (hereafter referred to as the center task), at the same duration as displayed during the Focused Attention task. However, another single smiling face was simultaneously displayed somewhere in the periphery. The face appeared randomly along any of eight radial lines along the cardinal and oblique axes, and at any of three eccentricities along circles with a diameter of 10°, 20°, or 30° visual angle. Participants were required to respond to the center stimuli just as they did in the Focused Attention task. Upon the response, an image was displayed showing the eight radial lines on which the single face could have appeared (see Figure 5E.4).

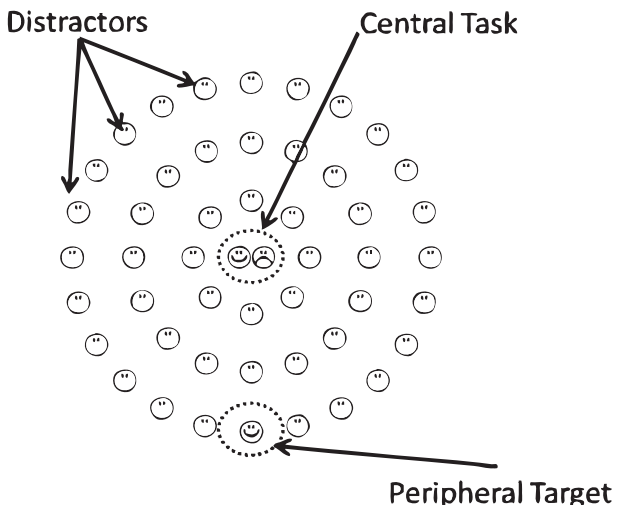


Figure 5E.4. Stimuli and distractors displayed during the selective attention subtask

Each line was labeled with the associated key on the number pad, so that the line directly up from center to the top of the screen was labeled as 8, the line to the upper right corner of the screen was labeled as 9, and so on. When the image was displayed the participants were to provide a second key press on the number pad to denote the location of the peripheral target. If the participant did not respond correctly to the center task, that trial was not counted and the data were eliminated from further analysis. This procedure ensured that participants were indeed maintaining their fixation on the center task. In addition, if participants did not respond within 5 seconds of the stimuli being displayed the trial was eliminated from further

analysis. Dependent variables for this subtask included response time, accuracy by peripheral location and eccentricity, and the final stimulus display duration.

Selective Attention

This subtask was conducted following the same procedures that were used during the Divided Attention subtask, except now 23 distracter stimuli were also displayed simultaneously with the target stimuli. Just as in the Divided Attention subtask, participants used the number pad to respond to the center task, and then responded to indicate the location of the smiling face in the periphery. The only difference was the presence of the distracters. The dependent variables were the same as in the Divided Attention subtask.

Training

Before testing, each participant completed practice trials of each subtask in order to become comfortable with the task and the response keys. For the practice trials, the starting display durations were much longer (500 to 1000 milliseconds) to reduce the complexity of the task. After participants felt comfortable with all of the subtasks they moved on to the full test. Typical practice sessions lasted 2-3 minutes. During practice as well as during each subtask, participants were instructed to guess if they were unsure about their response.

Analysis

For the Focused Attention subtask, the percentage of correct responses was calculated, as well as the mean response time. In addition, the final stimulus display duration was identified for each participant. These values were used to assess if any of the participants had problems with vision or the inability to focus attention. All participants were able to complete the tasks with stimulus durations of less than 100 ms indicating that no visual or attention problems existed in the trainee sample. This value also indicated the minimum time needed to process visual information.

The Divided Attention and Selective Attention subtasks required further calculation to determine FFOV size. First, the mean response time and percent correct were determined overall and for each eccentricity (10°, 20°, and 30° visual angle). The percentage correct at each eccentricity was used to perform a linear regression, and the FFOV size was defined as the degree of visual angle at which the percentage correct was equal to 50% (Ball et al., 1990 as referenced in Goode et al., 1998). The calculated values were capped at 30° for the upper limit and 0° for the lower limit due to these values being the respective maximum and minimum display angles for this test. One participant's data were excluded from all further analyses due to abnormal responses suggesting that he was simply making responses without attending to the task.

Results

All participants completed both the Focused Attention and Divided Attention subtasks almost perfectly, causing a ceiling effect and demonstrating no significant differences between pre- and post-training measures.

Data from the Selective Attention subtask ($n = 41$) were used to compute pre- and post-training FFOV size. A paired samples t-test revealed that post-training FFOV was significantly larger (M = 16.07, SD = 6.54) than the pre-training FFOV (M = 13.26, SD = 7.85), $t(41) = 2.81$, $p < .01$. This suggests that the Border Hunter training was successful in increasing the FFOV for the group as a whole. A second paired samples t-test was run on mean pre- and post-training response times. Contrary to the hypothesis, the post-training response times were significantly longer (M = 1274.2 ms, SD = 562.3) than the pre-training response times (M = 1168.1 ms, SD = 527.7), $t(41) = 2.04$, $p < .05$. One possible explanation for these results is that the trainees were fatigued at the posttest administration due to the rigorous training schedule, thus slowing their responses.

Participants were categorized by agency (Army, Border Patrol or Other) and a two-way repeated measures ANOVA was conducted on the Army and Border Patrol groups to determine whether there was a difference between agencies for pre- and post-training

FFOV size (n = 42). A within-subjects main effect of Training was found, $F(2,39) = 5.65$, $p < .01$ (which replicates the t-test result of a significantly larger post-training FFOV), though no there was no statistically significant effect of Agency or interaction between Training and Agency. These results suggest that the Army and Border Patrol groups began the course with similar FFOV sizes, and that their FFOV sizes increased similarly between the pre- and posttests.

Since age is known to significantly affect FFOV size, participants were also categorized by age group (20-29, 30-39, and 40-49) and a two-way repeated measures ANOVA was conducted. As expected (again replicating the t-test results) there was a main effect of Training, $F(1,39) = 7.354$, $p < .01$, though there was no significant effect of Age or interaction between Training and Age. These results suggest that initial FFOV sizes were similar across age groups, and that FFOV size increased similarly between the pre- and posttests, regardless of age.

Discussion

An important caveat for these data is that FFOV size is highly variable among individuals, which results in group data with high variances. High variances make it difficult to find significant differences between groups, even when the groups appear to be different. For this reason, the best way to determine training-related changes is to compare individual pre- and post-training FFOV sizes. However, even with the high variance in FFOV size, significant pre- and posttest differences did emerge in our group data from the Selective Attention subtask. The ceiling effects on the Focused and Divided Attention subtasks were anticipated due to the young ages of the participants (all of them below 60 years old) and were used primarily for screening, meaning that poor performance on either task would have been indicative of a visual problem or an attention deficit.

The results support the hypothesis that Border Hunter training increases the size of participant's FFOV and may be reflective of an increase in observational skills, allowing them to gather more information from a cluttered scene than before the training. However, the hypothesized decrease in response time was not supported by the data, and in fact a post-training increase in response time was observed. As noted, one possible explanation for these results is that fatigue due to over two weeks of rigorous training may have slowed post-training response times. Another possible explanation is that with a larger FFOV, more information is being processed within a given fixation, and more processing time may be needed before making a decision. This question needs to be further explored in future research.

There were also a few more specific limitations to this study which should be addressed by any future research. Due to the nature of the study, we were unable to gather pre- and post-data on a control group of participants who did not go through Border Hunter training. While the impact of this limitation is lessened by taking pre- and post-training measurements from participants (thereby having them act as their own control), it does limit the ability to conclude that the training itself is the cause of the increases in FFOV. Another limitation was in the test design. While this test was based on standardized testing procedures, a difficulty with the test design became apparent during data collection. Specifically, participants reported that they would occasionally press the incorrect key either by accident or after falling into a pattern of pressing a certain key. This could possibly result in FFOV estimates that do not accurately reflect the participant's attention capabilities, particularly with the relatively small number of trials that could be conducted in the allotted time. Design changes need to be implemented to address this issue and provide a more valid measure.

Future research should focus on determining what specific aspects of Border Hunter training resulted in the increases in FFOV, what other types of training might increase FFOV, and how an increase in FFOV translates to practical application of Border Hunter skills. In future research efforts, data should also be collected to monitor fatigue. This is especially important when the training is as rigorous as it was during the Border Hunter course. If FFOV size was found to decrease with fatigue it would serve as another important

reason to ensure personnel are well-rested. It is critical to fully understand what specific advantages come with a larger FFOV in order to be able to accurately illustrate its importance in an increasing number of real world situations.

SECTION

6 Field Study – Role-Players (Study 1)

The purposes of the role-player experimentation were to (1) document the training they received, (2) record the logistics of carrying out the combat profiling scenarios, and (3) test the hypothesis that the role-players receive useful training. Although it has been previously remarked that the role-players receive valuable instruction (Spiker & Johnston, 2010), this assertion had not been validated.

Empirical Testing

The role-players completed informed consents, demographics surveys, and two pretests on 16 April. They completed the corresponding posttests on 25 April. They also submitted brief reactions surveys for each day of classroom-based instruction (i.e., three days total). All of the testing materials were identical to those given to the regular trainees, except the demographics form was modified to include questions about role-playing experience. See the Appendix for more detail.

Videotaping

A dedicated video crew followed the role-player experience (see Figure 6.1). They taped the classroom instruction, rehearsals, and scenarios, as well as brief interviews with the role-players regarding their reactions to the course. This crew, directed by Eric Ortiz, was given unprecedented access to the ville during the combat profiling scenarios. Ortiz assumed the role of an insurgent cameraman, filming mock executions and attacks as real terrorists would, for exploitation purposes (see Figure 6.2). Curtis Brown and Michael Karmolinski, professional videographers from Metro Productions, acted as Al Jazeera network newscasters. By taking on these roles, the video team was able to

Figure 6.2. Professional videographers Curtis Brown (left) and Michael Karmolinski (right) played a news crew during the combat profiling scenarios

Figure 6.1. Eric Ortiz, videography lead, dressed as an insurgent in the Border Hunter ville

film the scenarios from inside the action.

Demographics

Twenty-two Soldiers (n = 22) received training in human behavior patterns, insurgent tactics, and Middle Eastern culture (see Figure 6.3). Information about the role-players include the following:

- Were relatively young (M = 24.5, SD = 4.90)
- Had an average of 3 years military experience (SD = 2.75)
- Ranged in rank from E-2 to E-5, with most role-players (n = 10) holding E-3 ranks
- Mostly came from the 11B (Infantry) Military Occupational Speciality (MOS) (n = 14)
- Mainly held high-school diplomas (n = 21) although, one had a bachelor's degree (n = 1)
- About one-fourth had been deployed to the Middle East (n = 6)

Daily Reactions

Reactions surveys were administered daily to the role-players during their classroom instruction. These surveys were passed out around the beginning of class, and they were collected by an experimenter after class ended. The role-player reaction form is the same for that was used to collect the main Border Hunter trainees' responses (see Appendix for details). As discussed in Section 3, the daily reactions surveys included 12 seven-point items, which were *a priori* divided into four clusters: perceptions of utility, affective reactions, estimated bias based on the instructor, and perceptions of the instructional materials. They also included a single, seven-point item that asked about the overall quality of the day's instruction and a small space reserved for open-ended responses regarding the most and least valuable elements of the training.

Figure 6.3. Soldiers receive training on how to act like insurgents during a scenario rehearsal

Method

On the first and second days of role-player training (16–17 April 2010), all 22 participants completed a reactions survey. On the third day, an additional Solider was recruited to participate in the training, and he also completed a reactions survey (but did not participate in any of the other experimentation). Thus, 23 respondents submitted reactions data on 18 April 2010.

Results

First, the reverse-scored items were recalculated, so that 1 = negative reaction and 7 = positive reaction. Then, basic means and standard deviations were calculated for the five categories data (perceptions of utility, instructor, and instructional material; affective reactions; and overall assessment of the training). Table

Table 6.1. Daily role-player reactions to the classroom-based instruction

Day	Perceived Utility of Training	Affective Response to Training	Perceived Bias Due to Instructor	Reaction to Teaching Materials	Overall Reactions
1	M = 6.2, SD = 1.18	M = 5.7, SD = 0.93	M = 4.2, SD = 1.11	M = 4.3, SD = 0.95	M = 6.4, SD = 0.67
2	M = 6.4, SD = 0.64	M = 5.4, SD = 1.14	M = 4.1, SD = 1.33	M = 4.6, SD = 0.94	M = 6.5, SD = 0.60
3	M = 6.4, SD = 0.75	M = 6.3, SD = 0.86	M = 4.2, SD = 1.20	M = 4.9, SD = 0.83	M = 6.5, SD = 0.60

6.1 lists the results of these analyses. Again, all items are scored on a seven-point scale where:

1 = extremely negative reaction
4 = neutral reaction
7 = extremely positive reaction

Discussion

The results indicate that the role-players judged their training as *very useful* and *very enjoyable*. They did not feel that their perceptions of the training were biased by the quality of the instructors, and they were indifferent to the instructional materials (e.g., booklets, handouts) that they received. Overall, the role-players rated the classroom instruction very high, between *good* and *extremely good*.

The open-ended comments from the role-players were also positive. On Day-1, four role-players reported that learning about the brain/thought processes was the most valuable part of the instruction. Nine responded with generic, positive statements, such as "I thought all of it was pretty valuable" or "I learned a lot of stuff about combat profiling." When asked which parts of the day were least valuable, two felt the discussion on brain processes lacked value, and two disliked the "Mule Deer Buck" hunting metaphor. However, the majority (n = 13) either left this item blank or wrote a positive statement, such as "Nothing at all [was least valuable]. Great session today."

On Day-2, seven role-players felt the lecture on kinesics (i.e., body language) was most valuable, and another seven wrote that the entire "Six Domains of combat profiling" presentation was the most valuable part. Finally, another three wrote generic comments, such as "I thought all was very useful and well taught." On the negative side, three felt the side-bars and examples distracted from the class, and one wrote "Coopers color code still valuable but everything else was more important." Once again, a majority of respondents (n = 16) either wrote nothing for the least-valuable item or filled in that space with a positive comment, such as "There wasn't one part that I thought wasn't valuable."

On Day-3, most role-players (n = 13) reported that learning the terrorist mindset and seven-step terrorist planning cycle were the most valuable components. Others most enjoyed the discussion on the five combat multipliers, hands-on exercises, or "everything." Once again, when asked about the least valuable parts of the day, most trainees failed to respond negatively. Five wrote that they would have liked more classes, and as before, most (n = 14) left the least-valuable item blank or otherwise left a positive remark, such as "There was no least valuable part. Great class!!" However, two thought too much time was spent on the terrorist planning cycle, and several (n = 5) felt the class periods should be shorter per day (although most also felt that more days should be added).

Overall, these data suggest that the trainees viewed the training positively. They felt the training was useful, enjoyable, and that many of them would like to have more of it.

Learning Outcomes

Declarative Knowledge Test

In order to assess role-players' knowledge gain, they completed the same observation/profiling declarative knowledge pre- and posttests, at the same time, as the enrolled trainees. Mean and standard deviation were computed for pretest and posttest scores (measured as percent correct) across role-players who completed both tests (n = 19). The mean pretest score was 26% correct (SD = 7.3), and the mean posttest score was 55% correct (SD = 20.6). In order to assess declarative knowledge gained by the role players, a paired samples t-test was conducted on their pretest and posttest scores. The results revealed a statistically significant difference between pretest and posttest scores, $t(18) = 6.11$, $p < .01$, indicating increased declarative knowledge following observation/profiling instruction.

Role-Player vs. Enrolled Trainee Scores

An additional analysis was conducted to determine whether there was a significant difference in declarative knowledge test scores between role-players and train-

ees enrolled in the full 20-day class. A two-way (Group; Trainee or Role Player x Training; pre- or post-) mixed model ANOVA was conducted. There was a statistically significant effect of Training, $F(1,59) = 326.26$, $p < .01$. The effect of Group was also statistically significant, $F(1,59) = 38.33$, $p < .01$, as was the interaction between Training and Group, $F(1,59) = 27.22$, $p < .01$. These results reflect the greater increase in posttest scores relative to pretest scores for enrolled trainees as compared to role-players. The results indicate that the trainees and role-players began the course with similar knowledge of observation/profiling terminology and concepts, but that trainees made greater gains in their declarative knowledge during the course than did the role-players. These pretest and posttest means and standard deviations are displayed in Figure 6.4.

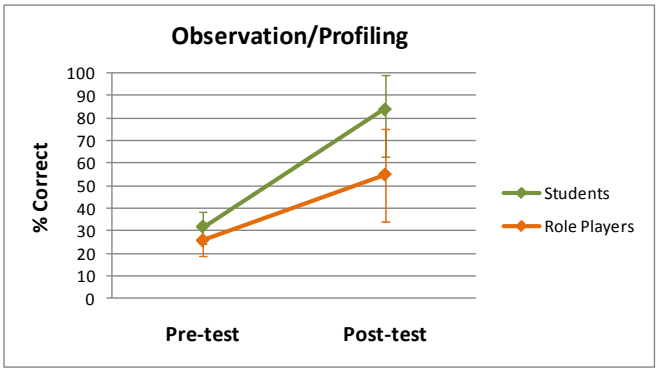


Figure 6.4. Mean observation/profiling declarative knowledge pretest and posttest scores by group. Error bars are standard deviations.

Photo Vignette Assessment

Like the enrolled trainees, the role-players completed pre- and posttest photo vignette assessments for the combat profiling domain (see Section 4 for more details on the method).

Table 6.2. Profiling photo vignette assessment content analysis results for role-players (*n*=20)

Response Type	Pre-Training Group Mean	Post-Training Group Mean	Statistical Significance
Descriptive	3.63	1.95	$p < .05$
Meaningful	1.67	2.25	$p < .05$
Terminology	0.00	0.32	$p < .05$

Table 6.3. Results of pre and post training intelligence value ratings for role-players' profiling responses

Pre-Training Group Mean	Post-Training Group Mean	Statistical Significance
3.82	4.87	p < .05

Content analysis on role-players' photo vignette assessment responses revealed results similar to those observed for enrolled trainee responses. There was a significant decrease in Descriptive information and a significant increase in Meaningful information from pre- to post-training responses. In addition, there was a significant increase in use of profiling terminology. The mean number of instances of each response type, pre- and post-training, is displayed in Table 6.2, along with the one-way ANOVA results for pre- vs. post-training differences in responses of each type.

The one-way repeated measures ANOVA on role-players' responses revealed that the intelligence value of the information provided increased significantly from pre- to post-training. Mean pre- and post-training response ratings are displayed in Table 6.3, along with the results of the ANOVA. While the rated intelligence value of one role-player's responses decreased from pre- to post-training, rated intelligence value increased for all other role-players.

Conclusion

The role-player-focused experimentation attempted to document the role-player experience and assess whether they received effective observation/profiling instruction. Unprecedented researcher and videographer access assured extensive documentation of the role-player experience. Measures of role-players' perceptions of the training, their declarative knowledge gain, and application of their knowledge to photo vignette assessments all strongly suggest that the role-players benefitted from the experience.

SECTION

7 Field Study – Instructors (Study 1)

This section presents an expert model and a developmental model for "Combat Hunters." Working as part of a large multi-disciplinary team, the Cognitive Performance Group (CPG) observed the Border Hunter course and conducted in-depth cognitive task analysis interviews with six tracking instructors and nine combat profiling instructors. The objectives of these activities were to:

1. Assess the feasibility of deriving an expert model of Combat Hunter skill.
2. Propose a developmental model of Combat Hunter expertise that can drive the design of future training and measures of training effectiveness.

Strategies for representing expertise vary widely. In this project, a cognitive engineering approach was used. Cognitive engineering has been defined as "an approach to the design of technology, training, and processes intended to manage cognitive complexity in sociotechnical systems" (Militello, Dominguez, Lintern, & Klein, 2010: 3). This approach has been used successfully to develop training in a broad range of domains including landmine detection (Staszewski, 1999; 2004; 2008) and meteorology (Hoffman, Coffey, Ford, & Carnot, 2001).

The expert model presented in this report leverages a number of knowledge representation techniques. *Concepts maps* provide an overview of skilled performance within the tracking and combat profiling domains. *Incident narratives* are offered to provide a view of Combat Hunter expertise in context. Finally, *decision requirements tables* are used to highlight the critical decisions involved in each of these domains, as well as common errors associated with these decisions, and cognitive abilities typically used in dealing with these critical decisions.

The developmental model is presented in a series of tables detailing core competencies and learning outcomes, each of which is classified in terms of learning outcome type (Job Knowledge, Job Skills, Cognitive Abilities) and learning levels (I, II, III). Finally, candidate teaching/training methods for each learning outcome are offered.

Demographics

A total of six experienced trackers and nine experienced profilers were interviewed as part of the cognitive task analysis. All were experienced practitioners as well as experienced instructors. A summary of participant demographics is included in Tables 7.1 and 7.2.

Table 7.1. Interviewees' professional experience

	Professional Experience	
	Trackers ($n = 6$)	Profilers ($n = 9$)
Law Enforcement	3	3
Military	2	4
Both	1	2

Table 7.2. Interviewees' years of experience

	Years of Experience	
	Trackers	Profilers
Mean	30.8 years	15.9 years
Range	15-45 years	3-42 years

Expert Model Development

Methods

A combination of cognitive task analysis interviews and observations, and psychometric instruments were used to obtain an understanding of Combat Hunter expertise. Interviews and observations were conducted by two researchers experienced with qualitative methods. A trained industrial/organizational psychologist administered all psychometric instruments.

Cognitive Task Analysis

Cognitive task analysis methods draw from a rich and lengthy tradition of task analysis, leveraging component of methods used as far back as the psycho-technicians in the late 1800s (Hoffman & Militello, 2010). Cognitive task analysis has been applied across a range of military and commercial domains in the context of both basic and applied research. For this project, a suite of three complementary interview techniques were used including the Task Diagram, Concept Maps, and the Critical Decision Method.

Interviews were conducted individually. One-to-two interviewers were present for each interview. Interviews lasted approximately two hours. Each interview was audio recorded and transcribed to facilitate qualitative data analysis. Permission to record the interviews was requested of each interviewee. Recorders were occasionally turned off at the request of interviewees. Interviewees were assured that all data would be treated as confidential.

Task Diagram. The *Task Diagram* interview method (Militello & Hutton, 1998) is designed to aid researchers in quickly coming up-to-speed in a new domain. It provides an overview of the major tasks required for skilled performance and highlights those that are most cognitively complex for further study. For this project, each participant was asked to list 4–6 key components of either tracking or profiling, depending on his or her area of expertise. A brief discussion followed in which the interviewer obtained an explanation of each component. The resulting high-level overview of skilled performance provided a foundation for the Critical Decision method portion of the interview.

Critical Decision Method. The *Critical Decision method* (Crandall, Klein, & Hoffman, 2006) is perhaps the most well-established cognitive task analysis method. First articulated in 1989 (Klein, Calderwood, & MacGregor, 1989), the method is based on Flanagan's Critical Incident technique (Flanagan, 1954). Interviewees are asked to recall an incident in which their skills were challenged. After obtaining a brief overview of the incident, the interviewer and interviewee work together to build a rough timeline of the major events. From the timeline, the interviewer then probes critical points in the incident to explore elements such as:

- Goals that were considered during the incident
- Options that were generated and evaluated
- Cue utilization
- Contextual elements
- Situation assessment factors specific to particular decisions

In the final portion of the Critical Decision method interview, hypothetical questions are used to explore errors inexperienced personnel might have made in similar situations and to explore the implications of specific cues or events within the incident.

Critical Decision method protocols provide detailed records of the information gathering, judgments, interventions, and outcomes that surround problem solving and decision making in a particular task or domain. Although recall of specific events cannot be assumed to be perfectly reliable, the method has been highly successful in eliciting perceptual cues and details of judgment and decision strategies that are generally not captured with traditional reporting methods (Crandall et al., 2006). Moreover, it provides such information from the perspective of the person performing a task, and so it can be particularly useful in identifying cognitive elements that are central to its proficient performance.

Concept Map. *Concept maps* were initially developed as an instructional tool to help instructors assess trainee understanding of concepts and relationships (Novak & Gowin, 1984). More recently, however, concept maps have proven useful in capturing mental models (Hoffman, Shadbolt, Buton, & Klein, 1995). For this project, the three most experienced instructors were asked to build a concept map describing skilled performance, guided by the interviewer. A question such as, "what does it take to be a skilled tracker?," was used to focus the concept map. As the interviewee described skilled performance, the interviewer recorded key concepts on a whiteboard and worked with the interviewee to define propositions linking concepts. Cross-links were added where appropriate to connect different segments of the map.

Observations. Two trained qualitative researchers observed 17 days of Border Hunter training. Observers recorded field notes in notebooks, focusing primarily on domain familiarization. Consistent with grounded theory (Strauss & Corbin, 1998), observers did not begin with a pre-conceived theory. Rather, the goal was to experience the training with an open mind, with the intent of building an understanding of the phenomenon rather than testing a theory.

Analysis

Cognitive Task Analyses

All interviews were transcribed to facilitate qualitative analysis. Researchers reviewed transcripts, searching for themes related to Combat Hunter expertise. Incidents were extracted and retold in narrative form (see Appendix G), from which decision requirements were extracted. Important themes that emerged elsewhere in the interviews were also extracted. Decision requirements from individual interviews were discussed until consensus was reached by the research team. Composite decision requirements tables were then constructed for tracking and for profiling, depicting the decision requirements and important contextual information for each.

A second sweep through the data focused on a developmental model of skilled performance. Researchers reviewed transcripts and field notes for job knowledge, job skills, and cognitive abilities specific to skilled tracking and profiling. Elements were discussed until consensus was reached. Based on the job knowledge, job skills, and cognitive abilities, a development model for each area of expertise was proposed (see Appendix G).

Psychometric Scales

Three measures comprised the cognitive battery given to trainees (n = 43) (see Section 5), as well as tracking (n = 6) and combat profiling (n = 9) instructors. These measures were established to relate strongly to three main attributes instructors were believed to possess: Attention to Detail, Critical Thinking, and Creativity. All three measures were provided at the same time, and participants were given 90 minutes to complete the battery. The battery consisted of the *Work Personality Index* (Macnab & Bakker, 2001), *Watson-Glaser Critical Thinking Appraisal* (Watson & Glaser, 1994), and the *Remote Associates Test* (Mednick & Mednick, 1962) (see Section 5 for more details).

Results were not obtained or were unable to be analyzed for all participants. While all data were retained for Trackers (n = 6), the trainee (n = 42) and Combat Profiler (n = 6) sample sizes were lowered. Each subgroup was analyzed for within and between group differences.

First, the WPI was analyzed using a one-way between-subjects multivariate analysis of variance (MANOVA) to investigate the impact of participant group on personality measures. This analysis was selected because of the multiple dependent variables investigated within the WPI. Three groups were formed (Group 1: Trackers; Group 2: Combat Profilers; Group 3: Trainees), and results indicated a statistically significant difference between these groups: Wilks' Lambda (=.241), $F(36, 68) = 1.955$ at the $p < .009$ level, partial $\eta^2 = .509$.

When the results of the dependent variable where

examined separately, only the innovation scale (within a larger factor termed Problem Solving) attained significance: $F(2, 51) = 3.96$, $p < .05$; partial $\eta^2 = .134$. Post-hoc comparisons using the LSD test indicated that the mean score for trackers M= 7.0, SD = 2.28) was significantly higher from trainees (M = 5.5, SD = 1.29) and combat profilers (M = 4.8, SD = 1.17). These results inform that trackers scored significantly higher than combat profilers and trainees on the Innovation subscale of Problem Solving. Further, there was no significant difference on this attribute between combat profilers and trainees.

The second set of analyses was run on the Watson-Glaser. Here, a one-way ANOVA was run on the three groups to explore the impact of the grouping variable on Critical Thinking Skills as measured by normative percentiles. No significant differences were found among any of the groups on this test $F(2, 51) = .409$, $p > .05$. These results indicate that no one trainee or instructor group outperformed another, and that with certain exceptions, all participants scored in the same range on this particular test of critical thinking.

Last, the Remote Associate Test was analyzed by conducting a one-way ANOVA to explore the impact of the same three groupings from the above analyses. This analysis was chosen because the independent variable contained three groups. There was a statistically significant difference at the $p < .05$ level in scores for the three groups: $F(2, 50) = 22.96$, $p < .05$; $\eta^2 = .48$. Post-hoc comparisons using the LSD test indicated that the mean score for trackers (M = 16.17, SD = 8.33) was significantly lower than combat profilers (M = 24.67, SD =3.20) and significantly higher than trainees (M = 8.39, SD = 5.70). Scores for combat profilers on creativity were also significantly higher than trainees. These results indicate that both sets of instructors outperformed trainees on the test of creativity.

Results

Expert Model

A Combat Hunter expert model is made up of both tracking and profiling expertise. A description of expertise in both domains was derived from the cognitive task analysis. Figure 7.1 presents an integrated model of the skilled Combat Hunter. This high-level conceptual view, depicts the goal and critical cognitive elements of Combat Hunter expertise. An integration of tracking and profiling allows the Combat Hunter define a baseline in any setting, from there take on the perspective of the quarry/adversary, and then apply technical and tactical skills to influence the quarry or adversary. Actions generally fall into one of three categories: kill, contact, or capture the quarry. Continually updating one's mental model of the situation allows the Combat Hunter to develop an integrated view of the situation, promoting action "left of bang."

In order to explore the development of Combat Hunter skills, however, a more detailed model is required. The detailed model (presented in Appendix G) includes concept maps summarizing the key aspects of expertise for each domain. Sample incident narratives are also presented in the Appendix to illustrate the aspects of expertise in context. Finally, decision requirements tables detailing critical decisions experts must contend with are provided.

Psychometric Findings

Comparison of scores between the participants indicated that there two areas where the instructors performed better than the trainees. One such area was in innovative thinking. These results suggest that when problem solving, trackers are more open-minded, curious, and are willing to consider unconventional ideas and solutions more so than combat profilers or trainees in this sample.

The second area where instructors were high performers was in creativity as measured in the RAT. Both trackers and combat profilers scored higher on average than the trainees in this dimension. In particular, combat profilers scored higher in creativity than the trackers. These results suggest that instructors, in particular combat profilers, are better able to make sense of associations among various sets of data in order to assess a situation. Appendix G includes a more thorough

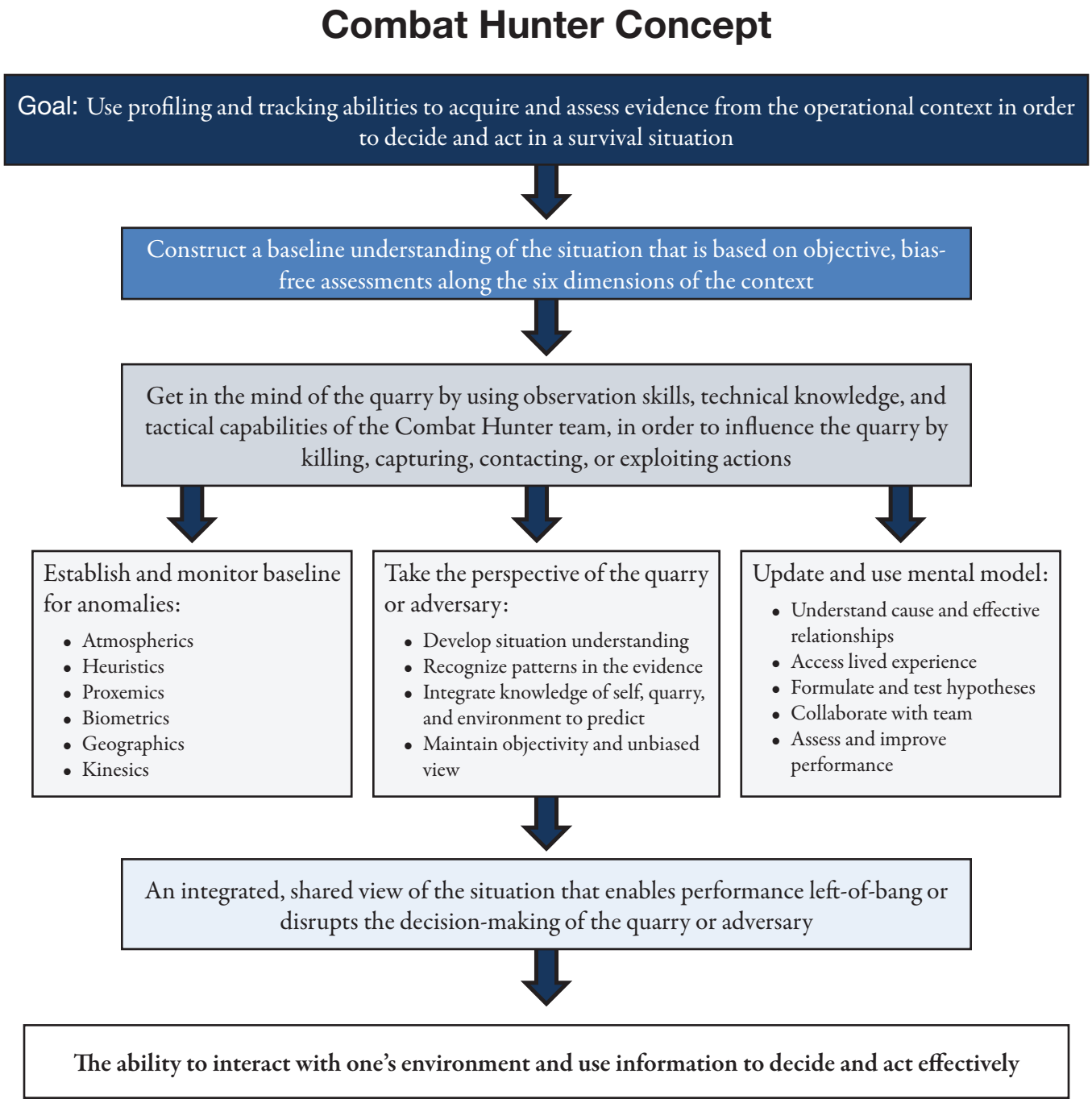


Figure 7.1. Expertise for deciding and acting in survival situations

breakdown of performance based on the three different groups evaluated.

Discussion

Our intent was to identify common traits, aptitudes and skill sets that distinguished the "outliers," that is, the SMEs who modeled the performance for the trainees—our goal was not to assess the effectiveness of the training solutions. We benefitted tremendously from being able to interact with the trainers, trainees, and other researchers who were present. We also were guided by the central issues of representing the elements of the expertise and assessing whether there was a development model that would produce similar qualities in a training audience.

While these two domains are currently taught by two different sets of instructors and are in many ways two different skill sets, the potential for integration of these skills is powerful. This is perhaps most evident via examination of the core competencies for each domain. We conclude that a more integrated presentation of the two skill sets that make up combat profiling and combat tracking would likely be beneficial to future Combat Hunters.

Conclusion

We applied both quantitative and qualitative methods to understand the underlying abilities and foundational knowledge that are present in the exceptional performers. Our effort was used to identify the aptitudes that characterize the instructor group and determine what part of the trainee population possessed similar aptitudes. We had limited performance measures for trainees, and thus we were not able to thoroughly explore the issue of whether psychometric instruments could be used to predict who would be an exceptional profiler or tracker. We did expect that where differences between instructors and trainees were identified, these gaps might be filled with instruction about critical thinking, creativity, and attention to detail.

The administration of the Cognitive Battery was performed as means of describing the aptitudes of the instructors. At the request of the Program Administrator, the same battery was administered to the trainee group to assess whether the attributes could be used as predictors of Combat Hunter performance. However, the results of the trainee group assessment were inconclusive due to the limited amount of performance data. Some usable information about the aptitudes of the instructors was produced and the findings are consistent with the qualitative data collected. We conclude that as a group, the instructors demonstrated an aptitude for creativity. This aptitude seemed to be an important factor in sensemaking and mental simulation of complex problem contexts. The ability to develop explanations of cause-and-effect relationships from evidence collected from the environment proved vital to mission success in both tracking and profiling scenarios.

This project resulted in an expert model and a developmental model of a skilled Combat Hunter. Our analysis indicates that tracking skill relies largely on a set of reliable and predictable indicators. Learning to see and read these indicators well, understanding their significance in a range of contexts, and using them to predict behavior; this is, in some ways, analogous to the skill of a chess master. The chess master learns a finite set of chess moves but is able to read a chess board and predict an opponent's moves, displaying expertise that goes way beyond the technical rules of chess. We suspect that the same is true for tracking. Although much of the training focused on technical tracking skills, it was the application of those technical skills to read spoor and predict the quarry's movements, and to skillfully apply tactics as if they were tailored to each tracking situation, that instructors worked to convey.

Profiling, on the other hand, is focused on preparing the Combat Hunter to observe elements of human behavior that have a core similarity but may be exhibited in an infinite number of ways depending on the culture, the setting, the mission, and general human variability. The profiler is, in some ways, analogous to a skilled poker player who is always paying attention to detail, including which cards have been dealt and the emotional state of other players. The expert poker play-

er is constantly evaluating risk, deciding when to commit resources, and evaluating the potential payoff. We suspect that the skilled profiler has many of the same attributes. Training focused on what to look for—in this case, not which cards have been dealt, but where are insurgents getting supplies to make explosives? Training also included strategies for reading the emotional state of an unknown person. Instructors encouraged trainees to pay attention to visible signs of anxiety (i.e., sweating, flush), and lying (dilated pupils, lengthy explanations), as well as body language and other indicators of social masking. Trainees were also provided strategies for evaluating a potential threat and different levels of response based on the threat level (i.e., kill, capture, contact, do nothing).

As mentioned previously, these two domains represent different sets of instructors and skill, yet are potentially well integrated. This is perhaps most evident via examination of the core competencies for each domain. For each there are shared technical skills.

Profiling and tracking are made up of complex cognitive skills integrating situation awareness, pattern matching, detection of anomalies, sensemaking, story-building. Instructors and trainees emphatically agree that these skills are trainable. Both tracking and profiling were described as skills that are inherent to the human condition. The courses we observed provide vocabulary and connections that direct attention and set the stage for self-reflection, discussion, and incorporation of practice into everyday life.

The expert model and developmental model resulting from the CPG cognitive task analysis effort represent an important step forward in capturing Combat Hunter expertise and making it more widely accessible. However, we caution that this may be the tip of the iceberg. Interviewees expressed the belief that the most effective instructors are those that bring passion, and connect Combat Hunter skills to the lives of the trainees. It is a commonly held belief that effective instruction requires instructors with extensive first-hand experience. Interviewees report that skilled instructors are modeling a way of observing and interacting with the world.

Establishing a vocabulary and procedures to describe tracking and profiling skills is an important step toward growing Combat Hunter expertise. We are skeptical, however that effective Combat Hunter training can be accomplished absent highly experienced and passionate instructors. A next important step will be to investigate what aspects of Combat Hunter skill may be taught via strategies suited to broad dissemination such as distance learning, text, and scripted lectures and demonstrations versus what aspects require the presence of a highly-experienced passionate instructor.

SECTION

8 Longitudinal Analysis (Study 2)

Longitudinal studies involve repeated measures, over time. In this case, repeated knowledge measures were employed to assess trainees' retention of the Border Hunter training content. Twelve participants complete the initial baseline questionnaire, which differed from all of the previously administered apparatus and included sections on skill application (similar to the photo vignette assessment), recall, and recognition. A portion of these trainees completed follow-up versions of the questionnaire approximate one and two months later (n = 7 and 9, respectively). At the third administration, trainees also completed a follow-up reactions survey, similar to the long-form reactions survey administered at the end of the Border Hunter course.

The purpose of this study was twofold. First, we attempted to determine the amount of skill decay that trainees generally experience after leaving the Border Hunter (or similar) training environment. These data provide valuable insight for training administrators, for example, for determining when to schedule refresher training. Second, we wanted trainees to retrospectively evaluate their Border Hunter experience, and report on whether they had used the Border Hunter KSAs in their own mission contexts.

Method

Participants

Because the trainees are stationed around the country, researchers could only follow a portion of the class longitudinally. Hence, only twelve trainees were selected to participate in this study. Half of these participants were Army scouts (n = 6) from the 3BCT/1AD at Fort Bliss, and the other half were Border Patrol Agents (n = 6) stationed at El Paso, Yuma, or El Centro. These specific trainees were selected because they were assigned to active operational missions or training duties (rather than working in an administrative position where they would be unable to adequately employ their training). Additionally, these participants were located in relatively close physical proximity to one another (i.e., in neighboring states), which better facilitated data collection.

Materials

We developed three equivalent versions of a knowledge questionnaire for this study (see the Appendix). Different versions were created because we believed trainees would be motivated to perform well and that they would review questions they could not answer. In other words, we felt that test–retest bias was a potential confound. Each test version was reviewed by SMEs and adjusted based upon their input. All of the questionnaires included:

- Knowledge Application section
  - Two tracking image-assessment questions
  - Two profiling photo-assessment questions
- Recall section
  - Four tracking short-answer questions
  - Four profiling short-answer questions
  - Two tracking long-answer questions
  - Two profiling long-answer questions
- Recognition section
  - Ten tracking multiple-choice questions
  - Ten profiling multiple-choice questions

Questionnaires required around 90 minutes to

Figure 8.2. One of the profiling photo vignettes from the profiling knowledge application section of Test Version 3 (photo courtesy of Tracy St. Benoit)

Figure 8.1. One of the tracking image vignettes from the tracking knowledge application section of Test Version 1

complete. Trainees were permitted to take as much time as they required.

The images/photos used in the knowledge application section were printed (in color for the profiling photos) on the apparatus, and trainees could view the photos as long as they wished. The tracking image vignettes consisted of simulated ground spoor technical drawing (see Figure 8.1). Trainees were asked specific questions about the footprints, such as "What information would you include about these prints in a SITREP?" or "How many people are walking together, and how can you tell?" They were also asked to describe the scene, in general.

The profiling photo vignettes were similar to those used previously, but six different photos were selected for inclusion (see Figure 8.2). For these vignettes, trainees were explicitly instructed to use their combat profiling vocabulary and think about what information might be mission relevant.

As mentioned above, a reactions questionnaire (based upon the long-form reactions survey used at the end of the Border Hunter course) was also administered to participants during the third administration of the longitudinal study, around the end of June 2010.

Table 8.1. Mean scores (and standard deviations) divided by Agency and Administration time; means are rounded to the nearest whole number

	Time-1 (*n*=12)	Time-2 (*n*=7)	Time-3 (*n*=9)
Army	71 (14.0)	73 (7.6)	62 (12.1)
Border Patrol	64 (7.0)	64 (23.5)	68 (8.1)
Total Average Score by Time	68 (11.6)	69 (15.4)	64 (10.9)

Design

This experiment used a repeated-measures design, where the independent values were Administration Time (Time-1, Time-2, and Time-3) and Agency (Army versus Border Patrol), and performance was the dependent variable.

Procedure

The baseline administration of the longitudinal questionnaire occurred on 25 April, after the trainees had completed their other Border Hunter posttests. The second administration occurred between 18–20 May 2010 for most trainees (although lack of access required that one trainee submit his second administration at a later time and prevented some trainees from completing a second administration all together). Finally, the third administration occurred roughly at the end of June 2010. Again, lack of access necessitated

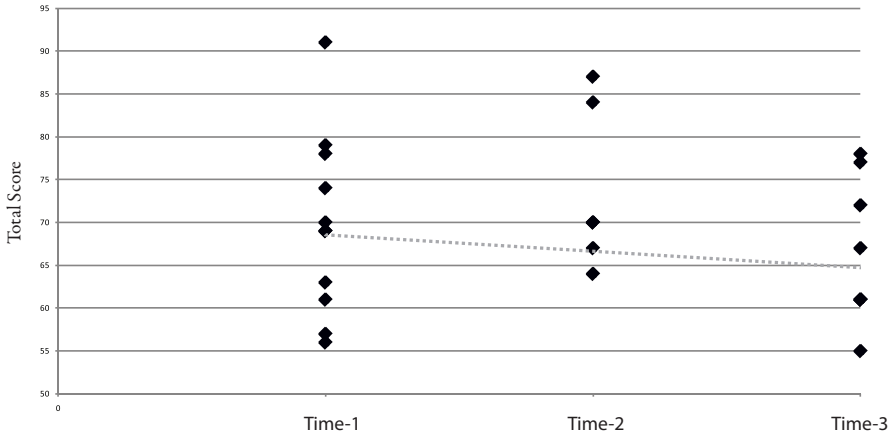


Figure 8.2. Individual participants' total scores by administration time; the gray dotted line shows the trend

that some trainees complete their third questionnaires independently and mail the results back to the experimenters. All of the participants in this study are active-duty Army or Border Patrol personnel, and their professional duties prevented them from meeting with the researchers at times.

When available, two members of the research team met with the participants and personally administered the questionnaires. The researchers' traveled to the participants' home stations, and when certain participants were unavailable, the researchers discussed administration procedures with a ranking officer or supervisor. In a few cases, researchers emailed participants directly, sending them the appropriate version of the test for them to complete and return via mail. Unfortunately, not all participants responded each time. For Time-2, only seven participants were available, but for Time-3, two of these participants were recovered for a total $n = 9$ for Time-3.

Scoring and Analysis

Two members of the research team independently scored all of the knowledge questionnaire. A rubric was created for the knowledge application section, to assess the correctness and completeness of trainees' responses. Additionally, the uses of tracking or combat profiling vocabulary were counted; each incident was counted, regardless of whether it was accurately employed. Trainees could score a maximum of 10 points on both the rubric and language use. The short- and long-answer questions were also scored based upon a rubric. Two points were available for short answer questions, and 10 were available for long-answer questions. Finally, each multiple-choice question was scored out only one point. The two raters graded each questionnaire independently, and then compared answers. When they disagreed on a score, they discussed the issue and came to an agreement.

Results

Test Versions

A one-way ANOVA was performed for each Administration Time in order to ensure similarity between the three test versions with respect to their domains (Applied, High and Low-Level Declarative Knowledge). No significant differences were found between test versions at any Administration Time on any domain ($p > .05$ in all cases), indicating that the three test versions used were equivalent.

Quantitative Analyses

A repeated measures within-subjects ANOVA was used to examine participants' scores, with respect to self and across the three test administra-

tions. No significant differences in total score were found ($F(1,2) = 2.911$, $p = .101$). Although (as can be seen in Figure 8.2), a slight downward trend appears over time.

Therefore, in order to include a more robust number of participants, individual *t*-tests were performed between administrations. A Bonferroni adjustment was used, in order to reduce Type I error, and as a result, the significance cutoff was set at 1.67% rather than 5%. With this significance criterion, no significant differences were found between Administration Time-1 and Time-2 ($n = 7$; n.s.), Time-2 and Time-3 ($n = 6$; n.s.), or between Time-1 and Time-3 ($n = 9$; n.s.).

Reactions

Long-form reaction data were collected from seven longitudinal participants at Time-3; as before, items were scored on a seven-point scale in which 1 = negative and 7 = positive. Table 8.3 shows a synopsis of the results. The reactions survey also included several open-ended questions (see the Appendix for full details). First, participants were asked "In retrospect, do you think attending the course was a good use of your time?" The respondents unanimously replied "yes" and several elaborated:

- "Yes I think the skills learned in the class can be used in everyday life and military as well."
- "Extremely valuable. However would be nice if handouts or training slides were available for instruction."
- "Yes it taught me to be more aware of my surroundings"
- "Yes, it brought more useful knowledge to table, where I can resort back to and also use in the field to accomplish the mission on hand."
- "Yes, I can try to read body language more, when talking to possible subjects."

When asked "if you could enroll your personnel in a 20-day Border Hunter course, would you do so?" participants who responded all replied affirmatively. Two elaborated; one wrote "Yes it's a skill all soldiers should know," and the other said "Yes, the more knowledge and experiences that person has, the more productive he can be for the unit."

Table 8.2. Mean scores (and standard deviations) on the retrospective reactions questionnaire; scored out of 7

	Rating (n=7)
Overall Combat Tracking	6.7 (0.49)
Overall Combat Profiling	6.7 (0.49)
Utility (I think the instruction was useful.)	6.7 (0.49)
Affect (I enjoyed the instruction.)	6.4 (0.53)
Materials (The instructional materials were good.)	6.4 (0.53)
Use (Since April, I have used some of the training in some aspect of my job.)	6.4 (0.53)
Transfer (Since April, I have taught one or more of my teammates some the material.)	6 (0.82)

Discussion

Complex cognitive skills and decision-making abilities, such as those taught through Border Hunter, are generally considered "highly perishable" (Stout, Cannon-Bowers, & Salas, 1997). Consequently, the standard wisdom is that such KSAs require periodic refresher training.

The results from this study do show a slight negative trend, which suggests that refresher training may be warranted for the Combat/Border Hunter skill set over longer periods of time. However, participants' degradation of knowledge was very slight, failing to reach significance between the end of the course and two months later. This suggests that the participants were effectively retaining their Border Hunter knowledge after the course.

In examining the reaction responses, it is clear that the respondents still regard the training experience favorably. They rated all aspects of the training very highly and acknowledged that they were using the skills they had gained in their own operations.

Taken together, these results suggests that the Combat/Border Hunter skill set is operationally relevant, has utility, and can be retained.

SECTION

9 Organizational Transfer (Study 3)

Kirkpatrick's evaluation level 4 examines training "results"—that is, what real-world impact has the training had? Level 4 includes a range of return-on-investment measures, such as overall cost impacts or organizational performance improvement (Kirkpatrick, 1994). For this study, we examined the indirect transfer-of-training between trainees and their peers. In other words, did personnel who work with Border Hunter attendees (but who themselves did not attend the course) acquire any of the Border Hunter KSAs?

We hypothesized that if personnel effectively employ and discuss their Combat/Border Hunter training in their operational settings, then some of that knowledge will "rub off" on their fellow personnel. Further, if we assume that this training supports mission effectiveness (as the MCCLL report, discussed in Section 1, suggests), then imparting such skills to the wider organization should increase the overall unit's mission effectiveness—which is the true measure of success but not a variable we could directly assess.

Method

Participants

Forty personnel participated in this study. Approximately half (n = 19) were Soldiers in the 3BCT/1AD, the others (n = 21) were Border Patrol agents, associated with either the Yuma BORSTAR sector or the El Centro Border Patrol station. Participants were, on average, 26 years old (SD = 5.56). All held high school diplomas and many had attended some college (n = 5) or completed their undergraduate degrees (n = 9). Among the Soldiers, the average length of military service was 2.7 years (SD = 1.78), and for the Border Patrol agents, the average length of time in their position was 2.4 years (SD = 2.86). The Border Patrol participants from the El Centro station had only recently completed the Border Patrol Academy and were in the equivalent of a "graduate school" for the Border Patrol. Two five-person classes participated; the first class (experimental) were assigned to one of the Border Hunter attendees, while the other five-person class (control) was under the mentorship of another Agent (who had not received Border Hunter training).

Materials

This study employed the same knowledge questionnaires used for the trainees' longitudinal study (see Section 8 and the Appendix). Participants were randomly assigned one version of the test to complete at Time-1 and a different version to complete at Time-2.

Design

This study used a 2 x 2 x 2 design, including Group, Agency, and Pre/Posttest. The experimental group consisted of personnel who work closely with one or more Border Hunter trainees who participated in the longitudinal study. The control group comprised similar personnel (i.e., from the same unit or sector and with equivalent duties) who do not work closely with any of the Border Hunter attendees. As mentioned, the two Agencies were Army and Border Patrol. Finally, participants complete the first questionnaire (pretest) in mid-May (18–20 May 2010) and the second administration (posttest) in late-June or early-July 2010.

Procedure

As with the longitudinal study, most participants completed the questionnaire at their home station, while under supervision of a two-person research team. However, due to logistical conflicts, some personnel completed the first or second administration independently or under guidance from their supervisor or commander. As before, participants had no time limits to complete the questionnaires and most required approximately 90 minutes. At Time-2, all participants were again asked to confirm that they had (or had not) worked with one of the Border Hunter attendees during the prior two months.

Of the 40 participants, only 33 completed both the first and second administration. The breakdown of these participants is shown in Table 9.1.

Table 9.1. Division of study participants who completed both the pre- and posttests

	Experimental *n*	Control *n*
Army	8	9
Border Patrol	6	10
TOTAL	14	19

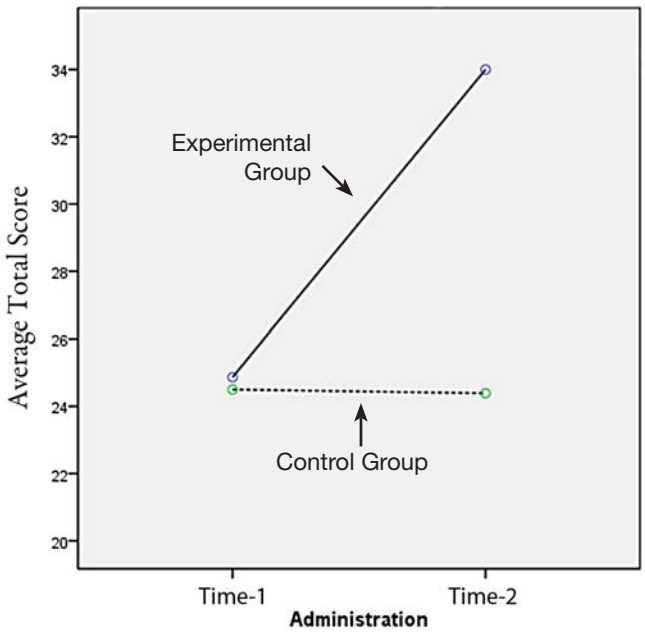


Figure 9.1. Comparison of group means, between Experimental and Control groups, at Time-1 and Time-2

Results

Scoring

Two researchers scored each of these questionnaires, using a procedure identical to the one used in the longitudinal study (discussed in Section 8).

Quantitative Analysis

First, a one-way ANOVA reveals that the two groups began with approximately the same degree of knowledge ($F(1, 38) = 1.404$, p = n.s.). At Time-2, the experimental group demonstrates a statistically significant improvement in performance, compared with the control group, whose performance remains consistent across both administrations. This result is depicted in Figure 9.1 and verified through statistical analysis ($F(1,31) = 5.144$, $p < .05$).

The three-way interaction between Administration Time, Agency (Army or Border Patrol), and Group was significant ($F(1,29) = 5.344$, $p < .05$), therefore further analysis was required in order to investigate the effects of each variable. The means and standard deviations of these cells are listed in Table 9.2.

A 2 x 2 mixed-model ANOVA including only Soldier participants revealed that there was a main effect for Training Condition ($F(1,15) = 10.307$, $p < .05$), with those in the Experimental Group scoring significantly higher than those in the Control Group (see Figure 9.2). However, no significant main effect for Administration Time or interaction was found ($p > .05$ in each case).

An identical 2 x 2 mixed-model ANOVA including only Border Patrol participants revealed a significant interaction between Administration Time and Group ($F(1,14) = 7.388$, $p < .05$). Further analysis showed a significant main effect for Administration Time for the Border Patrol participants in the experimental group ($F(1,14) = 6.264$, $p < .05$), with

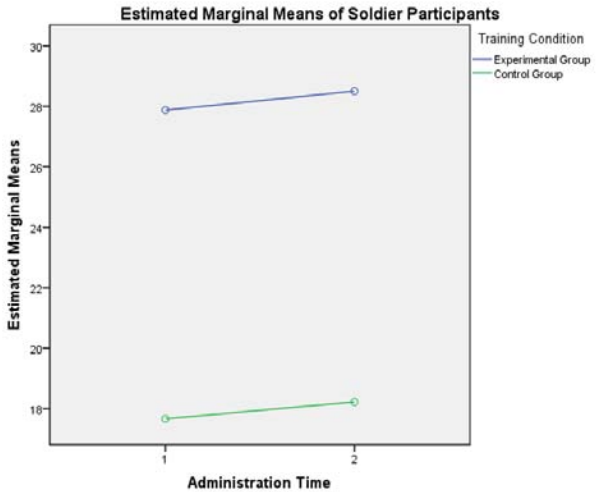


Figure 9.2. Soldiers demonstrated a main effect for Training Condition; those in the Experimental Group scoring significantly higher than those in the Control Group

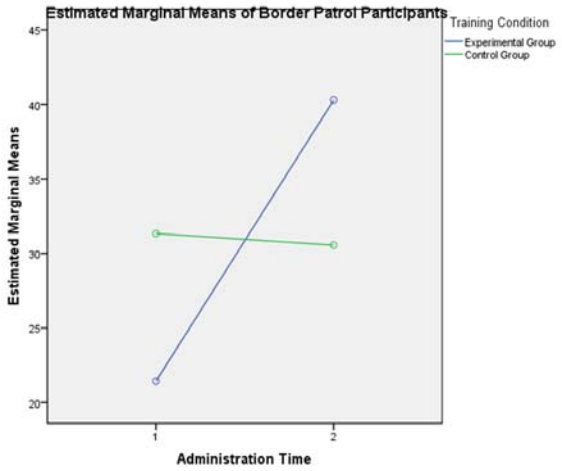


Figure 9.3. Border Patrol Agents demonstrated a main effect Administration Time, with those in the Experimental Group demonstrating a greater performance at Time-2

their performance in Time-2 significantly greater than Time-1. The same main effect was not significant for those Border Patrol participants in the Control group (see Figure 9.3).

Soldiers vs. Border Patrol Agents

Looking at Figure 9.2, it is clear that there are discrepancies between the Soldiers' and Border Patrol Agents' baseline knowledge. At both Administration Times, the Control group showed significant differences between the Soldiers and Border Patrol Agents, where the Border Patrol Agents achieved higher scores than the Soldiers, overall (Time-1: $F(1,20) = 13.666$, $p < .05$; Time-2: $F(1,18) = 8.777$, $p < .05$).

Table 9.2. Division of study participants who completed both the pre- and posttests (*n*=33)

	Time-1 Mean Total Score			Time-2 Mean Total Score		
	Army	CPB	Total	Army	CPB	Total
Experimental	27.9	21.3	25.1	28.5	43.2	34.8
Control	17.7	30.4	24.4	18.2	29.8	24.3

Discussion

The purpose of this study was to evaluate whether any organizational impact could be quantitatively detected after Border Hunter attendees returned to their home stations following training. A small sample of active-duty Army and Border Patrol personnel were selected for participation. Those participants who worked closely with one of the Border Hunter attendees were assigned to the Experimental Group, and those who did not work with one of the attendees were assigned to the Control. Statistical analyses revealed a moderate improvement in the Experimental Group at Time-2.

When the groups were further subdivided by Agency, it became clear that the improvement from pretest to posttest came primarily from the Border Patrol contributions. Most likely, this is due to the inclusion of the El Centro Border Patrol trainees, who are receiving direct mentorship from one of the Border Hunter attendees (who personally told the researchers that he wanted to try to teach his personnel some of the Border Hunter concepts).

The Soldiers results between Time-1 and Time-2 did not show a significant increase. However, the Soldier cohort showed a selection bias effect; the Experi-

mental participants performed better than the Control group, regardless of Administration Time. This may reflect a simple confound. Or, since the pretest was administered approximately three weeks after the Border Hunter trainees had returned to their units, it may suggest that the Experimental Group had already acquired some basic knowledge of Combat/Border Hunter skills before Time-1.

Although this was a small study, that was somewhat confounded by selection bias and complicated by the logistical realities of such an investigation, the results are promising. They suggest that at least some of the Border Hunter trainees, despite having no materials or formal training support, were able to transfer some of their knowledge to their organization.

SECTION

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SECTION

a Appendix

Appendix A: Glossary of Acronyms and Abbreviations

Appendix B: Border Hunter Training Topics, in Detail

Appendix C: Knowledge, Skills and Attitudes (KSAs)

Appendix D: Section 5 Details – Trainee Reactions

Appendix E: Section 5 Details – Situated Judgment Test

Appendix F: Section 5 Details – Behavioral Observation Checklist

Appendix G: Section 7 Details – Instructor Experimentation

Appendix H: Study Apparatus

Appendix A: Glossary of Acronyms and Abbreviations

AAR: After Action Review
ACOGS: Advanced Combat Optical Gunsight
BAD: Baseline + Anomaly=Decision
BCTC: Battle Command Training Center
Binos: Binoculars
BOC: Behavioral Observation Checklist
BORSTAR: Border Patrol Search, Trauma and Rescue
BORTAC: Border Patrol Tactical Unit
BP: Border Patrol
BPM: Beats Per Minute (heart rate)
CCC: Cooper's Color Code
CDM: Critical Decision Method
CH: Combat Hunter
CHTC: Combat Hunter Trainer Course
COIN: Counter Insurgency
CPG: Cognitive Performance Group
DK: Declarative Knowledge
DoD: Department of Defense
ELO: Enabling Learning Objective
Endex: End of Exercise
FORSCOM: US Army Forces Command
FFOV: Functional Field of View
FINEX: Final Exercise
FTE: Field Training Exercise
HR: Heart Rate
HUMINT: Human Intelligence
HVI: Highly Valued Individual
HVT: Highly Valued Target
IED: Improvised Explosive Device
IP: Iraqi Police
IW: Irregular Warfare
JTF-N: Joint Task Force – North
KSAs: Knowledge, Skills, and Attitudes
LF: Left Flanker
LiNDATA: Location, Number, Direction, Age, Type, Additional
LOE: Limited Objective Evaluation
LSP: Lost Spoor Procedure
MCCLL: Marine Corps Center for Lessons learned
MCWL: Marine Corps Warfighter Lab
MOUT: Military Operations on Urban Terrain
MSEL: Master Scenario Events List
MTC: Marine Training Cadre
NFOV: Narrow Field of View
OPFOR: Opposing Force
OP: Observation Post
PCR: Profiling and Cue Recognition
PID: Positive Identification
POI: Program of Instruction
PSE: Pacific Science and Engineering group
PVA: Photo Vignette Assessment
RAT: Remote Associates Test
RF: Right Flanker
RSG: Rear Security Guard
SA: Situational Awareness
SIGACTS: Significant Activity
SME: Subject Matter Expert
SOI: School of Infantry
SOP: Standard Operating Procedure
TDT: Team Dimensioned Training
TLO: Terminal Learning Objective
TL: Team Leader
TOC: Tactical Operations Center
TTPs: Tactics, Techniques, and Procedures
USJFCOM: US Joint Forces Command
VBIED: Vehicle Borne Improvised Explosive Device
WFOV: Wide Field of View
WPI: Work Personality Index

Appendix B:
Border Hunter Training Topics, in Detail

Day	Main Topic	Topic Details
1	Introduction to Combat Tracking	Practical uses of Combat/Tactical Tracking What is Combat/Tactical Tracking? Cooper's Color Codes Basic tracking techniques Dynamics of a footprint
2	Micro-tracking	Glossary of modern combat terminology "Spoor" description and overview Combat Tracking indicators Around the World with Indicators (photos) Dynamics of a footprint Micro-tracking exercise (practical exercise)
3	The tracking team	Advantages of a tracking team Tracking team formations Tracking team silent communications Lost spoor procedures Basic team formations (practical exercise) Basic follow-up practice (practical exercise)
4	Rules of tracking	Rules of tracking LiNDATA communications Basic team formations (practical exercise) Basic follow-up practice (practical exercise)
5	Lost spoor procedures	Review of the rules of tracking Tracking quiz and discussion of quiz Team formations (practical exercise) Challenging follow-up practice (practical exercise) Lost spoor procedure use (practical exercise)
6	Back-tracking practice	Aging spoor Improving tracking team security Back-tracking exercise (practical exercise)
7	Anti/Counter-tracking	Tracking team command-and-control Anti-tracking/counter-tracking Difficult tracking exercise (practical exercise)
8	Challenging tracking practice	Difficult tracking exercise (practical exercise)
9	Urban tracking	Communications security Israeli tracking teams Police tracking use Urban tracking Night tracking Urban tracking exercise (practical exercise) Night tracking demonstration
10	Tracking FINEX	Tracking FINEX on challenging terrain (practical exercise)

Day	Main Topic	Topic Details
11	Introduction to Combat Profiling	Left-of-bang OODA Loop Arabic language primer Introduction to profiling Physiology of the eye Cognitive functions tied to perception Introduction to heuristics Tactical patience Context and relevance Symbolic meaning of colors in Islam
12	Terrorist planning cycle	Review of Combat Profiling terms Moral/ethical/legal decision-making Advanced Observation introduction Baseline + Anomaly = Decision Mule Deer buck hunt metaphor OODA Loop and profiling decision-making Seven-step terrorist planning cycle Terrorism examples Juba Sniper exercise
13	Six domains of Combat Profiling	Juba Sniper exercise IED primer Six domains of Combat Profiling (4 of 6 discussed) - Heuristics - Lens through which you view the world - Proxemics - Physical positioning and distances - Geographics - Natural lines of drift in an area - Atmospherics - The look, taste, and feel of an area
14	Six domains of Combat Profiling (continued)	Six domains of Combat Profiling (continued) - Biometrics - Physical reactions and signs - Kinesics - Body language Combat rule of threes
15	Practical application of Combat Profiling	Practical application of Combat Profiling concepts Video/photo practical exercise
16	Practical application/ observation lane training	Basic optics and terminology Clearing buildings practice at a mini-village Clearing buildings rehearsal of occupied building Optic usage with role-players in place Advanced observation training Observation concealment techniques
17	Scenarios 1-5	Practical exercises
18	Scenarios 6-10	Practical exercises
19	FINEX	FINEX: Practical exercise
20	AAR and Graduation	FINEX and course review/discussion Completion of research posttests Graduation exercises

Appendix C: Knowledge, Skills and Attitudes (KSAs)

In this section, we expand upon the Knowledge, Skills, and Attitudes (KSAs), or competencies, that we believe underlie combat profiling and combat tracking.

Background

The military's acceptance of Irregular Warfare (IW) as a mission area for its small units has shifted the focus of training from procedural, equipment-intensive task-skills to behaviors and cognitions that cut across system, echelon, and theater boundaries. In support of this new human terrain orientation, a workshop was held to begin the process of defining training requirements for small units who will be conducting IW operations (The Irregular Warfare Training Symposium, 2009). Content analysis of 2 ½ days discussion with 40 SMEs from the behavioral and military sciences produced an initial framework of 14 performance requirements for small units, organized into the categories of decision-making, teamwork, stress, and culture (Johnson, Spiker, Williams, & Lethin, 2010). Whether one calls these performance requirements meta-skills, competencies, or knowledge-skills-attitudes (KSAs), they define what is to be trained; hence their identification and delineation is essential to future successes in IW endeavors, of which combat profiling and combat tracking are major components.

The small unit competency framework from the IW symposium was the starting point for Spiker and Johnston's (2010a) content analysis of the combat profiling course. Though represented at a fairly abstract level (e.g., "understanding when to act and when not to act" as one of the decision-making competencies), the framework offered a convenient canvas for collecting more behaviorally-focused observations of training outcomes. Spiker and Johnston (2010a) observed two successive evolutions of the course at SOI-W to compile an initial list of KSAs that would begin to define the "what" is being trained aspect. Based on the discussions at the workshop, and from earlier attendance at Profiling lectures, it was clear that a main focus of both the academic and field exercise elements of the course involves teaching trainees to recognize a set of cues and indicators of behaviors to spot people and events before the situation becomes lethal (Kobus & Williams, 2010). For this initial effort, there was less emphasis on validating their specific occurrence in the field as a distinct set of behaviors and more that they could be linked back to established behavioral science principles as an indication of the solid pedagogy underlying the instruction (Spiker & Johnston, 2010b).

Table C.1 presents the 21 KSAs that were identified based on observations of course conduct, discussions with instructors, and select interviews with a few of the Profiling trainees. The left column lists the KSA or profiling and cue recognition (PCR) skill with the right column giving examples of their use within the course; the skills are presented in no particular order.

There are three aspects to this method of defining KSAs that have important implications for small unit training in IW missions. The first is that the KSAs are, by design, very encompassing in the behaviors they embrace so that, if trained, they should have spill-over effects to a trainee's other courses, tasks, and mission areas of responsibility. Thus, training on these KSAs, as meta-skills, should yield a very large positive return on investment. Second, the KSAs tend to reflect a varying mix of cognitive behaviors that lend themselves to a theoretical organization. In this vein, Spiker et al. (2010) noted the preponderance of critical thinking and decision-making aspects of these KSAs. Consequently, they proposed a three-level organization in which these cognitive competencies could be categorized as identification, elaboration, or cognitive-monitoring. Third, depending on how a given skill is operationalized, one can view its manifestation at either the individual or team level, where many of the KSAs have elements of both.

Expanding the KSAs for Border Hunter

In the ramp-up to Border Hunter, we expanded the list of 21 KSAs above to 33, adding skills based on reviews of new materials for combat profiling, the extensive written documentation of combat tracking, and additional interviews with warfighter-graduates of Profiling training upon their return from Afghanistan (Spiker & Williams, 2010). These additional 12 KSAs are presented in Table C.2. The review was intended to ensure that all KSAs could be defined in a way that would apply to both profiling and tracking, so that a single list of KSAs could be used in the Border Hunter course. To facilitate this process, a common phrasing of the KSA was generated so that it could be usable in both course segments without modification; this was done for the 21 KSAs listed in Table C.1 as well. However, as shown in the two right columns of Table C.2, different examples or "behavior markers" were produced for each course segment. These behavior markers were generated for the 21 KSAs listed in Table C.1. Prior to the start of Border Hunter, we had a complete set of 33 KSAs, with behavior markers for each.

KSA Organization for POI

As a final step in this skill specification process, the KSAs listed collectively in Tables C.1 and C.2 were reworded to reflect a standardized verb-noun task/skill structure and organized into six categories that mesh with the POI that was developed for Border Hunter in parallel with the research effort. The result of this reorganization and restructuring is displayed in Table C.3. The left-hand column indicates the original KSA number (from Tables C.1 & C.2) to preserve the linkage. The KSAs are now arrayed in approximate order of complexity, beginning with the ones involving observation and event identification, followed by the intermediate levels of interpretation and synthesis, and culminating with proactive decision-making and cognitive discipline. We will refer to this organization when presenting the field observations in a later section.

Conclusions and Next Steps

We close by offering the following six points with regard to KSA assessment and validation. First, it is clear that the 33 KSAs presented here do seem to represent higher-order skills or competencies that comprehensively cover the skills being acquired and reinforced during the field exercises. With the exception of several stress-related KSAs that were still being fleshed out as the course began, the researchers observed at least one behavioral instance for every KSA, where most of the KSAs were associated with several behaviors in each course segment. Specifically, if

we combine the frequency of recorded behaviors across the two course segments, we find that 18 of the 33 KSAs registered least 5 behaviors by the two researchers and 29 of the KSAs had at least 3 behavioral instances. Thus, the KSAs clearly provide a solid foundation for directing researchers where to look for behavioral instances of trainable skills and organizing the resulting observed behaviors.

Second, while these results are encouraging, we clearly need to collect behavioral observation data from other Border Hunter researchers to confirm the utility of the KSA framework. In this regard, it is our hope that, over time, we will be able to elicit observed behaviors from the other researchers and see if the trends described above continue to hold or if other patterns will emerge. Based on discussions that were held during the field training exercises, the KSAs were readily comprehensible to the entire research team, where it was only time constraints that prevented a full suite of KSA data collection. Alternatively, it may require an independent round of empirical data collection, linked to another evolution of the Border Hunter course, to verify the veracity of the KSA framework presented here.

Third, considering the data in more detail, it would be advisable to perform a psychometric analysis to determine the extent to which inter-observer agreement can be achieved, both in terms of the occurrence of any KSA-relevant behavior as well as the assignment of any given behavior to one of the KSAs. That is, can a given training behavior be reliably observed, assigned to the appropriate KSA, and ultimately quantified to some extent? Assigning several researchers to observe a single team during the Border Hunter field training exercises will be required to answer the first question, whereas the assignment and measurement issues can be addressed with a concerted follow-up analytic effort. It is hoped that this activity forms part of the next round of Border Hunter research.

Fourth, as noted above, we had very low observed frequencies for behaviors associated with the three stress-related KSAs. This was particularly the case during tracking, which only produced 1 behavior. These low frequencies, however, are largely an artifact due to their late development in the project and because we did not have behavioral markers created for them when we went into the field. While the profiling segment had several scenarios where pyrotechnics were used, including the FinEx, which clearly induced stress, the contextual factors underlying stress in the tracking segment were not so clear-cut. More work in this area is needed, where the heart rate monitoring analysis conducted during this project and reported elsewhere (Kobus & Williams, 2010) will certainly help to shed light on the scenario contexts (e.g., time pressure, repeated failure experiences) more likely to induce stress.

Fifth, as the KSA framework receives additional empirical validation, it should be possible to use its structure to create scoring rubrics or organized templates to support performance measurement at both the individual trainee and team level. In this regard, an integrated development of the POI and KSA-based research data will yield, we believe, the insights needed to craft a scoring instrument that can, for example, reference the specific KSAs and their level of expression that is desired for a given day of tracking training or a given profiling OP scenario. Thus, we believe the KSAs will be an important first step toward an eventual scoring rubric that can be used by researchers and instructors alike.

Finally, as we create a true measurement capability for the KSAs, they can then be used as exit criteria for assessing training outcomes. Importantly, the ability to measure a trainee's or team's current level of a given KSA will move eventually move us toward a criterion-referenced method of training assessment such that we can monitor progression in proficiency development much like a learning curve. Armed with this information, we will be in a position to determine the desired number of training days for units who come into the course with varying levels of experience. As well, this measurement capability will support the uses of other training media—games, online instruction, simulation—to supplement live course instruction and achieve and sustain the requisite tracking and profiling skills prior to deployment.

Table C.1. Unique profiling KSAs identified by Spiker and Johnston (2010a)

KSA	Further Definition and/or Example of When Used
1. Taking someone else's perspective – getting away from egocentric view	In anticipating where an insurgent might plant an IED, ask yourself, "where would I put it if I were them?"
2. Shifting field of view – from wide to narrow and back	When observing a ville, Marines are trained to watch with binos(NFOV) and then switch to naked eye (WFOV) to better interpret the surrounding context.
3. Anticipating what will happen next – being proactive rather than reactive	This KSA involves viewing a series of actions as a "process" that can be identified and unpacked, where subsequent steps can be predicted. Examples include identifying one step in the seven-step terrorist planning.
4. Establishing a behavioral baseline – extracting normalcy	Making a systematic, sustained observation on a person, event, or location to determine what behavioral profile constitutes "normal." This normal is used as the baseline against which deviations (next KSA) are noted. A baseline, for example, might be established for market behavior when insurgents are not present.
5. Looking for anomalies – above and below baseline (including the absence of something)	With the baseline established, the Marine looks among the elements to note anything out of place or anomalous, either something that is there that shouldn't be or something missing. For example, they might be looking at a group of people to see if someone seems out of place) or if a vehicle is parked in an unusual location (possible VBIED).
6. Generating explanatory storylines that tie individual items of information together	This entails constructing alternative explanations for how individual events or pieces of evidence might be related and thus part of a larger whole. Examples include tying several precursors (e.g., someone missing at the market + someone else receiving a cell phone + a long-time parked car beginning to move) to an unfolding event (imminent attack).
7. Utilizing organic assets for positive ID (and avoiding reliance on hard-to-get equipment)	Organic assets such as optics (bino's, thermals) can be effective substitutes to biometrics in determining, e.g., what part of a body was shot based on the color of the blood on the ground. This clue can then be tied to someone who has a wound in that spot (e.g., shoulder, torso).
8. Adopting appropriate decision criterion – 3 cues or immediate action indicators	Since cues for a given profile tend to cluster, soldiers should collect 3 pieces of evidence before taking action. Examples would include 3 indicators of a leader or terrorist planning cycle. This is balanced against 1-cue "immediate action indicators."
9. Looking for prototypes instead of template matching	A prototype is a concept consisting of defining and characteristic features that are less confining than templates which need to be matched exactly. For example, one can have a prototype of a body bomber with characteristics that are often, but not always, present.
10. Taking an evidence-based approach to identification – what can you prove?	Listing the empirical evidence behind an ID, rather than going with a hunch, is a learnable skill that leads to more accurate PIDs, e.g., listing 3 reasons why an individual is an HVI.
11. Looking for signature behaviors – of an insurgent, HVI, HVT, POI, a vehicle	Because behavior is consistent, can ID individual, event, or vehicle from a cluster of cues in a "signature" pattern even if only part of it is available. e.g., vehicle-borne sniper platform signature is a broken rear window vent, popped trunk latch, and punched out taillight.
12. Looking for signature locations – of a habitual area, anchor point	Clusters of clues also aid in identifying habitual areas and anchor points, e.g., looking for common paths of entry and exit, avoidance of the area by the regular populace, and higher than normal levels of proxemics for those who inhabit the area.
13. Detecting an unfolding event by identifying a piece of it and inferring the rest	Viewing a sequence of events tied together by an underlying process – e.g., steps to create & plant a bomb– as a "movie," where ID of one frame determines what "movie is being shown."
14. Working with another person or group to construct a behavior profile of a person or event	Profiling of any large area is beyond the capacity of a small unit so they must communicate latterly, where extended events require "shared understanding" across adjacent units. For example, tracking the path of a body bomber, units may have to "hand over" responsibility for that coverage and pass on profiling information such as behavior tendencies & biometrics.
15. Making innovative use of optics to help construct a baseline or profile	Binos and thermals, etc. can be used to obtain information relevant to the 6 combat domains, e.g., range estimation in the RCO can be used to gauge proxemics of a POI is a leader and thermals used in the daytime for biometrics on potential suspects.
16. Making effective and efficient identification of anchor points	Anchor points represent points of comfort where insurgents congregate and regular people avoid, becoming heavy concentrations of illicit activity. An anchor point could be a bar, a place in the market, or some building, and thus the focal point of observation.
17. Making effective and efficient identification of habitual areas	Habitual areas (e.g., market, mosque) are places where the regular population feels safe and there are no restrictions on centers. They are also a convenient place for insurgents to seek out "soft targets" using IEDs, VBIEDs, body bombers, or sniper platforms.
18. Making effective and efficient identification of leaders	Leaders in a ville can be IDed from mimicry, adoration, giving directions, and having an entourage. Villages often don't offer up their leader to entering US troops, so identifying a true leader requires invoking the signature behavioral profile.
19. Using tactical patience to avoid committing too soon or going to kinetics unnecessarily	This attitude involves recognizing that patience, or waiting to initiate an action, can be advantageous, where avoidance of conflict can result in a better outcome. e.g., identifying a likely VBIED, tactical patience would suggest leaving it in case insurgents return to it.
20. Forming geometry of fires to create an interlocking network of optics, Intel, and communications	Having multiple units triangulate on an area for maximum Intel, optics, and communications. This involves ensuring shared understanding, standardized terminology, and having a geometry in place where there are no "dead spots" or areas not covered by anyone.
21. Orienting toward potentially hostile players or good guys and ignore the rest (who are neutrals, white)	Profiling becomes efficient by concentrating on potential bad guys and good guys, and ignoring the neutrals. Both bad guys and good guys engage in similar SA behaviors, such as "checking six," and in general exhibiting a greater awareness of others around them.

Table C.2. Additional KSAs identified during the analytic preparation for Border Hunter

KSA	Behavior Marker – Profiling	Behavior Marker - Tracking
22. Keep an open mind to the unexpected (recognize there are unknown variables in the situation)	Do they consider the possibility that insurgents might use totally new tactics (e.g., different IED emplacing) or attempt something that is completely different than anything that has been tried before?	Do they consider that the hostiles might be considering something completely different, like splitting up to rejoin at a rally point further down the track line?
23. Efficient refocusing in observation scan to include both near and far objects in the scene	Is the profiler able to keep all parts of his viewing sector, both near and far, within his visual field scan and in his focal attention so that no important cues are missed?	Does the right and left flanker keep their "head on a swivel" so they are able to see the TL signal to them without needing to be whistled at?
24. Effortless observation of profiling cues or tracks that doesn't require conscious attention	Can the profiler continue scanning his sector of the ville without showing excessive fatigue and is able to engage in other activities simultaneously, such as verbalizing hypotheses and reporting what he is seeing?	Can the tracker continue to stay on the track line without excessive fatigue or being extremely slow?
25. Recognizes when his SA is behind the power curve and what he needs to do to catch up	Does the profiler ask for help or request additional information when he feels his awareness of the situation he is currently viewing has broken down?	Does the tracker stop and consult with the TL when he realizes that his tracking behavior is not consistent or has become too slow?
26. Not settle for unexplained events or evidence [people don't come out of nowhere and signs don't just finish in thin air] but looks for antecedents in the situation	Does the profiler try to look for causal explanations or antecedents of puzzling events, such as trying to find where a mysterious vehicle came from or where a potential insurgent (presently unaccounted for) might have gone?	Does the tracker try to "explain" why there are only 3 tracks when previously there were 4 rather than just accept that and move on?
27. Confident that skill set will overcome obstacles [lost spoor, unexplained event] in the situation	Does the profiler not give up or exhibit excessive frustration when encountering an unexplained event (where an IED might be placed), and continue looking for at least one indication or signature behavior that might help solve the puzzle?	Does the tracker not get frustrated when he loses the spoor but exhibits confidence that his lost spoor procedures will work?
28. Imagining alternative courses of action or alternative event outcomes by what-if mental simulations	Does the profiler try to "think through" what might be happening in an unfolding event (e.g., a possible complex ambush) by running through different alternative outcomes?	Does the tracker or TL try to "think through" what the quarry might be doing (ahead of them) based on the track pattern they are looking at?
29. Developing an internal sense of time to know when their situation judgment needs to be updated	Does the profiler have a reasonably accurate "internal clock" that tells him when it's time to look for alternative cues (of an IED) or when it's time to switch optics?	Does the tracker stop periodically and consult with the TL when he realizes that he's a little "behind the curve"?
30. Induce or generalize pattern from 1-2 individual cues	Is the profiler able to infer the presence of a larger event – such as a VBIED or a complex ambush – by generalizing from the presence of a few cues (e.g., how a car is parked, how a sniper team has been deployed)?	Does the tracker or TL realize that a series of "long" tracks are associated with the quarry trying to walk in each other's tracks?
31. Makes effective decisions in spite of high stress conditions	Can avoid tendency to freeze or stop behaving when under high stress to make decisions needed to keep the team's performance at an acceptable level.	Can avoid tendency to freeze or stop behaving when under high stress to make decisions needed to keep the team's performance at an acceptable level.
32. Employs stress reduction strategies to manage physiological stress reactions	Uses effective stress reduction strategies (deep breathing, concentrating on task at hand, pausing to reflect) to avoid becoming a "prisoner" to one's stress level	Uses effective stress reduction strategies (deep breathing, concentrating on task at hand, pausing to reflect) to avoid becoming a "prisoner" to one's stress level
33. Recognizes when stressors are affecting other team members actions and helps them refocus their attention	Steps up to back up or take over for a team member whose performance has degraded due to their current high stress level	Steps up to back up or take over for a team member whose performance has degraded due to their current high stress level

Table C.3. Organization of KSAs to reflect desired Border Hunter training outcomes

KSA #	KSA – Training Outcome
Use of Enhanced Observation Techniques	
7	Using organic assets to make positive identifications
15	Making innovative use of optics to help construct a baseline or profile
2	Shifting field of view to avoid focus lock
23	Efficient use of refocusing in visual scans to include both near and far objects in the same scene
16	Making effective and efficient identification of anchor points and indications of anti-tracking
17	Making effective and efficient identification of habitual areas and action indicators
24	Effortlessly using observation techniques that do not require conscious attention
Identification of Critical Event Indicators	
4	Establishing a baseline to extract normalcy
5	Looking for anomalies outside of the baseline
11	Looking for signature behaviors (of a high-value target) via a cluster of cues
12	Looking for signature locations (e.g., habitual areas) through a cluster of cues
Interpretation of Human Behavior Cues	
1	Taking someone else's perspective
18	Effectively and efficiently identifying leaders
21	Orienting observation or tracking toward potentially hostile players and ignore neutrals
14	Working with others to construct a behavior profile of a person, event, or quarry
Synthesis of Ambiguous Information	
30	Inducing a pattern from a few individual cues
6	Generating explanatory storylines that tie individual items of information together
28	Imaging alternative courses of action or event outcomes by what-if mental simulations
3	Anticipating what will happen next
Proactive Analysis and Dynamic Decision-Making	
9	Looking for prototypes to guide rapid recognition and decision-making
13	Detecting an unfolding event or activity by identifying a piece of it and inferring the rest
8	Using appropriate criteria (e.g., 3 cues) to make timely but accurate decisions
10	Taking an evidence-based approach, using hard data to confirm or disconfirm hypotheses
26	Not settling for unexplained events or evidence but looking for antecedents in a situation
31	Making effective decisions in spite of high stress conditions
Employment of Cognitive Discipline	
19	Using tactical patience to avoid committing too soon or going to kinetics unnecessarily
20	Using geometry of fires to create an interlocking network of optics, Intel, and communications
22	Keeping an open mind to the unexpected (recognizing there are unknown variables)
25	Recognizing when one's situational awareness is low and how to mitigate the condition
27	Trusting that one's skills will overcome obstacles in the difficult situations
29	Developing an internal sense of time in order to know when a situational judgment needs to be updated
32	Employing stress reduction strategies to manage physiological stress reactions
33	Recognizing when stress is affecting other team members' actions and helping them refocus their attention

Appendix D:
Section 5 Details – Trainee Reactions

This section provides additional details on the trainees' reactions to the course. It includes a breakdown of reactions by agency, a list of the open-ended item responses, and a discussion of "instructor bias."

Daily Reactions Data, Detail

Daily reaction data were calculated by Day and by Agency (i.e., Law Enforcement versus Military). See Table D.1 and Figure D.1. These results show that trainees (regardless of their employment) rated all aspects of the class very high.

Table D.1. Daily mean reactions to the Border Hunter instruction, by trainee employment category

	Day	Law	Army	Law	Army	Law	Army	Law	Army
		Overall Reactions		Utility Reactions		Affective Reactions		Instructional Material	
Combat Tracking	1	6.43	6.62	6.83	6.67	6.02	6.14	6.23	5.36
	2	6.60	6.63	6.63	6.67	6.22	6.63	6.30	5.92
	3	6.59	6.69	6.27	6.73	6.55	6.56	6.10	6.08
	4	6.59	6.69	6.67	6.76	6.40	6.51	6.22	6.24
	5	6.76	6.50	6.73	6.54	6.48	6.53	5.89	6.11
	6	6.57	6.81	6.55	6.64	6.17	6.38	6.15	6.12
	7	6.71	6.61	6.74	6.70	6.45	6.54	6.20	5.82
	8	6.71	6.68	6.76	6.66	6.35	6.52	5.80	5.93
	9	6.80	7.00	7.00	6.73	6.27	6.93	6.45	5.95
	10	6.68	6.88	6.70	6.73	6.46	6.63	6.18	6.17
Combat Profiling	11	6.57	6.8	6.11	6.68	6.20	6.52	5.62	5.91
	12	6.58	6.90	6.36	6.72	6.25	6.43	5.46	6.09
	13	6.38	6.71	6.27	6.62	6.15	6.54	5.62	6.02
	14	6.50	6.63	6.35	6.69	6.33	6.52	5.54	6.17
	15	6.08	6.65	6.52	6.76	6.33	6.37	5.65	5.93
	16	6.67	6.71	6.30	6.58	6.59	6.33	5.49	6.07
	17	6.64	6.75	6.01	6.77	6.62	6.63	5.92	6.06
	18	5.88	6.80	5.63	6.08	6.08	6.73	5.14	5.90
	19	6.80	6.73	6.22	6.76	6.78	6.62	6.01	5.90

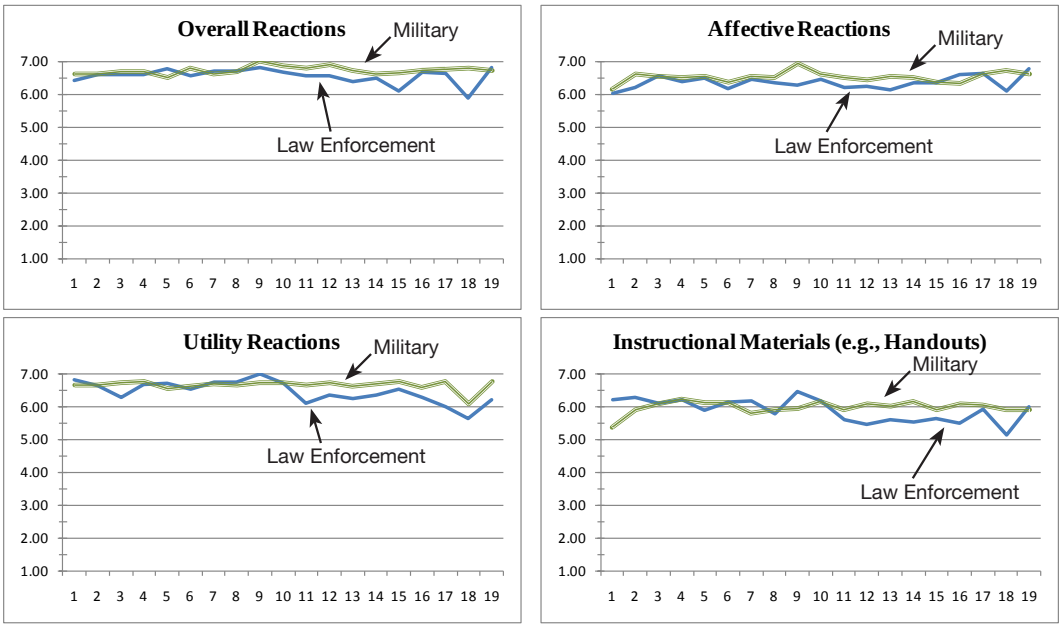

Figure D.1. Daily reaction to the Border Hunter instruction, by trainee employment category

Overall Reactions Data, Detail

Similarly, overall reactions to the course were rated quite high, regardless of employment. Table D.2 and Figure D.2 show a breakdown of the overall reaction scores, by question and by agency.

Phase	Utility: The instruction was useful. I can use it in my job (at least in the field).		Affective Reactions: I enjoyed the instruction.		Materials: The instructional materials (e.g., slides, handouts) were good.		Overall: Overall, I would rate the course...	
	Law	Army	Law	Army	Law	Army	Law	Army
Combat Tracking	6.86	6.95	6.86	6.85	6.71	6.80	6.90	6.95
Combat Profiling	6.33	6.95	6.43	6.90	6.05	6.55	6.24	6.95

Table D.2. Overall mean reactions to the Border Hunter 20-day course, by trainee employment category

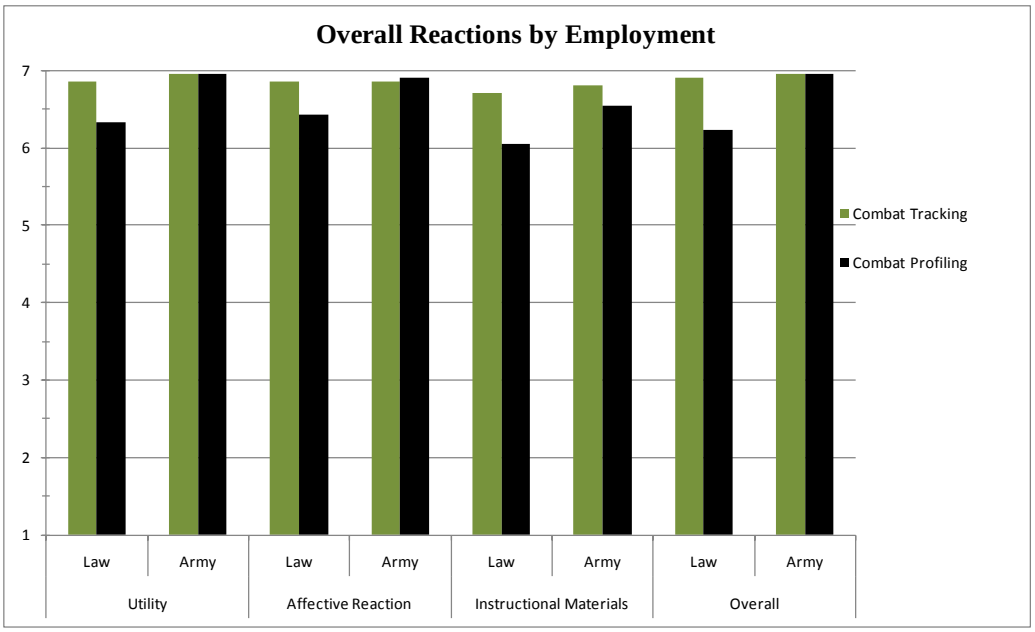

Figure D.2. Overall reactions to the Border Hunter 20-day course, by trainee employment category

Open-ended questions

This section provides complete details on the open-ended response questions. These surveys were administered on the twentieth day of the course, as part of the overall reaction survey set. The first two questions dealt specifically with Combat Tracking. The first open-ended question asked, "If you could improve one logistical issue about the Combat Tracking portion of the course, what would you change and why?" The following responses were given. Note, spelling has been corrected for readability, but no other edits to grammar or language were made. Also, responses that were simply "none," nothing," or "N/A" are excluded from this list.

- Better graphics
- None were really needed
- Different terrain. More tough terrain (etc. woodland)
- Realistically the logistics went well enough that it didn't affect the quality of the training.
- From what I saw everything logistically was good
- Sitting at the gate waiting for someone to come and let us out to the ranges took A LOT of time from training
- If we could incorporate <ILLEGIBLE> thru the city
- Take some time off between courses. Give the brain time to rest which allows you to concentrate better for the next course.
- Train the trainer how to train the material
- Scheduling problems relating to weekend food schedule.
- Proximity to training areas...Time was wasted due to driving times
- Maybe involve more areas with more than one type of terrain ie. Trees, grass, leafs
- Different area, some where there might be a combination of environments so we can experience tracking in different ones
- Have all personnel in the same uniform. Have a person in charge of the group. Soldiers begin out of uniform shows lack of discipline to learn and take the class seriously.
- I would probably have to say working on weekends.
- Water points were centralized to the entire training area, not to the individual team start points in the training areas.
- Food, we all like it. People learn better when they can eat on a regular basis. MREs don't suffice.
- Less travel time
- A great deal of time was wasted while waiting for security guards to

unlock gate, allowing bus into range area.
- Nothing! It was perfect
- Location of training venues. Driving to and from ranges; time lost by waiting for police to open gate. Possibly location areas on McGregor Range as well as barracks located there at McGregor as well as chow hall.
- Opening of the gate to the training area
- Travel time to TAs. Too much time was used to travel to and from training areas. More time could have been used to track if we didn't spend time on the bus.
- Location
- Communication between team members need radios w/ our own freq. to keep the formation together
- Mission specific to each group
- Days off in between to decompress and review
- The training location would be off of a military base. I am not military and do not want to be.

The second open-ended question asked, "If you could improve one instructional issue (i.e., not logistical) about the Combat Tracking portion of the course, what would you change and why?" The following responses were given. Again, spelling has been corrected for readability, but no other edits to grammar or language were made. Also, responses that were simply "none," nothing," or "N/A" are excluded from this list.

- More input from other instructor during the lecture part
- None, the course was pretty good
- Maybe add in a more realistic ending where you have to kill, capture an enemy
- It would be nice to get a chance to track in different environments.
- I would have like a multiday track like maybe a day and a half or two days. This way we could have combined both day and night tracking.
- Maybe a little more time in the mountains/less time in sand. A night track (I understanding equipment was an issue)
- Sound levels (too hard to hear) in the large classroom that was used.
- I cannot think of one thing that I would improve on with the instruction. It was well put together and the instructors were very knowledgeable.
- A day off
- I would add more field time so that we might get to experience more tracking situations, ie tracking in the rain, wind, water
- Don't give home work. We need that time to study stuff we missed during the class, with the book and we will be able to research questions for the class.
- Wish we could have coordinated a night tracking follow-up in the course, and I wish we could have done another long follow-up over all the different terrains combined.
- More time with the instructors and more teaching materials for unit trainer
- The instructional part was awesome. I know I did most of my learning just <ILLEGIBLE> to some of the stories the cadre put out.
- Possibly break up the training areas to allow a greater variety of terrain. It was area specific, but I would like to track in woodland areas as well.
- Shorter days. Everyone reaches a point of burn out.
- More emphasis on tactics and team movement or interpreting action indicators
- All instructional portion of the course was outstanding.
- Make sure instructors are rotated. Our group did not get instruction from all the instructors.
- Possibly vehicle tracking, pertains to BP
- Instructors should initially mandate that everybody in the team stick to their positions. It was hard to control team members during scenario due to "Macho attitude", "I know what I am doing". Maybe have role players shooting blanks when somebody is not performing their task (paintballs) keep everybody on their toes.
- Specific actions on contact, force on force to implement tactics
- None - good job!!
- All instruction was excellent.

Next, the same questions were asked about the Combat Profiling. The first open-ended Profiling question asked, "If you could improve one logistical issue about the Combat Profiling portion of the course, what would you change and why?" The following responses were given. Again, spelling has been corrected for readability, but no other edits to grammar or language were made. Also, responses that were simply "none," nothing," or "N/A" are excluded from this list.

- Blanks on the finex would have been nice, more realistic.
- Real world profiling exercise (Wal-Mart, Downtown)
- Smoke and blanks for FTX. More amputee role players for realism.
- More support for transportation from our organic units.
- Being able to go out into the actual city to observe closer
- Time off between courses gives the brain time to recover and allows you to concentrate for the next course.
- Student housing facilities
- Again, proximity to the training area to save on drive time.
- Nothing the class logistics were very well planned out
- Coordinating for going out on town and applying some of the things we learned with the instructors so we could get personal experience and examples
- Some working on weekends.
- Better course materials. Access to videos. Spend more time on subject matter explanations, theory, and case studies. Cut out the theatrics. Don't try to teach tactics and operations planning in a profiling course.
- Provide course schedule. Keep students informed in advance when evening classes are schedule. Make sure students know what they will be doing so appropriate gear/clothing will be packed.
- No it was perfect
- Same as the tracking course. Training venues.
- DAYS OFF
- George, get rid of him!
- No improvement needed
- Going out into the public and probably @ regular public places
- Too much days without days off. It affects the learning curve. It directly affects the second part of the program. If at least two days off were applied between the two different classes, it would helped a lot on the learning process.
- Again, my only complaint is the location of the class. I would hold the course at a college campus or something similar.
- Evening prior to next day instruction it would be nice to know what equipment would be needed

Again, second open-ended question about Combat Profiling asked, "If you could improve one instructional issue (i.e., not logistical) about the Combat Profiling portion of the course, what would you change and why?" The following responses were given. Again, spelling has been corrected for readability, but no other edits to grammar or language were made. Also, responses that were simply "none," nothing," or "N/A" are excluded from this list.

- Ensure the class goes into the nearby city and practice what is learned.
- Hearing from other instructors
- None, the course was well rounded.
- Handouts or general outline to assist note taking in class.
- Going out and getting realistic training on a gang neighborhood or Wal-Mart
- Maybe some urban surveillance on the local populace so we can get a clear definite difference on different baselines.
- I would have liked to have more practical application of profiling. Maybe spend a day in town in small groups just observing people with an instructor just profiling.
- Instructional material was primarily focused on warfighting scenarios. A larger portion needs to be focused on the law enforcement application of combat hunter/profiling.
- More time on biometrics
- The book was not very well put together. That said, I know that it was a hurried project that will be improved on in the future.
- To do a live profiling, on the spot profile description by the instructors, and not only picture they have seen before.
- More time for the class portion. Because I need more time to fully understand and grasp info like this
- Wish we could have gone out everyday after learning the content in the classroom and do a hands-on exercise on what we learned because not everyone learns by just doing powerpoint presentations. I personally learned the most during the 3 day field problem at the end.
- I would have liked to have gone out in small groups to observe real world profiling situations and scenarios.
- Yes. I believe the core information is valid and useful.
- Gear towards Border Patrol scenarios
- The two evening demonstrations seemed sub-par. Particularly the second night. I could not see what was transpiring through my NVGs. The training value would have increased if we'd known to bring helmets so the NVG's could have been worn in conjunction while clearing the buildings. It is a bitch to clear a bldg w/ a rifle while holding NVG in your hand.
- No. I thought I was in college.
- None; all instructions/instructor provided real time experience with their classes.
- Would enjoy a market place walk through scenario
- Separate LEA and military. The scenarios from the exercise were all military related. LEA scenarios would allow the LEA personnel to easier apply the lessons learned in class.
- Days Off
- How it pertains to BP and how we can use it.
- A list of recommended reading materials
- Making it more mission specific
- None great course!
- Everything was great.
- Greater detail on the six domains of combat profiling. Information was covered in detail but needed ample time to relate the domains in our current law enforcement environments.

The remaining questions asked about the overall 20-day course. The first of these asked, "as a supervisor/commander, if you could enroll your personnel in a 20-day Border Hunter course, would you do so? Why?" The following responses were given. Again, spelling has been corrected for readability, but no other edits to grammar or language were made. The one comment in brackets was added for clarity.

- Yes. This is a tool that can be given to soldiers without adding weight.
- Yes, this could help young sm [Soldiers/Marines] get a great understanding on what is going on and what is happening during deployments
- Yes, it is totally and collectively full of things that make the individual more aware and a harder target.
- Yes I relates to our job as a scouts/recon platoon
- Yes. I wish I had this training in Ramadi. When I thought back to some of the attacks and environmental/atmospheric conditions or reactions from locals we cover have prevented losses of our lives and Iraqis
- Yes it is very important
- Absolutely, as a leader, I will never see everything that happens on the battlefield. It would be great to have trained people around me to support and help build the big picture and pull out the details.
- Absolutely. I believe everyone who deploys to Iraq or Afghanistan should have this training. I believe this type of training is invaluable and could SAVE LIVES!!
- Yes, new soldiers need these skills coming in. Veterans can fully realize the skills they possess.
- Yes to get my observers to look for signs instead of just reacting
- Yes I would, the more soldiers that know and have the knowledge of the course, the better chance soldiers will have to save lives and help receive intelligence
- Yes, useful to our job
- Yes. Tracking skills at this professional level are not currently taught anywhere in the Border Patrol.
- Yes. Any training that I hold value in, I want my troops to go through. Anything to keep my trainee/agents safe/alive, I'm for it.
- Absolutely, if any of my subordinates could learn just one thing that improves their survivability it is well worth the time and cost.
- Only the persons who were in a instructor role or training role
- Yes, because this course will save lives and also show soldiers how to think outside the box and not just focus on what is in front of them
- Yes, because the course will increase each soldiers situation awareness. It will facilitate each member to be able to increase survivability during the deployments.
- Yes, because for my company which is strictly a recon company we need these skills to aid in our brother battalions with intel before they enter a village with who and what they should be looking for.
- Yes, it is a valuable, critical part of what we do now.
- Yes!!! B/c it would improve their look at their surroundings and would be more alert during and off of combat.
- Yes, I felt like if I would have received this training before my previous deployment it would have helped us save more of my friends lives
- I would. The information is extremely relevant and I believe the soldiers under my command could process, interpret and field the information accordingly.
- Yes because it's something every person should know. Everyone could be on the same page.
- no.
- Yes, this training would be very beneficial to the Border Patrol mission. The course teaches the useful skills needed for the job and the identifiers that could possibly save your life.
- Yes, because all of the skill taught are valid and applicable
- Yes. To enhance training for all agents.
- I would enroll them only if the course was/had weekends off to give the students a break
- Yes - learn human behavior profiles

- Yes, it would give a new person an advance in reading people and when a situation is right and when it is wrong
- Unknown at this time. I will take what I have learned and apply it at work. If it is useful I would send people.
- Yes
- Yes, especially to newer members of BP, it would help develop a great baseline to build agents on.
- Yes, as a LEO we need to know why our hairs on the back of our neck stands up so we can react sooner
- Yes, it was very useful information. Everything was pertinent to the mission
- Yes I would but I will make it a 22 days course.
- Yes. This course provides knowledge that will keep you alive.
- Border Hunter provides some important information that is not currently being instructed within the federal training cycle. One issue for the National park Service is funding for law enforcement rangers to attend training.

The next question asked, "Do you intend to teach your teammates at home any of the Border Hunter content? If so, how will you do it?" The following responses were given. Again, spelling has been corrected for readability, but no other edits to grammar or language were made.

- Yes. Will start with teaching tracking and move into profiling.
- Yes. No doubt. The young guy will learn.
- Yes, I will use the hand outs that were given so we can help each other get better.
- Yes, we need to be good shepherds and pass on the info
- Yes. Working on putting a presentation together but mainly in a field environment due to lack of classroom materials. After more reference research, I intend on building a power point.
- Yes by using more scenarios to build file folders
- Yes. Our training schedule is pretty regimented so when I can it will be hip pocket type training unless my command will give me time to give full classes.
- Yes, I would model it after the actual class but more condensed
- Yes, tracking in the Franklin Mts, profiling in real time when we're out and about
- Yes unsure how to teach them right now
- Yes, similar to what was taught here in this course
- Yes
- Not currently
- Yes I will. I will incorporate the Border Hunter contents into my class at the US Border patrol academy. I will also make every effort to have the program implemented into the USBP Academy.
- Yes, I am currently an instructor @ the academy so I will implement my instruction of these topics immediately.
- I'll share my notes and personal input and experiences.
- Yes, the best way I feel is the hands on and demonstrations
- Yes, I plan to set up a class that will include a power point slide and a hands on training in the field with a quiz at the end of the course.
- Yes, mainly through a hands-on exercise primarily but with some
- Yes, by using most of the teachings the instructors used.
- Yes! I'll try to use as much as the textbook that was provided for us.
- Yes, by teaching the basics of the class and showing how to use this hands on
- Yes! It may prove somewhat difficult, but I believe following the crawl/walk/run methodology used by the instructors that it can be successfully taught to others.
- Yes, I will use my own knowledge and experiences.
- Lost spoor procedures. Pre action indicator determination
- Yes, 8 hr training days once/bi-weekly, using lecture and hands-on techniques.
- Undetermined
- Yes. Profiling for safety issues
- Yes. Utilize the handouts and use real time examples given to us by the instructors.
- Share information, research information, maybe one on one with a team trainee
- I think instead of a formal class, to start I will show teammates while I am working with them
- Yes. Before and during operations. Talk about concepts and how they would apply.
- Yes
- Our team is now having Wednesday training days, I would love to implement a 4 hr block of tracking and another of profiling and at least get my team members on the same page, also would love to have someone come to Yuma and refresh our memories from the profiling side.
- I will be able to teach the tracking because I had a base to build upon with new information. Profiling I will not be comfortable due to my lack of knowledge a the psychological side.
- yes, I will try to incorporate some of the material into the Patrol Canine Instructor Course.
- Yes. I will concentrate on the topics that apply to our daily work days.
- Yes.
- Without question! My intent is to return and reread all documentation provided with a focus on seven step cycle, six domains of profiling, combat multipliers. I intend to reorganize it in a fashion no to offend non-combat experienced/military experienced Park Rangers.

The next question asked, "What was the most useful lesson you learned during Border Hunter?" The following responses were given. Again, spelling has been corrected for readability, but no other edits to grammar or language were made.

- How to read human behavior.
- The truth about profiling and what is going on during the deployment of war
- I would say learning how to use my senses to better know what it is I'm seeing and tracking and people profiling.
- Info gathering on a quarry. Lost spoor procedure.
- Profiling, how to read the people even if you miss the environmental/geographic signals. There are usually a greater number of people to depict a baseline and anomalies.
- Being left of bang is better than reacting to a bad situation
- No one portion of this course is more beneficial than another. It all ties in together.
- Profiling
- Being able to articulate the notions/feelings/6th sense I'm having about a situation
- Watching for attacks and predicting what people are going or intend to do
- 2 things, the detailed Ops and profile. Tracking is also going to help prevent ambushes on our soldiers.
- Everything
- Proximity (distance) negates skill. Distance from a potential threat needs to be maintained until the area is as safe as possible.
- All. Everything was useful.
- No matter how much you think you know and comprehend there

is always more to learn.
- A way to systematically teach some one the tracking techniques to do our job better.
- The counter and anti tracking because for my job it will ensure that me and my team stay alive. Then the profiling because I have to watch people for my job.
- Being able to track. Reading the importance and how to read people that are willing to kill or injure coalition forces.
- To use the environment around you as clues to what could or did happen, and to think outside the box.
- Both tracking and profiling and how to use them and why we should use them.
- Everything!!!
- How to expand the view of how things are set up instead of just reacting to what already happened.
- The attention to detail can and will predict the events to unfold.
- All of it.
- I would break the course into two parts and not work on the weekends in order to avoid burn out.
- The human profiling and body language class.
- Attention to detail
- Combat Profiling
- Reading people, terrorists planning steps, 6 domains, I could go on and on since the course if definitely outstanding/superb/excellent.
- Human pattern 6 domains
- How to read tracks and humans and how to articulate it
- Reading of body language and how it applies.
- Don't go to El Paso in the spring
- Look at the bigger picture.
- Thinking outside the box when going after the bad guy. Going after the organization instead of the single guy by profiling and finding out the common denominator.
- The body mechanics as for how a footprints and all of the combat profiling
- Thinking left to bang
- I learned to read my surroundings and to look for anomalies so as not to get complacent. I learned how to use my optics.
- Heuristics - I would have to say I have learned a lot from this course of instruction that may not be captured in testing.

Finally, the last question asked, "If you could make one improvement to Border Hunter, what would you change? Why?" The following responses were given. Again, spelling has been corrected for readability, but no other edits to grammar or language were made.

- None
- Diversity of instructional aspect. Use different peoples point of view.
- Nothing I thought it was fine.
- More difficult terrain.
- Extend 2 more days for more mission specific roles and interactions like last day of FTX. Its one thing to observe from an OP and to actively engage in the environment. Puts more stress and greater impact on decisions.
- More real time scenarios to build more file folders
- It would be awesome to have more practical exercises in complex environments. I'm a field guy and love hands on experiences.
- Just more time. I think if we had a little more time we could have got a little more in depth and that would be awesome.
- Nothing
- N/A Can't change something we are not instructing. You also need to make everyone stay in barracks. Its easier to get info or catch up on any of the lessons.
- None
- A time/day break needs to be incorporated. Twenty days without a break is a long time to process all the information presented.
- Nothing.
- No COC during the profiling portion. I was stuck in the COC for the FINEX and was therefore unable to participate in the actual observation of the FINEX.
- Days off.
- It was all good training but I do feel that there should be more time for the profiling portion of this because myself the mass info sent to me at times seem to much.
- I will change the questions given at the end of the course. I will be more specific on the vignette. I will ask written questions need it to accomplish the mission like tracking: How many people, how old is the track; Profiling: Which guy is suspicious and why.
- If logistically possible, have the weekends off so that soldiers can spend more time with their families.
- More time with the instructors.
- Nothing just have weekends off
- N/A
- Nothing
- Schedule at least one or two days off during the course.
- Personalize it to the Border Patrol
- Nothing
- More time to plan for operations.
- More smaller groups for quality time with instructors on human behavior patterns
- A small one day break in between the sections would get focus back on the class.
- Less tracking and more profiling. The tracking was quick to pick up in this area (real sandy). We could have used more time profiling.
- DAYS OFF
- Just get rid of George. He was a pain in the ass. Everything else was great and I will definitely use this every day.
- Going out in the "real" world and read groups of people at malls or stores.
- I would have at least the federal law enforcement personnel go out into the public places with the guidance of an instructor and profile criminals in public places
- 22 days. 2 days off mid portion of course.
- I would allow the students some days off so that they do not get burned out.
- I would change some of the scope from AFG + Iraq to focus on our key issues that we face on the Southern Border. I assure you the examples from AFG + Iraq are valid but would like to see some examples within our borders and to the south.

Instructor Bias Effects

Finally, to address concerns raised by Spiker and Johnson (2010), the trainees were asked how much the high-quality instructors biased their opinion of the material. In other words, if different instructors were teaching the same instruction, would the trainees still find the material useful, or were the trainees simply responding to the high-energy, entertaining subject-matter experts. The results of the daily scores, as well the overall responses, are listed in the tables below.

Table D.3. Results of instructor bias, from trainees, rated on a 7-point scale

Day	Perceived Bias Due to Instructor
Combat Tracking Phase	
1	$M = 4.04$, $SD = 1.20$
2	$M = 3.96$, $SD = 1.14$
3	$M = 3.66$, $SD = 1.26$
4	$M = 3.77$, $SD = 1.19$
5	$M = 3.97$, $SD = 1.34$
6	$M = 3.83$, $SD = 1.19$
7	$M = 3.61$, $SD = 1.26$
8	$M = 3.73$, $SD = 1.34$
9	$M = 4.15$, $SD = 1.55$
10	$M = 3.89$, $SD = 1.28$

Day	Perceived Bias Due to Instructor
Combat Profiling Phase	
11	$M = 4.31$, $SD = 1.32$
12	$M = 4.36$, $SD = 1.05$
13	$M = 4.30$, $SD = 1.14$
14	$M = 4.26$, $SD = 0.90$
15	$M = 4.01$, $SD = 1.20$
16	$M = 3.95$, $SD = 0.71$
17	$M = 3.69$, $SD = 1.34$
18	$M = 3.78$, $SD = 1.35$
19	$M = 3.85$, $SD = 1.31$

Instructor Bias: If different instructors taught, the course wouldn't be as good.
Combat Tracking Phase:
$M = 5.00$, $SD = 1.97$
Combat Profiling Phase:
$M = 5.15$, $SD = 2.05$

These results suggest that trainees felt that the instructors slightly affected their positive assessment of the training, particularly when they were asked on the final day of instruction (i.e., in retrospect). Consequently, while trainees felt the instructional material was directly beneficial, usable, and enjoyable, they admit that the course content would be somewhat less appealing and effective if taught by less skilled instructors.

Appendix E: Section 5 Details – Situational Judgment Tests

Historical Background of SJTs

SJTs have their roots in assessments of work situations, dating back to the 1920's with the George Washington Social Intelligence Test (McDaniel, et al., 2001). One of this test's subtests was called Judgment in Social Situations, requiring "keen judgment" and a "deep appreciation of human motives." Written in a multiple-choice format, the test briefly described several work scenarios, requiring subjects to select the most appropriate social response among several alternatives. Subsequently, SJTs were used in World War II by the Army to assess soldier judgment. At about the same time, SJTs were being used in industrial settings to measure supervisory potential. In many of its guises, SJTs have been criticized on several grounds, including high overlaps (and presumed redundancy with) general intelligence, poor psychometric performance (particularly low internal reliability), difficulty in construction, and placing heavy demands on reading ability. Despite these critiques, SJTs have actually had fairly widespread use over the years in such areas as selection of executives, evaluation of military personnel, training of pilots, and assessment of medical doctors (Fritzsche, Stagl, Salas, & Burke, 2006).

The meta-analysis of McDaniel et al. (2001) has been largely responsible for reintroducing SJTs into the psychological mainstream. In particular, their analysis showed that, when SJT items are developed based on careful job analysis, with scenarios simply described, the tests show moderate correlations (average r = .26-40) with measures of job performance. Under these design conditions, SJTs also exhibit incremental criterion validity when measures of general intelligence have been factored in, where they show their greatest utility in assessing jobs requiring complex cognitive abilities and decision-making (Gessner & Klomoski, 2006). It is this latter characteristic that makes SJTs a particularly attractive testing vehicle for our purposes, since these are undoubtedly a core part of executing successful Tracking and Profiling behaviors.

In its various guises, four methods of response item scoring and construction have been used for SJTs. One class of SJT uses basic four-foil multiple choice items, where one foil is scored correct and the others are all incorrect. A second class involves having the respondent rank order the 4-6 response options, where the ranking is compared to that provided by an SME. A third class has the respondent indicate the most preferred option and the least preferred option, where these choices are again compared to the ones selected by the SME. A fourth class has the respondent rate, on some type of Likert-scale, the effectiveness of each of the response options. Again, test performance is scored by comparing the ratings to those provided by the SME. This latter class of construction has proven a particularly sensitive index of judgment when test performance is scored by summing the squared deviations of the subject's ratings from the corresponding mean rating of the SMEs (Weekley, Ployhart, & Holtz, 2006). Accordingly, we selected this method for our project.

Rationale for SJT Use in Border Hunter

By their nature, SJT items ask respondents to make a prediction about the effectiveness of various response or behavioral options. Since the scenarios are intentionally "lightly written," so that all the situational cues are not known, a greater dependence must be placed on one's judgment. This dependence essentially involves a balance between analysis and intuition (Brooks & Highhouse, 2006), where those two constructs can be viewed as lying on the ends of a continuum. As noted by Funder (1987), good judgment is the ability to go beyond the information given, to rely on one's broader knowledge and past experience. If trainees have been receiving this experience, by virtue of participating in the field training exercises, then they should exhibit improved performance on the SJTs between pretest and posttest.

To the extent that SJTs are assessing respondents' knowledge about effective and ineffective courses of action in problematic work situations, they can be viewed as gauging procedural knowledge (Motowidlo, Hooper, & Jackson, 2006). This aspect of SJTs – tapping respondents' procedural knowledge - is thought to underlie the modest correlations ($r \sim .30$) with job performance that are observed. Nevertheless, no matter how SJTs are written, their performance will tend to reflect a variety of associated constructs, including personality (modest correlations with conscientiousness), tacit knowledge, cognitive ability, and general intelligence (Ployhart, 2006). Despite this psychometric complexity, SJTs offer an opportunity for a partial reflection of job performance under the controlled conditions of written testing. Thus, it provides a valuable adjunct to the more difficult-to-measure behaviors that trainees exhibit during field training exercises. It is in this spirit that we developed and administered SJTs - to index the degree of learning that occurred as a function of experiencing the field training exercises in Combat Tracking and Combat Profiling.

In this regard, it is important to note that the field training exercises for both parts of the Border Hunter course are scenario-based, and as such, reflect a looser content structure and "less of a tight rein" on what is learned than is the case with a more circumscribed classroom experience (Schmitt & Chan, 2006). The looseness of the structure was even more evident by virtue of having multiple instructors oversee the field scenarios, where the POIs were still in development just prior to course onset. Thus, it is to be expected that a wide variety of cognitive processes would be engaged and a varied set of competencies would receive attention and reinforcement. The richness of this set is addressed in a later section. Because of these vagaries, it was difficult to tell in advance which specific competencies might be most influenced by the field training exercises, and moreover, there could well be individual differences in how they would be enhanced.

The SJT instrument is a particularly useful tool in this context because its scenario items "can induce the psychological processes similar to those that occur in a typical operational context" (Fritzsche et al., 2006). Indeed, we believed that, by creating a SJT-like test where realistic scenarios were described and various alternative response options were to be rated, we would have a reasonable approximation of the types of cognitive process improvements expected during repeated field training exercises. In addition, by using the SME instructors' ratings as our "answer key," we would, in effect, be assessing how the trainees' mental representations of various real-world problems would begin to approximate that of the SME instructors. By administering the test just prior to the first real field training exercise and immediately following the last field training exercise, we would have a relatively controlled—though admittedly imperfect and only partially representative of the full field training exercise POI—administration of a pretest/posttest assessment instrument.

Development of SJTs

Because of the rapid ramp-up for the BH course, the POIs for Combat Profiling and Combat Tracking were still under development as we began constructing the SJTs. Nevertheless, we were able to use previous versions of the curriculum for Combat Hunter as the basis for our test scenario items. In the case of Combat Tracking, we had access to the recently-developed 10-day POI that was being executed at Fort Huachuca. This POI would share similar features to its adapted BH version. This POI also included a very extensive trainee manual as well as the seminal book on tracking written by Mr. David Scott-Donelan. These materials provided a rich source of information on which to base candidate scenario test items and response options. For Combat Profiling, we had the advantage of having observed the course on two successive occasions at Camp Pendleton last October (Spiker & Johnston, 2010a). From our field notes and the trainee handbook, we also had a thorough content basis on which to develop test scenario items.

For the Combat Tracking SJTs, our review of the materials identified six skill areas that were (a) particularly important for success and (b) amenable to testing via a short, written scenario. These were: methods for closing the time/distance gap, executing lost spoor procedures, counter-tracking tactics, tactical formations, ground spoor characteristics and C2 procedures, and dynamics of the footprint. For each topic area, we wrote a short, one-paragraph scenario to set up the problem for the trainee. We then generated six alternative courses of action options that might be initiated by the tracker in response to this problem. In developing these options, we attempted to specify two options that would be superior, two that would be inferior, and two that would be in the middle (i.e., would have both strengths and weaknesses).

We created two versions of the Combat Tracking SJT, version A and version B, where these same six topic areas were covered in each. The second version had a somewhat different problem scenario, where again we attempted to generate six response options with two that would be the best, two the worst, and two in-between. For each scenario, the trainee would be asked to rate the "effectiveness" of each option on a five-point scale, where 5 = highly effective and 1 = highly ineffective.

An example item from one of the Tracking SJTs is presented below. As can be seen, the scenario set-up is brief, which reduces the reading requirement of the trainee and leaves a number of desirable pieces of information omitted. Thus, the trainee must make inferences and exercise judgment which will be aided by experience (such as that obtained during the field training exercise) – the main intent of the SJT. While our objective was to create an even distribution of "effectiveness" across the six response options for each item, we had no way to determine if that was in fact the case until they were reviewed and then rated by the SMEs. Unfortunately, because of the rapid pace of BH development, we were not able to gauge our success in that regard until after the tests had been administered to the trainees. As we shall see when we discuss the SJT scoring, our attempts at creating a wide distribution of response option effectiveness were met with mixed success.

We followed a similar procedure to create the Combat Profiling SJT. In this case, we thoroughly reviewed our field notes from the Combat Hunter Limited Objective Evaluation, and from that, identified the following topic areas to focus on: six combat domains (atmospherics, geographics, proxemics, kinesics, heuristics, biometrics), tactical cunning (think like the enemy), use of optical devices, tactical patience, and combat rules of 3. As with Combat Tracking, we created two versions of the Profiling SJT, versions A and B, where we altered the scenario description for each item, while basically covering the same topic area. Also as before, we attempted to generate six response options for each item that evenly covered the range of "effectiveness."

Example SJT Item – Topic Area: Counter-tracking

Your team has been tracking an experienced, well-armed band of insurgents for several days. The time/distance gap has been slowly closing to where it is now about 8 hours. You come upon where their tracks should be but they have been obliterated by tracks of local cattle that cut through the ground spoor from several directions. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Have one of your flanker trackers and the rear security tracker back track to the point where the cattle came from to see if the quarry's tracks are intermixed with them

[ ] Initiate a 360-degree lost spoor procedure

[ ] Look at surrounding tree branches in the immediate area for aerial spoor to estimate if/when the quarry had been there

[ ] Change to a Ranger/single file formation to look for any quarry ground spoor that might have escaped obliteration by the cattle

[ ] Change your tracking direction to follow the cattle path with the highest density of tracks

[ ] Slow pace of tracking movement to prepare for counter-tracking tactics

To facilitate the scenario description, and reduce the amount of writing, all items referred to a common sketch of the "ville" that the profilers were watching. This sketch was loosely based on the layout of the ville that was used during the Combat Hunter courses. While this added considerable realism to the scenario, it did cause some problems later on, during posttesting, since the ville for BH had a different configuration than the one sketched in the SJT. Some trainees thought the SJT sketch was referring to the ville they had just experienced in CH, and took issue with the layout. This issue will be discussed later, when we present the test data results.

Due to the rapid pace of BH initiation, we had limited time for SME vetting of the draft SJTs. The Combat Tracking SJTs were reviewed by the lead instructor just prior to course onset, and some minor changes in scenario description were made. For Profiling, we made changes to the test instructions while on site, based on interactions with the instructors. Unfortunately, and as noted above, we were not able to generate SME ratings to the response items until the tests had been administered to the trainees. In hindsight, it would have been preferable to obtain the SME ratings first, and then alter response option descriptions so as to obtain a more widespread and even mix of effectiveness ratings across each scenario item. However, time constraints did not allow us to iterate response option development with the SMEs so that a nice, evenly distributed "answer key" could be generated.

SJT Scoring

At the conclusion of the course, we entered the SJT data for each trainee and each instructor into an Excel file, where separate tallies were maintained for versions A and B of each test. To generate the "answer key," we analyzed the data file for the response option ratings for the six (Tracking) and four (Profiling) instructors who took the test at approximately the same times as the trainees. To create this key, we needed to compute

the SME aggregate rating for each response option for each scenario item. We used the following logic to do this:

For the Tracking SJTs, we compared the ratings for the two senior SMEs, and when they agreed, we used that value. If they disagreed, we tended to go with the rating provided by the lead SME. However, if the ratings from the other four instructors tended to strongly agree with the second SME, we would go with the second SME's rating. If the two senior instructors' ratings differed by 2 points, which was rare, we would use the average rating unless there was a consensus from the other instructors that ended to favor one of the senior instructors over the other.

A similar logic was used for Combat Profiling, where we used the ratings from the two senior SMEs as the primary basis, with a higher weighting given to the lead instructor. As with Tracking, we used whole numbers for the aggregate rating, where the ratings of the other two instructors were used to break ties or favor one of the senior instructor's ratings when the two lead instructors' ratings differed notably. Again, marked differences between the two lead instructors was uncommon. For three-fourths of the items, they were either in complete agreement or differed by 1. Of the other 25%, we used the mid-point of their two ratings virtually all of the time.

To compute a score for each subject, we used the sum of the squared deviations from the SME "answer key" as recommended by Weekley et al. (2006). For example, suppose a subject produced the following ratings to a scenario item, where the corresponding SME aggregate rating is in parentheses: option 1: 3 (2), option 2: 1 (3), option 3: 4 (4), option 4: 3 (5), option 5: 1 (4), and option 6: 5 (2). The subject's score for that item would be: $(3\text{-}2)^2 + (1\text{-}3)^2 + (4\text{-}4)^2 + (3\text{-}5)^2 + (1\text{-}4)^2 + (5\text{-}2)^2 = 1 + 4 + 0 + 4 + 9 + 9 = 27$. His total score would then be the sum of these option scores across all six items. With this scoring method, underestimates and overestimates of the SME rating are weighted equally, where extreme deviations are weighted more heavily (by the square). Higher scores correspond to worse performance since they are more discrepant from the SME's assessment of the problem decision options.

To determine degree of learning, or performance improvement during the field training exercise, we computed each subject's difference score as their posttest score minus pretest score. With this method, negative scores correspond to improved performance on the posttest.

SJT Empirical Results – Combat Tracking

A complete set of pretest/posttest data were collected from 42 trainees; one trainee was dropped because he was not available for the posttest. Table 1, below, presents the total scores that each trainee (as indicated by their subject code number) received on the pretest SJT and the posttest SJT. The fourth column indicates the difference score, calculated as the posttest score minus the pretest score. Since a higher score represents a greater deviation from the instructors' response, a negative difference score signifies "improvement" in the posttest and hence the degree of learning that occurred during the field training exercises. The last column indicates the version of the test that the trainee took during pretest and posttest, where the trainees have been ordered by test version, with the trainees taking version A listed first.

SJT Empirical Results – Combat Profiling

A complete set of pretest/posttest SJT data were collected from 40 trainees; two trainees were dropped from the analysis due to failure to follow the test instructions in one case and incomplete responses in the other. Table 2, below, presents the total scores that each trainee (as indicated by their subject code number) received on the pretest SJT and the post-

Table 1
Trainee Scores on the Combat Tracking SJT Pretest and Posttest

Subject Code	SJT Pretest	SJT Posttest	Difference Score	Test Version
A02	151	162	11	A
A04	127	134	7	A
A06	210	179	-31	A
A09	96	77	-19	A
A10	88	106	18	A
A11	98	101	3	A
A13	102	85	-17	A
A17	115	88	-27	A
A30	116	104	-12	A
A31	141	101	-40	A
A32	103	101	-2	A
A33	108	104	-4	A
A34	90	57	-33	A
A35	131	113	-18	A
A36	85	74	-11	A
A37	77	77	0	A
A38	136	151	15	A
A39	141	94	-47	A
A40	102	102	0	A
A41	164	132	-32	A
A43	99	88	-11	A
A01	73	84	11	B
A03	65	87	22	B
A05	70	89	19	B
A07	80	64	-16	B
A08	117	112	-5	B
A12	85	106	21	B
A14	63	86	23	B
A15	58	67	9	B
A16	46	61	15	B
A18	73	90	17	B
A19	149	143	-6	B
A20	75	70	-5	B
A21	115	91	-24	B
A22	145	96	-49	B
A23	107	73	-34	B
A24	109	115	6	B
A25	127	125	-2	B
A27	68	72	4	B
A28	64	45	-19	B
A29	70	51	-19	B
A42	52	57	5	B
Avg	**102.2**	**95.6**	**-6.6**	

test SJT. The fourth column indicates the difference score, calculated as the posttest score minus the pretest score. Since a higher score represents a greater deviation from the instructors' response, a negative difference score signifies "improvement" in the posttest and hence the degree of learning that occurred during the field training exercises. The last column indicates the version of the test that the trainee took during pretest and posttest, where the trainees have been ordered by test version, with the trainees taking version A listed first.

Looking at the bottom row, we see that while the average posttest score was lower, by an average of -3.7, this is a substantially smaller difference than we observed with Combat Tracking. Applying a within-subject (paired) t-test to the data, we find that $t = 1.144$, $p < .26$, $df = 39$. Thus, the results, while trending in the right direction, fail to meet the test of significance. It should be noted that the average performance of trainees was much better overall in Combat Profiling, where the average scores were in the low to mid 60's compared to the mid to high 90's for Combat Tracking. Later on, we will discuss some possible reasons for this higher performance, which may have masked the impact of significant improvements in SJT performance by the time of the posttest. In comparing performance of the subgroups on the two test versions, we find that the performance levels were virtually identical, with an average difference score of -3.6 on version A and -3.8 on version B. Thus, the two test forms generated comparable judgment data.

Table 2
Trainee Scores on the Combat Profiling SJT Pretest and Posttest

Subject Code	SJT Pretest	SJT Posttest	Difference Score	Test Version
A02	85	72	-13	A
A03	56	71	15	A
A05	58	57	-1	A
A08	90	95	5	A
A09	40	26	-14	A
A12	152	59	-93	A
A13	41	31	-10	A
A14	66	64	-2	A
A15	32	51	19	A
A16	56	44	-12	A
A21	66	50	-16	A
A24	52	73	21	A
A28	43	38	-5	A
A29	51	65	14	A
A30	55	72	17	A
A33	74	54	-20	A
A37	53	42	-11	A
A40	31	48	17	A
A41	51	71	20	A
A01	100	76	-24	B
A04	94	75	-19	B
A06	70	71	1	B
A07	60	53	-7	B
A10	67	81	14	B
A11	66	47	-19	B
A17	65	65	0	B
A18	46	44	-2	B
A20	33	53	20	B
A22	105	76	-29	B
A23	81	57	-24	B
A25	106	111	5	B
A27	53	77	24	B
A32	33	36	3	B
A34	75	80	5	B
A35	81	72	-9	B
A36	42	35	-7	B
A38	73	55	-18	B
A39	61	53	-8	B
A42	66	64	-2	B
A43	80	96	16	B
Avg	**65.2**	**61.5**	**-3.7**	

Appendix F:
Section 5 Details – Behavioral Observation Checklist

Behavioral Observation Checklists (BOCs) offer a structured method for collecting quantitative and qualitative data on individual and team performance during field training exercises (field training exercises). They were a primary means for collecting performance data in the Border Hunter project for both the Combat Tracking and Combat Profiling sections of the course. While their main focus is on performance, particularly team performance, the BOCs also yield information concerning degree of trainee learning during field training exercises as well as the quality of training that is being provided during the field scenarios. Before describing our findings, we first present a brief background on the BOCs, followed by the rationale for their use in this project. We then describe the methods used to create the BOCs and how the data were collected. The remainder of the section summarizes our empirical findings.

Background

The BOC was originally created as a structured guidelines/scoresheet to record the quality and extent of Critical Thinking behaviors that were addressed during the Limited Objective Evaluation of Combat Profiling training (Spiker & Johnston, 2010a). In particular, the instrument was designed to capture the lessons learned from the Tactical Decision Making under Stress (TADMUS) research and development program the Navy conducted in the 1990's (Johnston, Poirier, & Smith-Jentsch, 1998). Besides the TADMUS lessons learned, Spiker and Johnston (2010) added other skills/behaviors to the instrument. These were based on the Team Dimensional Training (TDT) methodology created by NAWCTSD for the TADMUS program (Smith-Jentsch, Zisig, Acton, & McPherson, 1998) as well as some enabling cognitive behaviors from Anacapa's Critical Thinking training program (Fischer, Spiker, Harris, & McPeters, 2006). The result was an eight-page checklist with 33 scoreable behaviors organized into seven categories, including application of cognitive task analysis, decision-making strategies, realistic practice, critical thinking training progression, demonstration of skills, team critical thinking, and team dimensional training. The checklist was formatted as a scorecard that would indicate the extent to which various critical thinking and decision-making behaviors and strategies are addressed in the course, either in the academic portion or in the field exercises.

Each item was scored on a 3-point scale, where a score of "2" was assigned if the topic was completely covered, a "1" was given if it was partially covered, and a "0" if it was not covered at all. As such, the scorecard is more indicative of content validity (or course value) than learning per se. That is, it is really a measure of what the trainees were to have learned – i.e., the course training objectives – than whether in fact they had learned them. However, since it is difficult to achieve much learning in a course if its content is anemic, it seems appropriate to consider the learning goals of the course in the context of a training value assessment.

An example segment from the BOC is shown in Figure 2, below. The Guideline column indicates the topic category that was being assessed. The particular behavior or strategy is specified in the Checklist column. The Score column indicates the rating (0, 1, or 2) assigned for that behavior or strategy. The Notes column provides the commentary on which the scores were based.

As reported by Spiker and Johnston (2010), the LOE performed on Combat Profiling using the BOC format yielded an overall score of 58 out of 66 possible, or 88%. This score is quite high given that the intent of Combat Profiling training was not specifically in the areas of critical thinking and decision-making. Nevertheless, it was clear from the BOC data that the course does an impressive job of covering these vital cognitive skills in the context of academic instruction and practical application. As it turned out, the areas where the course did not score as well included individual performance measurement, use of particular planning strategies (what-iffing, devil's advocate), self-correction feedback, and emphasis on particular teamwork behaviors. The LOE report discussed ways the Combat Profiling course could be improved to rectify these areas. However, the extent to which critical thinking and decision-making skills are covered in the course was, and is, quite impressive, where the authors concluded that it was another reason for the continued success the course enjoys.

Empirical Results – Combat Tracking

Figure 1 depicts the average ratings for the first three procedural behaviors on the BOC: marking the grid reference at the start point, not walking on the spoor line, and marking the last known spoor. All of the procedural behaviors were rated on a 3-point (0-2) scale.

The average ratings for the second set of procedural behaviors are plotted in Figure 2. These are for the team maintaining visual contact with one another, the tracker never going beyond the flankers (i.e., staying "off point), and the team marking LiNDATA while at the ICP. Inspection of the figure indicates that only the LiNDATA index exhibited a pronounced linear increase with days, despite an inversion on Days 8-9.

Figure 3 depicts the average ratings for three behaviors: Quarry Mindset, Dynamics of the Footprint, and Tactical Decision-Making (TDM). Visual inspection of the figure indicates that all three measures showed a progressive increase in mean rating across training days. By Day 10, all three measures received an average rating of 4.0 or higher, where they started at markedly different levels on Days 2-3.

Figure 4 presents the average ratings for the other four high-level behaviors scored on the BOC. These correspond to Team Communica-

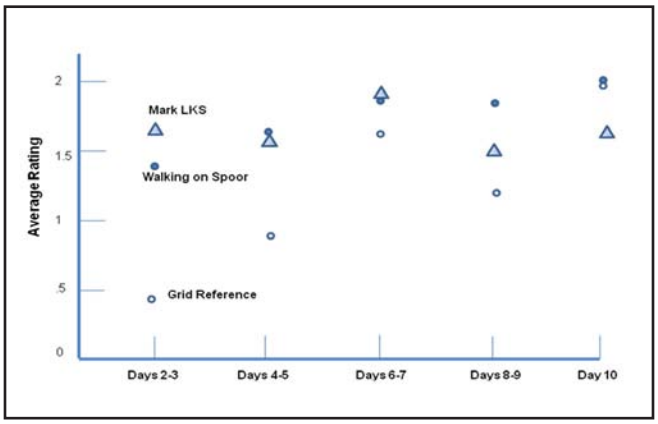

Figure 1. Average Ratings for the first three Procedural Behaviors.

tion, Team Control, Situation Awareness (first measure), and Situation Awareness (second measure). Visually, it is quite apparent that all four measures showed a progressive increase across days of training, though at different rates and reaching somewhat different levels. In this regard, the two SA measures achieved a higher asymptotic rating (4.5-4.67) relative to the other two.

Combat Tracking Qualitative Analysis

Training Events. Analysis of the content in the Training Event section gives us information concerning what was trained and how the training was conducted. Viewing the training across days of field training exercises, Day 2 (the first day for which we have BOC data) began with a focus on micro-tracking, understanding print recognition and the dynamics of footprints, and working in teams of 2 to follow quarry who are walking in soft desert sand, the easiest terrain on which to track. When microtracking, the trainees basically stay heads down most of the time, where there is no emphasis on teamwork or closing the time-distance gap.

The field training exercises for Tracking move at an accelerated pace, where already by Day 3, the trainees are engaged in macrotracking using the five-person team formation. The terrain is slightly more difficult, including grassy sand and some vegetation (shrubs). Concentration is on detecting changes in direction, maintaining good team formation (e.g., the tactical Y, Ranger file), and using hand signals to support quiet tactical operations. The "quarry" during these Day 3 events, either role-playing trainees or the instructor, does not attempt to cover their tracks or engage in any counter-tracking activities.

On Day 4, the team formation behaviors are continued, where trainees are tracking quarry who are leaving action indicators (stopping, taking a knee, adopting a 360 degree security posture, running, crawling, walking backwards, walking in each other's tracks, "bush jumping," walking in a line, leaving special spoor, etc.) of increasing complexity. A greater emphasis is placed on tactical movement and associated command and control (C2) techniques, where the five-person trainee team is expected to move silently on the quarry once the time-distance gap has been closed. Tracking difficulty is increased intentionally so the team experiences lost spoor and can learn to develop effective lost spoor procedures (LSPs).

The curriculum takes a marked shift on Day 5, where the trainees are tracking, mostly on their own, over longer periods of time and over tougher terrain (e.g., mix of gravel and grass, rocky hills). In this event, the trainees track a multiple person quarry, where they are expected to note places in the terrain where passive sensors (e.g., acoustic, motion sensors) could be laid to collect information on insurgents or drug smugglers. Besides effective macrotracking, a key aspect of the event is to maintain a good team formation despite variations in terrain, where the team has to be wary of being watched (at a distance) by the quarry.

By Day 6, the training focus is on "getting into the quarry's mindset" more, by taking in cues (spoor, patterns of movement, action indicators) to "paint" a picture of what the quarry were doing, where they are headed, and what they had planned. These interpretations are to be made in the context of pre-delivered intel that is provided at the beginning of the scenario. The event is made more complex by working from a backtrack focus, in which the quarry was actually going back to their original departure point. This is essentially a historical track in that the quarry is in jail, where the trainees' job is to collect physical evidence and arrive at conclusions that will either exonerate the suspect or keep them in jail. For this event, the terrain becomes a little bit easier – hard sand and rock, sandy dunes with plants – so that intricate action indicators can be inferred and unusual ground spoor can be identified.

On Day 7, the objective has become even more difficult – tracking a single quarry who is using a variety of countertracking tactics while escaping over difficult terrain (sand and rocks, dry creek beds). The trainees are expected to maintain very stable team formations while moving through terrain of varying elevation and topography. The event is quite formal, with detail expected at the ICP (call in LiNDATA, grid referencing, etc.) and mandatory situation reports (sitreps) called in on the radio every 30 minutes. Tactical discipline (careful motion, little sound) is particularly

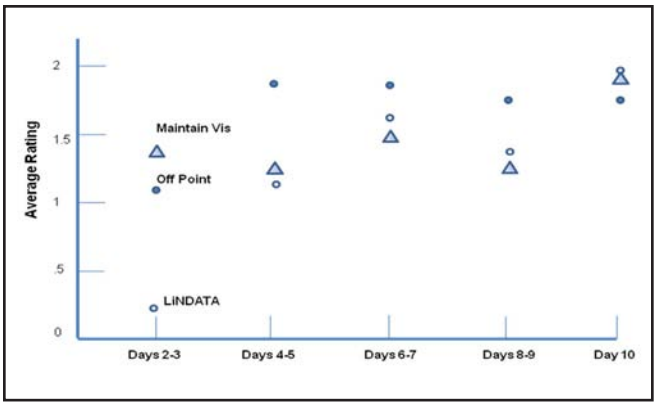

Figure 2. Average ratings for the second set of three combat tracking procedural behaviors.

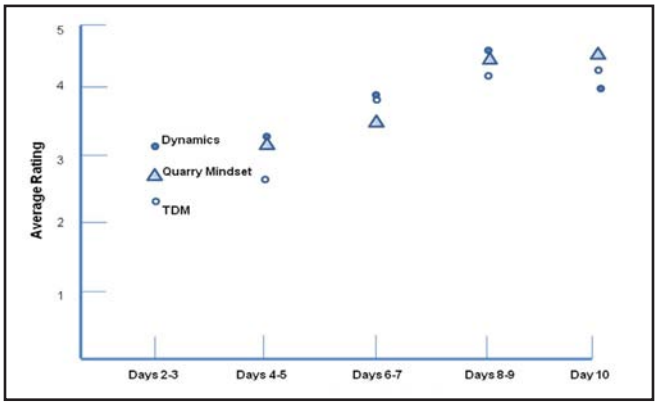

Figure 3. Average ratings for the first three combat tracking high-level behaviors.

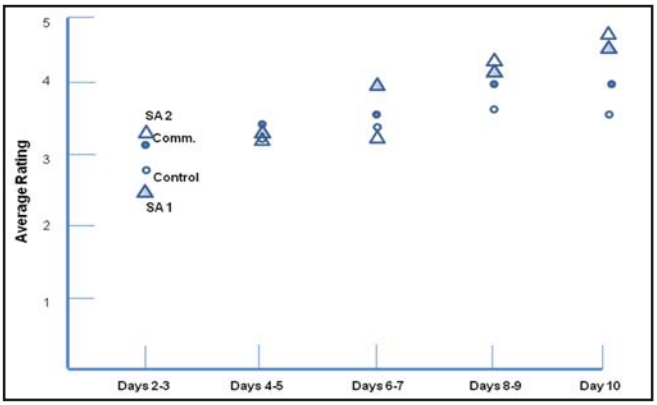

Figure 4. Average ratings for the second set of combat tracking high-level behaviors.

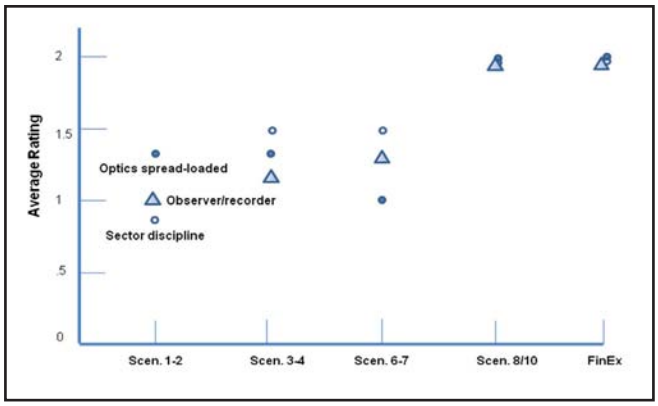

Figure 5. Average ratings for the first three combat profiling procedural behaviors.

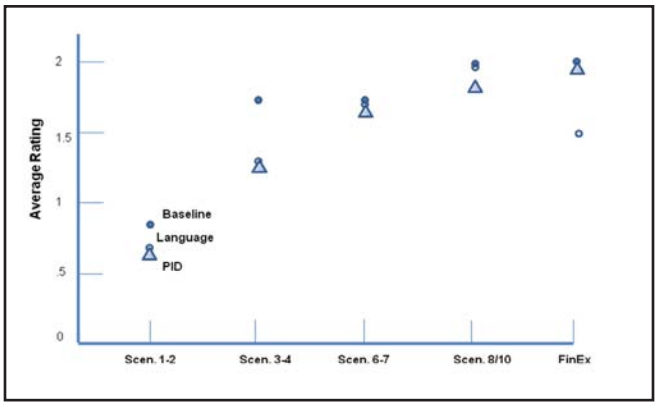

Figure 6. Average ratings for the second three combat profiling procedural behaviors.

important since the quarry for this event is "armed and dangerous."

On Day 8, the trainees expand to an 8-team formation, using two trackers and an additional person in the rear, on binoculars, scanning forward. The terrain is again fairly difficult (sandy gravel to rocky hill), where the event is quite long, lasting an entire day. This was the physically most demanding scenario, lasting over six hours with few breaks. Maintaining tactical discipline, moving quickly, and recovering from lost spoor as quickly as possible, are all emphasized. Tracking complexity is increased by having to discriminate the quarry's tracks from those of others in the area.

Day 9 is a very different event in that it involves tracking a single quarry in an urban environment. The trainees work in pairs within their 8-9 person team under the direction of a single team leader. It is a fast-paced event, where trainees are literally running as they search for track traps far ahead of the core team. The goal is to catch up to the quarry quickly while maintaining proper tactical discipline.

Day 10, the FinEx, is an extended event where the 8-person trainee team tracks a two-person quarry (instructors), using all available assets, over mountainous terrain in a National Park. The trainees are expected to "put it all together," where they collect physical evidence, interpret action indicators, and close the time-distance gap, all while maintaining good team formation and proper tactical discipline. The terrain is extremely difficult at times, including rocky hillside and dry waddis.

Empirical Results – Combat Profiling

Figure 5 depicts the average ratings for the first three procedural behaviors on the Profiling BOC: having the optics spread-loaded, adhering to sector discipline for viewing assignments, and distributing the observer/recorder duties across the team. All of the procedural behaviors were rated on a 3-point (0-2) scale. Visual inspection of the figure suggests the measures showed similar though not identical patterns of change over the course of field training.

The average ratings for the second set of three procedural behaviors are plotted in Figure 6. These include achieving a stable baseline, using profiler language, and using cue clusters to make a PID. These behaviors exhibit similar patterns to the ones above, where all show substantial relationships to scenario, though only one behavior achieved statistical significance.

Turning to the high-level behaviors, all were rated on a five-point scale. Figure 7 depicts the average ratings for three behaviors: adopting an insurgent mindset, detecting basic events, and interpreting complex events. Visual inspection reveals that all three measures showed a progressive increase in mean rating across scenarios, where by the end of training, they were at the maximum value of 5. Figure 8 presents the average ratings for the other four high-level behaviors scored on the BOC: external communications with the TOC, internal (intra-team) communications, exhibiting tactical patience, and anticipating events.

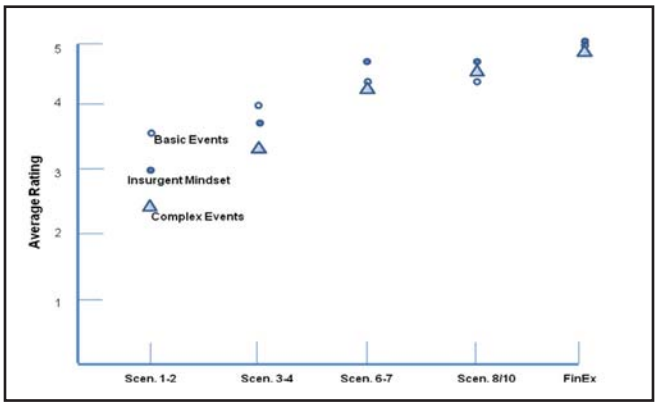

Figure 7. Average ratings for the first three combat profiling high-level behaviors.

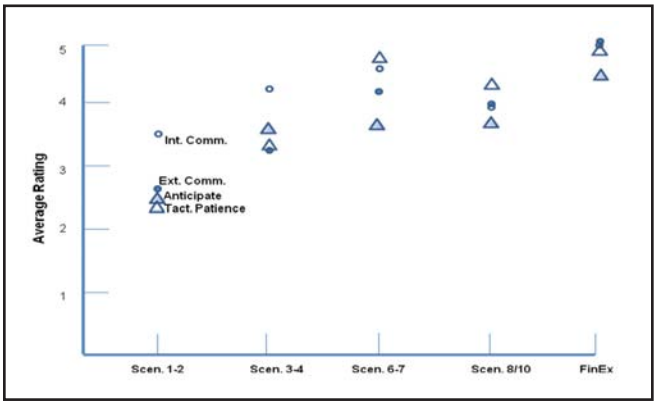

Figure 8. Average ratings for the second set of combat profiling high-level behaviors.

Appendix G:
Section 7 Details – Instructor Experimentation

This section provides additional details on the instructor-focused experimentation, specifically on creation of the expert mental model.

Tracking Expertise

A typical tracking incident is made up of three phases (Figure G.1). The tracker or tracking team begins with Mission Orientation, followed by Pursuit of the quarry, and ends in Closing with the quarry. In this section, each phase is explored in detail.

Figure G.2 provides an overview of the Mission Orientation phase. In this phase the tracker may receive a briefing from other law enforcement personnel or from intelligence sources. Based on this information, the tracker will begin to mentally prepare, assemble a tracking team if available, and assign roles. The tracker will then locate the commencement point, and document the evidence using the Location, Number, of personnel to be following, Direction of quarry movement, Type of track, Additional information (LiNDATA) format to be communicated to command. This initial assessment of the situation is used to establish common ground within the tracking team, and allows the tracker to begin to get into the mind of the quarry.

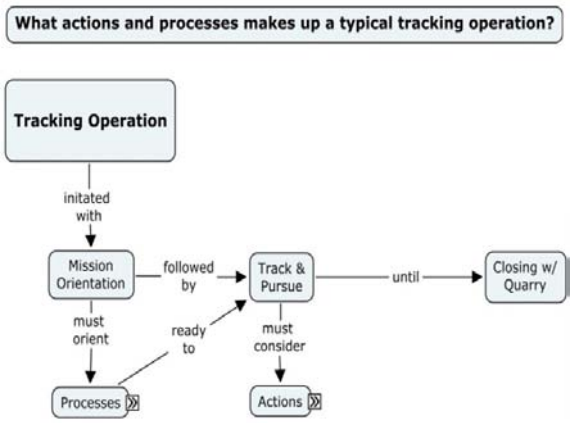

Figure G.1. Four Phases of Tracking

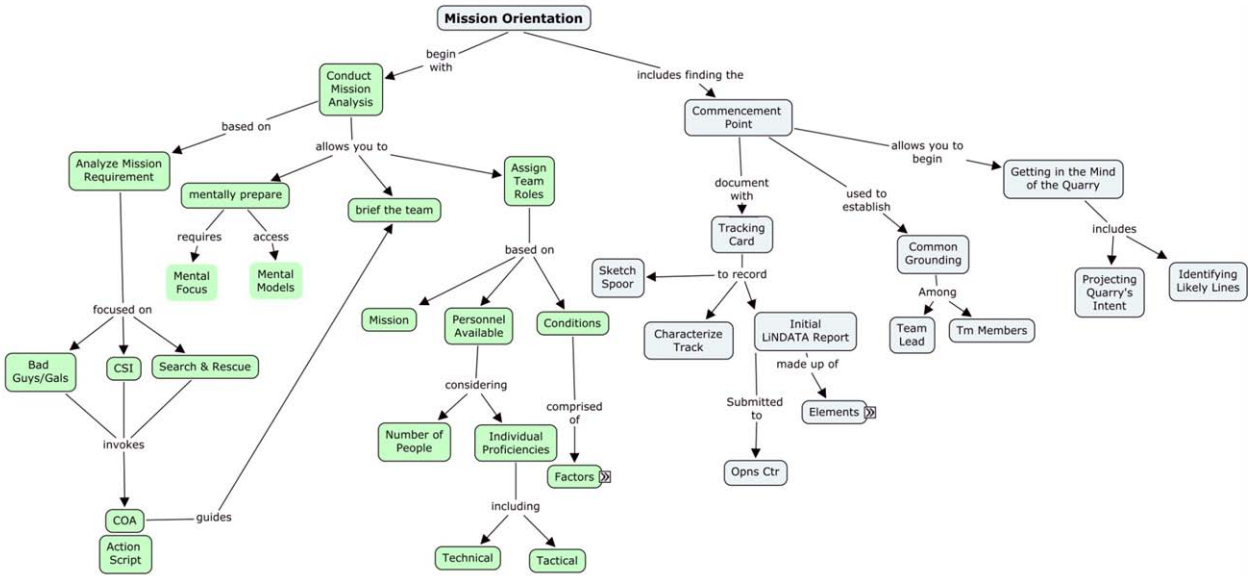

Figure G.2. Concept Map of Mission Orientation in The Context of Tracking Incident

Figure G.3 provides an overview of the *Pursuit* phase. This phase includes six critical components of tracking that all happen in parallel as the incident unfolds.

Performance monitoring includes the tracker's need to constantly monitor the time-distance gap to ensure that the tracking team closes on the enemy purposefully. Poorly calibrated time-distance gap estimates can result in an ambush if the tracking team unwittingly over-runs the quarry. Another aspect of performance monitoring is metacognitive in nature. It is important that the lead tracker monitor his/her own performance. If the tracker finds that he/she has become fatigued, discouraged, or is experiencing performance decrement for any reason, the tracker must request that positions be rotated so that a fresh person can move

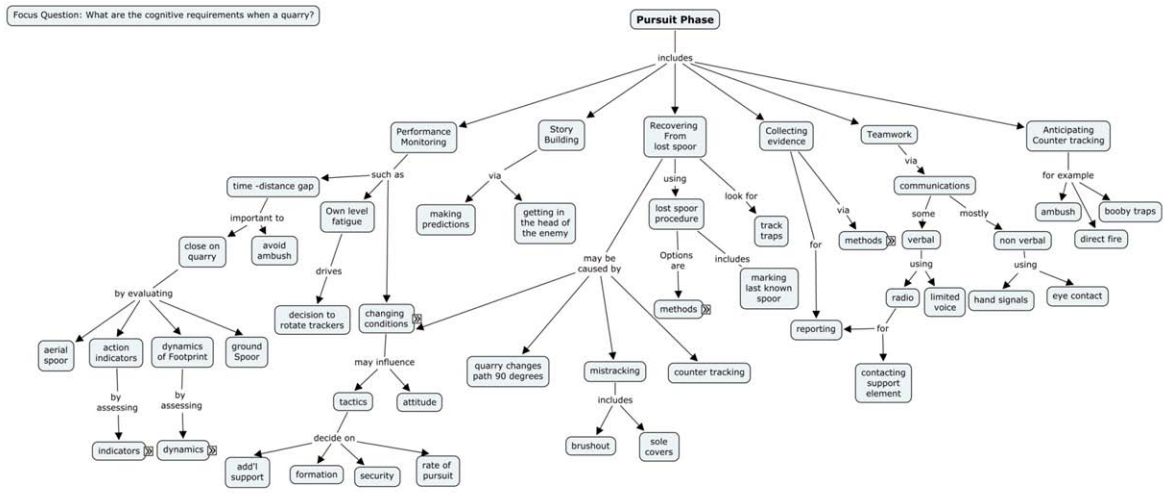

Figure G.3. Concept Map of Pursuit Phase of a Tracking Incident

into the tracking positing. Yet a third aspect of performance monitoring is outwardly focused. The tracker must constantly monitor changing conditions, such as the threat of rain or darkness. Any change in the environment that might affect the team's ability to follow the tracks or the quarry's ability to escape must be constantly monitored.

Storybuilding refers to the tracker's ability to integrate all the evidence available to predict the quarry's path and intent. Trackers refer to this as "getting in the head of the quarry." Skilled trackers are able to build a story, for which they constantly seek confirmatory and contradictory evidence, revising the story as the incident unfolds. One experienced tracker emphasized the importance of avoiding the tendency to force the track to conform to your preconceived ideas. Avoiding this sort of tunnel vision requires an open mind, and a disciplined consideration of all evidence and associated implications.

Recovering from lost spoor is perhaps one of the most talked about aspects of tracking. In nearly every incident the spoor is lost at some point, and often many times. In some terrain, one can expect to find clear evidence only in functional track traps (wet or sandy surfaces where a footprint is clearly visible). A set of lost spoor recovery procedures has been articulated that increase the likelihood that the team will be able to recover the trail efficiently. Application of lost spoor procedures is often dependent on the skill of the tracker in a) remembering to mark the last known spoor and 2) and maintaining control of the tracking team. As the team becomes fatigued, anxious, and hurried, it is easy to default to a group of individuals independently searching for the track. This haphazard approach is likely to extend the search and create confusion among team members.

Collecting evidence may seem like an afterthought to an inexperienced tracker working under time pressure. However, many tracking incidents will result in legal proceedings, making collecting evidence an integral part of the job. One tracking instructor related that new Border Patrol agents often forget to document the footprints at the commencement point. Even if the quarry is discovered, without evidence linking the quarry to the tracks that were followed, it is not possible to prosecute. Experienced trackers document and collect evidence reflexively. One interviewee reported that he often draws a footprint on his hand if he finds himself without a notebook.

Teamwork is another key component of skilled tracking. Although many Border Patrol agents find themselves tracking alone based on an existing work culture, many acknowledge that they are able to work more effectively and safely as part of a team. Working as part of a team, however, requires strategies for maintaining a shared understanding of the situation and for working a in coordinated manner. All of this team coordination must be accomplished in a stealthy manner in order to avoid detection by the quarry. Specific hand signals are used, as well as eye contact, to minimize the need for talking. Radio communications are used sparingly, and often using coded language to reduce the likelihood of interception by the quarry or accomplices.

Anticipating countertracking refers to the need be vigilant for potential attack by the quarry. Military personnel are trained to expect a hostile adversary. For Border Patrol personnel the level of violence from drug cartels has increased significantly in recent years, creating a need for increased vigilance on the part of Border Patrol agents. In either setting, trackers must avoid becoming so focused on the track that they fail to notice potential ambush, booby traps, improvised explosive devices, and other acts of aggression.

Figure G.4 presents a depiction of the *closure* phase which includes critical assessments that lead to a shift from tracking to increased security and apprehension of the quarry.

Awareness that the *time-distance factor has shortened* is perhaps the defining assessment of this phase of tracking. The tracker must constantly assess how close he is to the quarry as this will have implications for the safety of the tracking team. A hostile quarry may attempt to ambush or otherwise harm the team. Proximity of the quarry is assessed based on a number of cues. Sound is a key cue. At times, the tracking team will pause and stay silent for a several minutes. A quarry that knows he is being followed will sometimes panic at the sound of silence and run noisily, giving away his location. Another key cue is visual sighting of the quarry. A third key cue is the age of the spoor. In one incident the interviewee described coming upon a footprint in which water was still pooled. This was in clear indicator that the tracking team was close on the heels of the quarry.

Situation dynamics is another important type of assessment. As the time-distance factor shrinks, the tracker is constantly assessing the situation dynamics to determine how best to safely apprehend the quarry. In law enforcement scenarios there may be a perimeter in place to which the trackers are pushing the quarry. The tracker may also be considering

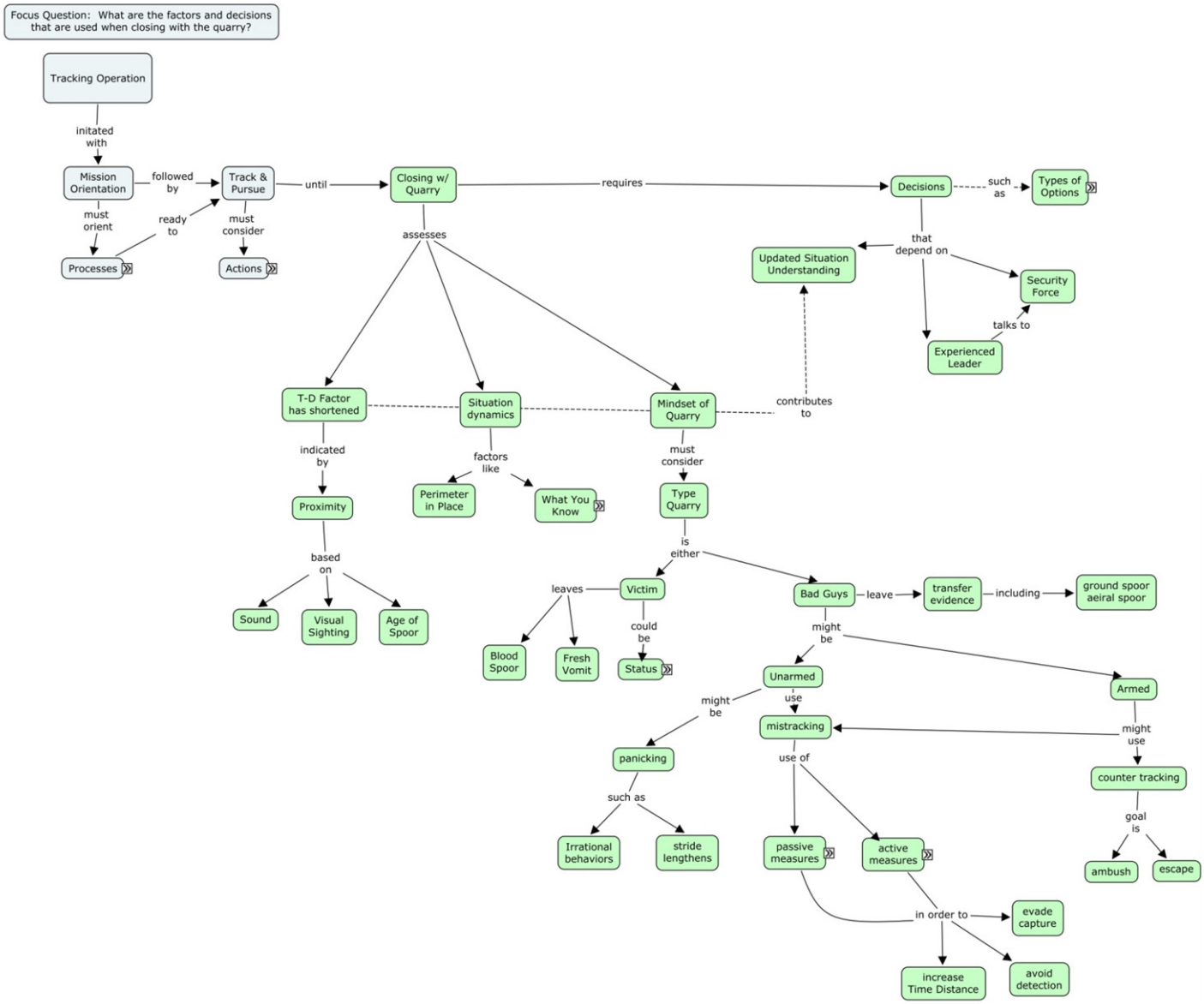

Figure G.4. Concept Map of Closing with the Quarry in the Context of Tracking Incident

the risk to his team based on what is known about the quarry. Elements such as weather and light may influence how quickly the team moves to closure. The experience level of the tracker and his team may also play a role in how the closure phase is conducted.

Yet another important assessment relates to the *mindset of the quarry*. A reasonable understanding of the mindset of the quarry will allow the tracker to more accurately interpret the cues available, and to predict the quarry's movements and actions, as well as the potential threat to the tracking team. The tracker must consider the type of quarry. The quarry may be a victim, in which case the tracker might expect to see blood, vomit, or other signs of a struggle. There may indicators suggesting that the victim is a hostage. The victim may be dead or incapacitated. The victim could be a person who is lost in the wilderness. In other cases, the quarry may not be a victim but rather a criminal or other type of adversary. The tracker will be considering the likelihood that the quarry is armed versus unarmed. For an unarmed quarry, the tracker will assess whether the quarry is using mistracking tactics to increase the time-distance gap, avoid detection, and evade capture. He will also look for signs of panic on the part of the quarry including irrational behaviors and a lengthening stride. An armed quarry represents an increased risk. The tracker will assess the situation for counter-tracking tactics such as an ambush that might lead to harm for the tracking team and escape of the quarry.

These different types of assessment combine to form the tracker's *updated situation understanding*. Key *decisions* are made based on this updated situation understanding. Each decision is tailored to the situation

at hand. Some examples from the incidents related by tracking instructors include monitoring to detect the presence of the quarry, going to an on-line formation in expectation of encountering the quarry, seeking guidance, bringing the security force forward, increasing protection, and deliberately pushing the quarry to the perimeter to be apprehended to by law enforcement personnel there.

Tracking Incidents

For a more detailed, context-rich view of tracking expertise, incident narratives were derived from the interview data. Below are two sample narratives. The first is recounted by a former military officer who describes an event early in his career in which several mistakes were made. This sort of negative experience can be as instructive as a success story. The second is remembered by a Park Service officer and represents a challenging tracking event in which the team operated smoothly to apprehend an armed quarry.

Incident #1: Giraffe on the Runway

Situation. Early in my career, I was at training camp about 100 miles from Victoria Falls. While we were there, a group of 22 terrorists crossed above Victoria Falls and split into two groups of 11. The first group attacked a police station. The second group moved down overnight to Victoria Falls airport, nine miles south of town. They attacked the airport.

We were choppered to the airport and got a briefing. They gave us an overview: "The runway is here, the control tower is there, the terminal is there. The terrorists shot windows of the control tower and some fuel tanks. There was some blood, so they must have wounded one of their own guys. Then they went onto the runway."

The Incident. We had to pick up the tracks on the runway. We botched the whole damn thing. There were giraffe and elephant all over the place. We had the problem of which way did they go. We knew there were going to head for sanctuary. When we found the track heading toward Botswana , we turned on the radio to send the search up and the batteries were dead. That was one of the first lessons learned. You have got to have your communication.

We tracked for several hours. We wanted to get as far as we could before the evening rains came. We tracked into a stone quarry from which they mined the stone for the runway. It was 3 or 4 miles, probably a couple of hours walk. It was all overgrown. We went to the edge of the quarry. We had an African soldier with us. He pointed at some grass that was lying at an angle. It has been freshly cut. It was obviously covering a hole. We put a hook on a cable line and pulled the grass off and inside was a Russian backpack.

We flushed them out of the quarry – their meeting point. We picked up 22 backpacks. That told us two things: 1) the two groups had joined together at the quarry and 2) they were on the run with no food, no water, and no ammunition. They still had their load-bearing kit, and maybe a water bottle or something.

It got to the point where we were tired and we were anxious to make contact with these people. We let the lost spoor procedures go. We wasted hours just wandering around like individuals, hoping to bump into the track. The worst footprint in game country is giraffe prints (Figure G.5). They are easily confused with human prints. They are maybe 10 or 12 inches. It looks like a perfect human print, so you are always being drawn to these giraffe prints. It took a long time in your mind to distinguish the humans from the giraffes.

Figure G.5. Giraffe Prints

We picked it up eventually, but we wasted four hours. I said, "This has got to stop. The controller must keep his team and know where he's gone. Anything like this is just a total catastrophe."

Incident #2: Creek Jumping Criminal

Situation. It was February. I had gone to a meeting in Oklahoma City with most of my staff. I left B on duty for the district outside of Tulsa. His wife was getting ready to go to the hospital to deliver their first child and I wanted him to be close to home. There are 9 people that work for me directly, so 8 of us were in Oklahoma City and B was back at the office near Tulsa. Nearly every law enforcement guy in the state was at this meeting. Generally, if we have to be out of the district, the sheriff's office will absorb because we do that for them.

The Incident. Right at mid-day, B called on the cell phone and told me that something had occurred in this little town called Peru. Peru has maybe 500 people. It is between Tulsa and one of our state parks. A man had shot at his wife with a rifle and then headed to the elementary school in Peru. He had tried to get into the school, but they had locked the doors before he got in. After that, they didn't know where he'd gone on foot.

I said, "Okay, I'll be there in a little bit." At the time, I was thinking they would get the highway patrol involved. I was two hours away, so I grabbed a couple of guys and said, "let's go. We're leaving."

My main concern at this point was that I didn't want B to have to get involved. He's got this situation with his wife. I wanted to be there so I could send him home if his wife needed him. He could always make a statement tomorrow.

I knew I was going to send B home when I got there. I brought D with me, who is a little slow, a little plodding, but he's a pretty good technical tracker. He gets a little nervous about things, but he's a good technical tracker. I brought another one of my guys to put on the perimeter. If the perimeter started to do something silly like close in on us – thinking they could help track – he could manage the situation and get them back in formation. There are all sorts of problems when people from the perimeter move in to help. Sometimes they end up shooting at each other.

I had my vehicle heading up the turnpike when C, the Chief Criminal Deputy for the county that runs from north of Tulsa to Kansas, called. This was only about 10 minutes after I had spoken to B. C said he was setting up the perimeter. They had talked to some people who had seen the gunman go into a big quadrangle. The area was probably 3 miles by 2 miles on the Arizona River. He said that he was holding the SWAT team until I got there because he wanted me to track the guy.

I called the highway patrol and told them I would not be driving the speed limit. I arrived at the scene in a little less than an hour.

As I was driving, I turned off the digital radio they use to communicate. I told B and C to call me if there was anything else I needed to know. When you are 45 minutes away and there is nothing you can do to help the situation, listening to a play-by-play of the situation is not the best thing. Of course, B was calling me with updates. I was thinking about the best way for me to mentally prepare and it wasn't listening to the radio.

I would have been happy if I had arrived and they already had the guy in custody. I don't have a lot of pride left. I think you'd have to be a moron if you weren't relieved to find out that he had been caught and nobody was hurt. I'm just not a big high-five guy, and I don't like working with guys who are.

When I got there I was in this silly dress uniform, which is not what you want to wear when you track. It is all bright and shiny, and not the best foul weather gear. I didn't have a rifle. I didn't have any body armor. I borrowed a rifle and vest.

At this point, I knew we probably had at least 3 hours of daylight. I knew it was a situation where either the gunman was going to pick a fight, or we were going to have to push him. There was already a 90-minute to 2-hour time-distance gap when I arrived.

We found the commencement point where he had entered the woods pretty quickly. It was probably 10 minutes since I had arrived at the post. I felt confident this was him. I was thankful we found the commencement point so quickly. I had already thought about the possibility of getting a dog out there if we had trouble finding the commencement point.

I started to follow his tracks, looking for likely lines of travel. It was about 5 minutes after we found the commencement point that I found a soft piece of ground that was a functional track trap. It was the same foot track I found at the commencement point. I knew then that I was tracking the right guy.

He kept parallel to the river. I would leave D at a really good track. Then I would sprint off maybe 50 yards and find another good track. Twice I didn't find a good track when I ran ahead, so I bounded back and reappraised. You are literally looking around, thinking, "somebody couldn't go there. They could go there. I don't think they would have gone there." Then I'd run up and hit it again. That's how I would find the track line. I wasn't leapfrogging the rest of the team because I didn't want them in front of me. I was leapfrogging on my own, using D as a springboard.

After about 45 minutes of tracking, there was a bend where the river bent back to the south. It was a nice shallow area with a lot of rock. When he made it to that bend, he crossed the river. The first time, I thought, "OK, I'll play." I thought maybe he had gone across and kept going. So I crossed the entire team, got onto high ground, and then could see from the high ground that he had crossed back across and continued. I signaled to the rest of the team to stay on the track. I continued tracking.

I thought, "This is silly. I am not going to go back and forth across the river all day. I am going to figure out where he comes out and nail him down." I crossed the river, and D stayed on the other side. The quarry goes into the river. He comes out of the river. He's doing this to slow us down. It won't work, because he's got to come out. Every time he comes out, we pick up his tracks on the bank. The guy finally made a decision and stayed on D's side of the river. D signaled to me that the tracks kept going on that side.

I crossed the river again to continue tracking. E was watching for the threat while I tracked. E is one of those guys that cares nothing about tracking, but he was a wing by me with an M-4. Sometimes he had his hand on my shoulder or his rifle over my shoulder because I was trying to work through something. You can't do both – focus on the track and watch for the threat.

I thought, "If this guy is that hot, and we have to go up an incline coming out of the river and it's a fairly steep bank, I better put everyone online. That way if anything pops up, you've got 5 guns on target."

As we crested the top, the guy made another turn north. That's when I called F to me. I was trying to anticipate what this guy would do as we closed on him. It's not enough to read the tracks, you have to know what they mean. We had been tracking and his stride was 30 inches or so all along. That's the way you and I would walk. Then, he started coming in and out of the river in an attempt to evade us. As he came up the hill and made the turn to the north, he shifted to an all out sprint. His stride opened up to 40 to almost 50 inches. That's a dead run. That's when we saw the water coming out of the tread pattern. When you've got water trickling from the imprint of one tread into another one, you are within rock-throwing distance of this guy.

I called F, the SWAT team leader, over. F is the one who is responsible. He's got to understand what we are walking into. I brought everyone online and we are staying online. It's probably been 30 minutes since we first crossed the water at this point. The light was starting to fail.

When I showed Eddy the track with the water in it, I didn't have to say anything. He knew it was one of those times. We looked at each other and it was like, "okay, here we go."

There had been a kind of accordion effect with the SWAT team attention span. They knew all along it was going to take a while to track. But now they knew something is up, that we were getting really close.

As the SWAT team came online, I stayed in the middle. I spaced the six guys out as far as I possibly could. Then we started moving on the tracks. That way if he tried to get away, he would run into one of us. It sounds like an idiot thing to say, but at that point you are trying to pick a fight. If the guys throws down his gun and puts his hands up, that's fine. But if the guy has already shot at people, and has that intent, you are picking a fight on your terms, one that is defensible. You are picking a legal fight.

When you start coming online, you know you have got your quarry panicked. You know you are very close to them. You make a decision to keep after them.

Another prudent thing to do at this point is to shut every down for maybe 4 or 5 minutes and listen. If the guy knows you are there, he is expecting you to keep coming after him. If he is really in a panic, he will get up and run, and you will hear him. We listened, but we didn't hear him.

This is a tricky thing when you are tracking. You have to get it set in your mind. He is going to see you. He knows you are pushing him. We were getting closer and closer, and his chances of getting out of this thing are very, very slim now. This is good. We have had a chance to get this guy away from the school long enough that the

kids are back with their parents. We pushed him to the perimeter and the perimeter guys got him. It was probably 5:00 or 6:00pm now, but it was pretty dark because it was February.

Tracking Decision Requirements

For each incident, a decision requirements table was created summarizing cognitively challenging elements of the scenario and the decision requirements for managing the situation. Each cognitive challenge is characterized as a dilemma/decision/judgment, and then working across the table, key contextual information associated with each is captured. This contextual information includes: decision triggers, challenges/why difficult?, cues and factors, actions/Strategy, Information Sources, Common Errors, and Cognitive Abilities. Decision requirements tables allow researchers to look across incidents for common cognitive challenges across incidents. The table also serves as a quick reference, pointing the investigator back to additional detail in the narrative version of the incident when needed.

From these component tables a composite decision requirements tables were created for each domain. Composite decision requirements tables highlight the critical decisions experts face. These are generalized dilemmas culled from the 90+ individual, incident-specific dilemmas identified across all the interview data. They are organized according to the key components for each domain. For example, in the orientation phase of tracking, critical decisions include:

- Mentally preparing for a tracking event
- Preparing for a mission to locate an armed person
- Determining tasks and identifying the conditions for a capturing the quarry
- Selecting and organizing the team based on mission requirements
- Interpreting the intentions of the quarry

Experienced trackers make these critical decisions seamlessly, constantly assessing and adapting as they go. These are often not experienced as individual decisions, but merely as part of the tracking event. This is in contrast to novices who may commit any of a number of common errors. Common errors reported by the experienced trackers largely focus on acting impulsively without considering risks, consequences, resources available, and roles, and not thinking ahead about what might be needed as the incident unfolds. Common orientation phase errors reported across a range of incidents include:

- Not evaluating the risks and consequences
- Acting impulsively, and not establishing the starting conditions
- "Most people don't have a plan to react...and it's too late once you become engaged in the situation.'
- "You always think nothing going to happen because I am here."
- Not using the capabilities of the tracking team to the fullest
- Not knowing what people to put in which roles.
- Not sharing essential information needed to organize and direct the team
- Not getting into the mind of the quarry to appreciate and anticipate how he is likely to behave
- Not clearly assigning roles in a manner consistent with the tracker's concept
- Not thinking ahead about who will be needed if called in to track
- Not knowing when to push the quarry.

Table G.1 presents a decision requirements table summarizing the orientation phase critical decisions and important contextual information surrounding each.

Table G.1. Decision Requirements Table for the Orientation Phase of Tracking

Orientation Phase							
This table summarizes critical decision tracker must face during the Orientation Phase							
Critical Decision	**Decision Triggers**	**Challenges/Why is it Difficult?**	**Cues and Factors**	**Action/Strategy**	**Information Sources**	**Common Errors**	**Cognitive Abilities**
Mentally preparing for a tracking event	Received a phone call: Individual shot his wife and escaped into a wildlife management area with his children	Military tracking is more dynamic and team oriented than tracking individuals for law enforcement.. Multitasking: 1) organize information needed to make sense of a context, 2) labeling the experiences so they can be accessed quickly, 3) create a mental picture of the mission	Transfer evidence--ground and aerial spoor I was a police officer for 9 years; and, served on a federal DEA task force for two years Have been teaching tracking and survival for 6 years	Always let someone know the plan, what you are about ready to do, where are you going. Always wait for others to assist, when there is hostile quarry involved. Touch an anchor point before proceeding (e.g., calling your wife to say goodbye) in order to clear your head and concentrate on the mission.	Quarry: name, age, physical description Map, radio, GPS, cell phone	Not evaluating the risks and consequences Acting impulsively, and not establishing the starting conditions	Assess mission requirements in information within the context to identify how they combine to define a situation or problem context-- **sense making.** **Mentally simulate** the sequence of events from the last known point to the objective in order to visualize the design of the operation Ability to identify options and tipping points that yield a successful end-state or outcome. **Identify Leverage Points** Ability to frame a problem context based on relationships and patterns within the situation. **Pattern Recognition** Ability to integrate new knowledge and experiences and use them to **update one's mental model** of critical contexts
Preparing for a mission to locate an armed person	Received a phone call: Individual shot his wife and escaped into a wildlife management area with his children	Staying calm and focused in stressful situations. Timing... Super Bowl Sunday	The tracker seemed nervous and distracted because his wife was going to have a baby Many things going on in personal life. You don't know who will be part of the tracking team when you get the mission.	Use tactical patience. "We're sitting here waiting until it gets light..." [9/8] When the weather conditions are adverse, you have to act more conservatively. It's about balancing urgency with caution... safety of civilians and Law Enforcement personnel Make sense of things, bounce your ideas off someone else [15/19] Having a flawed plan is better than no plan	Law enforcement, telephone call	Most people don't have a plan to react ... and it's too late once you become engaged in the situation. "you always think nothing's going to happen today because I am here..." [22/22] Not using the capabilities of tracking team members to the fullest [34/6] [35/1] "it's about knowing what people fit what roles."	**Multi-tasking under stress** **Mentally simulate** the sequence of events from the last known point to the objective **Hyper focus**... shed everything and get into the "bubble" [16/4]. The ability to manage one's attention on key information and relationships. Ability to integrate new knowledge and experiences and use them to **update one's mental model** of critical contexts
Determining tasks and identifying conditions for capturing the quarry	Tracking team has been notified to prepare for a mission (verbal FRAGO) involving pursuit and closure with a quarry? Forensic analysis of a site indicates that the insurgents have left transfer evidence of their presence, which is actionable.	Many times the area has been contaminated and collection of transfer evidence to initiate the tracking cannot be isolated. Individual tracking skills vary within a unit or organization. Having the appropriate level of expertise on the mission would be key.	SITREP provided by the unit that was ambushed. Ground spoor consists of footprints: sandals and boots. No military boots Threat level and force protection. Is the quarry laying a trap? Tracking team consists of five individuals. All have tracking skill. Terrain is covered with vegetation and cross with irrigation ditches. Civilians in the fields. Last contact with the insurgent was 30 minutes ago.	Determine what is known about the quarry: number, type weapons, direction of movement. Assess Most Likely and Most Dangerous COA. Characterize the area as far as risk, terrain, enemy dispositions as weak, friendly capabilities such as a UAV or other Scouts. Visualize how the tracking operation will unfold. Orient the Team on the concept before commencing. Assess likely avenues of egress.	SigActs or other reports that describe the action. Base order or instructions from the Platoon or higher headquarters.	Not sharing essential information needed to organize and direct the team. Not getting in the mind of the quarry to appreciate and anticipate how he is likely to behave. Not clearly assigning roles in a manner consistent with the Tracker's concept.	Rapidly assimilate information about the situation and share it w/ team members-**common grounding** Visualizing what to expect-**mental simulation** Quickly evaluating skills of personnel available - **assessment** Applying tacit knowledge and current knowledge of the situation to explain what is happening - **mental model**

Orientation Phase							
This table summarizes critical decision tracker must face during the Orientation Phase							
Critical Decision	**Decision Triggers**	**Challenges/Why is it Difficult?**	**Cues and Factors**	**Action/Strategy**	**Information Sources**	**Common Errors**	**Cognitive Abilities**
Selecting and organizing the team based on mission requirements	Anticipating that may be called on to track	Interviewee and most of law enforcement personnel in Oklahoma City Incident will involve coordination with Sheriff's office, SWAT team Don't know role yet for sure Don't know what the situation will be when arrive in 45 minutes	Will need another tracker; will need someone to manage the guys on the perimeter (from the sheriff's office) Know own personnel well; Know sheriff personnel well; know this area well	Bring a good tracker, and a person who will be able to effectively manage the perimeter	track traps when he comes out of the water. Foot prints tell us his status… how old, how fast he's moving. He knows he's being pursued.	Not thinking ahead about who will be needed if called in to track	anticipating that may be asked to track- **predicting** **mentally simulating** what to expect mental simulation quickly assessing skills of staff available - **assessment**
Interpreting the intentions of the quarry	Suddenly he starts to do things very, very differently	Individual used countertracking by entering the river at some point. You have to have a mindset. You know he's going to see you.	Change in length of stride from 30 inches to 48". Tracks were wet; we're closing on him. Water was still trickling in the treads in the boot print… we are a stone's throw from this guy. [28/15] By running back and forth across the river, he was losing ground, not evading us 1.5 hours into the track the pattern changed. I believed he was trying to show us down…. But it won't work because eventually he's got to come out too. It had begun to rain and it was getting dark. When you are on line, the quarry is likely to panic because he knows he's trapped.	we place one of us on each bank looking for signs that he has emerged. Use track traps, "..sprint forward 50 yards to the traps, and when they didn't happen, bound back and re-appraise whether someone could go there…"	track traps when he comes out of the water. Footprints tell us his status… how old, how fast he's moving. He knows he's being pursued.	Not knowing when to push the quarry	**Seeing the big picture**. The important thing was to push him away from the school and into the perimeter where he could be captured. [29/14] Assess mission requirements in information within the context to identify how they combine to define a situation or problem context-- **sense making.**

Four critical decisions were associated with the *Pursuit Phase* of tracking. These include

- Deciding whether to fight or push the quarry based on his motivations
- Interpreting the intentions of the quarry
- Recovering when you lose the track
- Selecting the correct tactic during pursuit

Emphasis has shifted from initial assessments and planning, to updating assessments with new information, applying tactics, and updating the plan based on new information. During the pursuit phase, time becomes an increasingly important element as the tracking team can easily get caught up in the chase or succumb to pressure to move quickly, taking unnecessary risks or losing the track altogether. Common errors during the pursuit phase include:

- Taking action before the team is set... Being too aggressive unnecessarily
- Not spacing the line formation across the width of the track line
- Not knowing when to push the quarry
- Yelling instead of using visual signals causes team to break concentration during mission
- Breaking concentration might put the team at risk of an ambush.

Table G.2 presents a decision requirements table summarizing the pursuit phase critical decisions and important contextual information surrounding each.

TABLE G.2. DECISION REQUIREMENTS FOR THE PURSUIT PHASE OF TRACKING

Pursuit Phase							
This table summarizes critical decision tracker must face during the Pursuit Phase							
Critical Decision	Decision Triggers	Challenges/Why is it Difficult?	Cues and Factors	Action/Strategy	Information Sources	Common Errors	Cognitive Abilities
Decide whether to fight or push the quarry based on his motivations. tracking event	Received a cell call from Nick about 1200 about a shooting in a small town. I found his track and established the most likely line to pursue him.	What if Nick gets into something (he's alone) [24/17] Nothing really went the way you wanted. Equipment, tracking uniforms, and no weapon or body armor. He had at least 1.5 hours of time distance between us (and that was theoretical based on the last time anyone had seen him)	Individual shot wife with rifle and tried to enter a k-8 school. I felt vulnerable. Still daylight. We found the commencement point quickly--- LiNDATA Report. [36/11] I felt confident we had his spoor. Length of stride 30 inches, which indicates a walking stride. LEA meeting in Feb, which was 2 hrs away from the scene Sherrif's office provides back up during the meeting Sometimes the calls are unfounded Man left the school on foot. The search area is vast--3 miles by 2 miles along the Arizona river. Search area bounded by paved roads, which are all covered. That's the perimeter.	Adapt the formation to the situation. When closing, shift from a "Y" formation deploy the SWAT to a line formation. Be aggressive if you pick to fight. Fight on your terms	Information from the tracking or support team. Assessment of track dynamics and indicators.	Assess mission requirements in information within the context to identify how they combine to define a situation or problem context-- sense making. Mentally simulate the sequence of events from the last known point to the objective in order to visualize the design of the operation Ability to identify options and tipping points that yield a successful end-state or outcome. Identify Leverage Points Ability to integrate new knowledge and experiences and use them to update one's mental model of critical contexts determine cause and effect relationships in order to assess sources and effects of risks. manage risks associated with current tactic or technique.	Assess mission requirements in information within the context to identify how they combine to define a situation or problem context-- **sense making** **Mentally simulate** the sequence of events from the last known point to the objective in order to visualize the design of the operation Ability to identify options and tipping points that yield a successful end-state or outcome. **Identify leverage points** Ability to integrate new knowledge and experiences and use them to **update one's mental model** of critical contexts **Determine cause and effect** relationships in order to assess sources and effects of risks. **Manage** risks associated with current tactic or technique.
Interpret the intentions of the quarry	Suddenly he starts to do things very, very differently.	Individual used countertracking by entering the river at some point. You have to have a mindset. You know he's going to see you.	Change in length of stride from 30 inches to 48". Tracks were wet; we're closing on him. Water was still trickling in the treads in the boot print... we are a stone's throw from this guy. [28/15] By running back and forth across the river, he was losing ground, not evading us. 1.5 hours into the track the pattern changed. I believed he was trying to show us down.... But it won't work because eventually he's got to come out too. It had begun to rain and it was getting dark. When you are on line, the quarry is likely to panic because he knows he's trapped.	We placed one of us on each bank looking for signs that he has emerged. Use track traps, "..sprint forward 50 yards to the traps, and when they didn't happen, bound back and re-appraise whether someone could go there..."	Track traps when he comes out of the water. Foot prints tell us his status... how old, how fast he's moving. He knows he's being pursued.	Not knowing when to push the quarry.	**Seeing the big picture**. The important thing was to push him away from the school and into the perimeter where he could be captured. See the situation from other's perspective and paint the picture using that information-perspective taking in order to use mental simulation in order to **visualize expected outcomes** and **leverage points**

Pursuit Phase							
This table summarizes critical decision tracker must face during the Pursuit Phase							
Critical Decision	Decision Triggers	Challenges/Why is it Difficult?	Cues and Factors	Action/Strategy	Information Sources	Common Errors	Cognitive Abilities
Recover when you lose the track	Tracker marks last known spoor and indicates he has lost the trail.	quarry might be using mistracking or counter tracking methods to deceive the tracker light conditions terrain or ground cover	quarry changed his pattern and began going back and forth across the river. moving forward in a Y formation. Team had worked together before	got onto the high ground to verify where the quarry might be crossing.	Information provided by flankers who support formal lost spoor procedures, e.g., flanker 360, crossover over or box techniques. Support from aerial platforms that might be in support of the operation. Inputs from perimeter. Last known spoor data.		using predictions about the adversary to decide and act in a moral, ethical and legal manner, decision-making, when things don't add up or there are anomalies identified they highlight a need to change tactics or make a decision--problem detection and generating leverage points update mental models of situations based on revised or re-calibrated baseline use knowledge and experience to anticipate how events will unfold, mental simulation assessing cues and factors to understand the situation as it is unfolding, sensemaking, capture the details and process them to make sense of the situation
Select the correct tactic during pursuit	Tracker has a sense that the quarry is changing his pattern and signaled the flanker to stay on track "... I believed that the guy (quarry) had finally decided which way he was going..." [41/9]	team is deployed over a wide area and the armed quarry could back track and ambush the team	quarry changed direction see "stress" in the eyes of the flanker flankers were not tracking; they were providing security and looking for signs of back tracking	maintain visual contact [42/3] "it is not enough to look at each other; we actually have to make eye contact" [42/19]	non-verbal cues such as hand and arm signals	yelling instead o visual signals causes someone to break his concentration during the mission breaking concentration might put the team at risk to an ambush	Assess mission requirements in information within the context to identify how they combine to define a situation or problem context-- sense making. Mentally simulate the sequence of events from the last known point to the objective in order to visualize the design of the operation ability to identify options and tipping points that yield a successful end-state or outcome. Identify Leverage Points ability to integrate new knowledge and experiences and use them to update one's mental model of critical contexts

Closing with the Quarry Phase is the final phase of tracking, and perhaps the stage when a cool head under pressure is most important. In this phase, stealth is often important, particularly in situations in which the quarry is believed to be armed or have hostile intent. The tracker must have in mind a clear plan for capture with in increased need for security even as the tracking element continues to require focus. Critical decisions during this phase include:

- Containing an armed quarry that is cornered
- Interpreting the intentions of the quarry
- Deciding when to go into a line formation and close on the quarry

Common errors can be technical, tactical, or team-oriented. Examples include:

- Using anything other than green lights at night. Red lights are common, but green is more effective
- Not organizing the team into a Y formation for the search
- No communications among team members. Keeping all the information with the tracker.
- Not knowing when to push the quarry
- Not recognizing the threats and risks associated with the abrupt change
- Neglecting the aspects of rear security
- Trying to effect the capture instead of pushing the quarry into the perimeter for capture

Table G.3 presents a decision requirements table summarizing the closure phase critical decisions and important contextual information surrounding each.

Table G.3. Decision Requirements Table for the Closure Phase of Tracking

Closing with the quarry							
This table summarizes critical decision tracker must face during the *Closing with the Quarry* Phase							
Critical Decision	Decision Triggers	Challenges/Why is it Difficult?	Cues and Factors	Action/Strategy	Information/ Sources	Common Errors	Cognitive Abilities
Containing an armed quarry that is cornered on his	An armed guy who you have been tracking is hold-up in a structure.	Individual is desperate and might act irrationally... and we keep pushing him [9/5]. Individual has abducted children who might be injured in the confrontation. Identifying a COA that is the single safest for everyone involved	Tracks indicated he was in the building Weather conditions--snow, sleet, rain Suspected that the cabin was also a "meth" lab based on location and man's history It is dark, 0100 when I got the call. I was asleep. Law enforcement has set up a perimeter around the building. He knows where we are; we don't know where he is. Individual had shot at his wife and taken the kids- already committed a violent act	Use tactical patience. "we're sitting here waiting until it gets light..." Adopt a specific search system, two flankers really spread out. When the weather conditions are adverse, you have to act more conservatively. It's about balancing urgency with caution... safety of civilians and Law Enforcement personnel	flankers, lights (red) because we're operating at night	Use anything other than green lights at night. Not organizing the team into a Y formation for the search. No comms among team members. Keeping all the information with the tracker.	**mental simulation**, thinking through the whole mission and matching it to one's training... mental model. Ability to adapt and connect with the environment (context) and **sense-making** within the big picture of the tracking operation
Interpreting the intentions of the quarry	Suddenly he starts to do things very, very differently.	Individual used countertracking by entering the river at some point. You have to have a mindset. You know he's going to see you.	1.5 hours into the track the pattern changed. I believed he was trying to show us down.... But it won't work because eventually he's got to come out too. It had begun to rain and it was getting dark. When you are on line, the quarry is likely to panic because he knows he's trapped.	Change in length of stride from 30 inches to 48". Tracks were wet; we're closing on him. Water was still trickling in the treads in the boot print... we are a stone's throw from this guy. [28/15] By running back and forth across the river, he was losing ground, not evading us.	We place one of us on each bank looking for signs that he has emerged. Use track traps, sprint forward 50 yards to the traps, and when they didn't happen, bound back and re-appraise whether someone could go there..."	Not knowing when to push the quarry, Not recognizing the threats and risks associated with the abrupt change.	**Seeing the big picture** Assess mission requirements in information within the context to identify how they combine to define a situation or problem context-- **sense making** **Mentally simulate** the sequence of events from the last known point to the objective in order to visualize the design of the operation Ability to identify options and tipping points that yield a successful end-state or outcome. **Identify Leverage Points** Ability to integrate new knowledge and experiences and use them to **update one's mental model** of critical contexts **Determine cause & effect relationships** to assess sources and effects of risks. **Manage risks** associated with current tactic or technique.

Closing with the quarry							
This table summarizes critical decision tracker must face during the *Closing with the Quarry* Phase							
Critical Decision	Decision Triggers	Challenges/Why is it Difficult?	Cues and Factors	Action/Strategy	Information/ Sources	Common Errors	Cognitive Abilities
Deciding when to go to a line formation and close on the quarry	Saw water dripping from the tread pattern. Decided to listen when we were close, because quarry might be in a panic mode	Team is deployed on both sides of the river. It was getting dark	Quarry knew we were closing in It gets dark early in Feb, and it was almost 6 PM	The water dripping in the treads Stride went from 30" to almost 50", meant the quarry was sprinting Felt like we were fairly close	Coordinated with the SWAT leader Slowed everything down so we could get the final plan together on how to confront the quarry	Law enforcement guys often neglect the aspects of rear security Trying to affect the capture, instead of pushing the quarry into the perimeter for capture.	Using predictions about the adversary to decide and act in a moral, ethical and legal manner, **decision making** When things don't add up or there are anomalies identified they highlight a need to change tactics or make a decision--**problem detection** and generating **leverage points** **Update mental models** of situations based on revised or re-calibrated baseline Use knowledge and experience to anticipate how events will unfold, **mental simulation** Assessing cues and factors to understand the situation as it is unfolding, sensemaking **Determine cause and effect** relationships in order to assess sources and effects of risks. **Manage risks** associated with current tactic or technique.

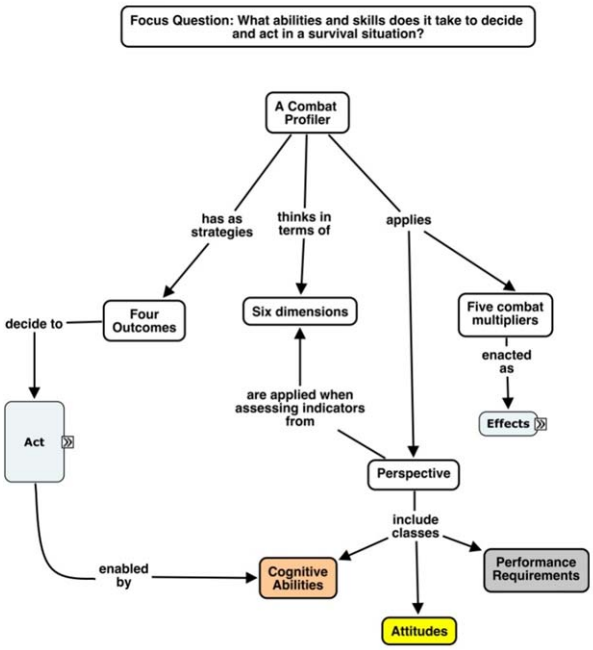

Figure G.6. Overview of combat profiling concept map

Profiling Expertise

Combat profiling expertise can be characterized in terms of *cognitive abilities*, *attitudes*, and *performance requirements*. These combine to create a combat profiler perspective. The combat profiler thinks in terms of six dimensions (i.e., atmospherics, heuristics, biometrics, proximics, kinesics, geographics). He applies five combat multipliers (i.e., tactical cunning, tactical patience, geometry of fires, good shepherd, and guardian angel), and relies on four potential outcomes to guide his actions (i.e., kill, capture, contact, do nothing).

Key *Cognitive abilities* for the combat hunter include *observing the baseline, recognizing patterns, and deciding to act* (Figure G.6).

Observing the baseline refers to the ability to monitor the environment with the intent of determining what are normal or typical behaviors, so that anomalous elements are easily recognizable (Figure G.7). Baseline observations are affected by the baseline conditions, which are content driven. For example, when observing an Afghan village, one might note areas in which people typically gather to play soccer, shop, and engage in other common activities. The timing of these activities and general routines of the village would be noted, as well as typical dress and culture-specific signs of deference and respect. In an urban center, observations might focus on the types of businesses and the activities and routines around business activities. People engaged in different types of business would be noted as well as people who do not seem to be engaged in business activities. Observations are also influenced by relevance to the problem or mission the combat profiler is engage in solving. Missions focused on disrupting a network of insurgents might include observations focused on identifying the supply chain for creating explosive or the money trail for funding the insurgents. Law enforcement missions might focus observations on the activities of people who seem highly alert, wear clothes or body art signifying gang membership, and to whom others show deference or fear.

The ability to observe and define the baseline is also affected by the profiler's access to indicators. The ability to blend in, and observe at close proximity allows more direct access to high quality cues, and allows for better discrimination of miscues. However, for pragmatic or tactical reasons, observations sometimes take place from a distance, in which case the combat profiler relies on optics, and other technologies to observe the baseline.

Observations of the baseline are also influenced by the combat profiler's lived-experience. Combat profiling instructors referred to this experience base as a set of "file folders." These "file folders" allow profilers to recognize a situation or cluster of cues. This recognition is accompanied by an understanding of implications, as well as the generation of expectancies.

Recognizing patterns is a second cognitive ability exhibited by skilled combat profilers. These patterns are located along the current baseline of known atmospherics, heuristics, proximics, geographics, biometrics and kinesics, which are used to guide observations.

- Atmospherics refers to the profiler's interpretation of the general feeling or mood of the environment via the five senses. This is described as "how a place looks, sounds, tastes, feels, and smells." (Williams, April 2010, lines 1347-1348)
- Heuristics are described as tactical shortcuts. Often a few familiar cues are enough to allow the combat profiler to draw a reasonable conclusion.
- Proximics refers to the distance people maintain as they interact. In terms of conducting observations, it is important to maintain awareness of how close the threat is because a closer threat can do more damage. In terms of the object of observations, much can be learned by how people greet each other, the posture they use when interacting, and how close they stand to each other.
- Geographics refers to the identification of habitual areas where people from the community gather for routine activities such as meeting, dating, shopping, and sharing ideas, as well as anchor points where groups, tribes, or gangs meet. Anchor points are areas where rehearsing and planning of attacks/crimes are likely to take place. Habitual areas are often targets for attacks/crimes.
- Biometrics is a term used to encompass retinal scans, fingerprints, micro-facial expressions, heat signatures, and other mechanical devices used to detect and measure biological activity. Combat profilers tend to focus on indicators that can be viewed in context to interpret a person's emotional and physical state. These indicators include blushing, histamine flushing, flared nostrils, salt stains, sweating or lack of sweating, clammy skin, fixed/pinpoint/dilated pupils, and swelling.
- Kinesics is described as body language. Although humans often try to mask their emotions or intentions, body language often gives underlying emotions and intentions.

These six dimensions are used to guide observations from which a baseline is defined. The baseline is constantly compared to current conditions and activities to recognize *anomalies*.

Combat profiling expertise relies largely on the ability to *recognize patterns* consisting of anomalies, social networks, physical terrain, information, and things hiding in plain sight. These elements interact to create cause and effect relationships that may produce new tactical problems or a new understanding of existing tactical problems.

Assessing the threat requires consideration of information from a range of perspectives. The profiler must consider information as it is perceived by the profiler himself, the coalition, the adversary, local popula-

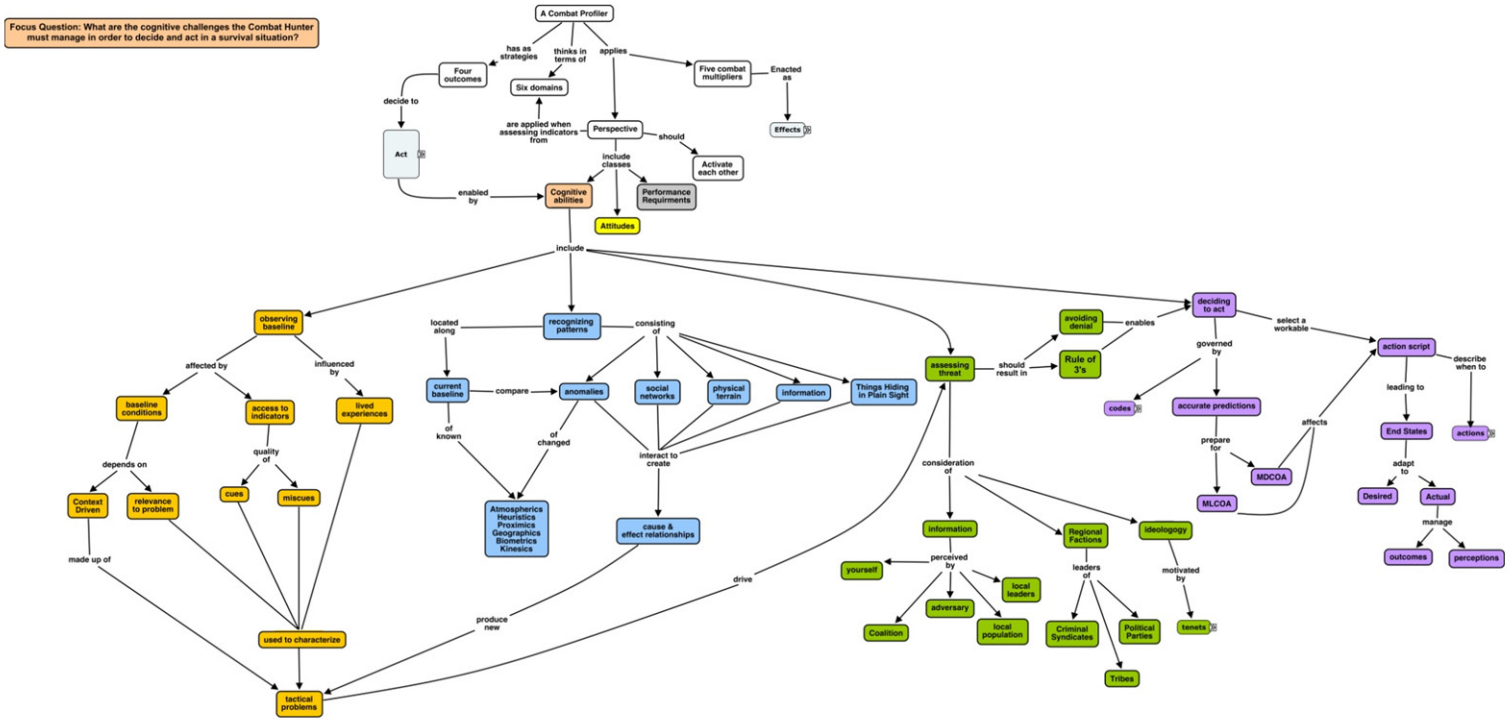

Figure G.7. Combat Profiler Cognitive Abilities Concept Map

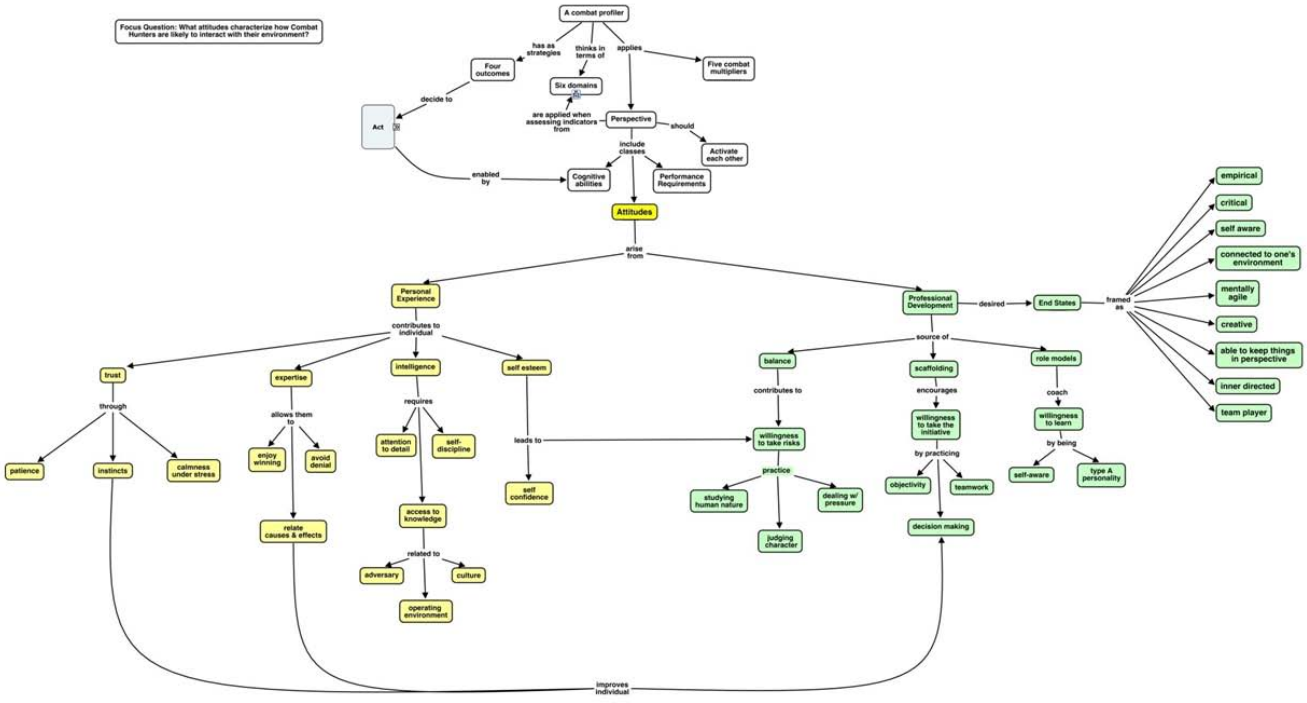

Figure G.8. Combat Profiler Attitudes Concept Map

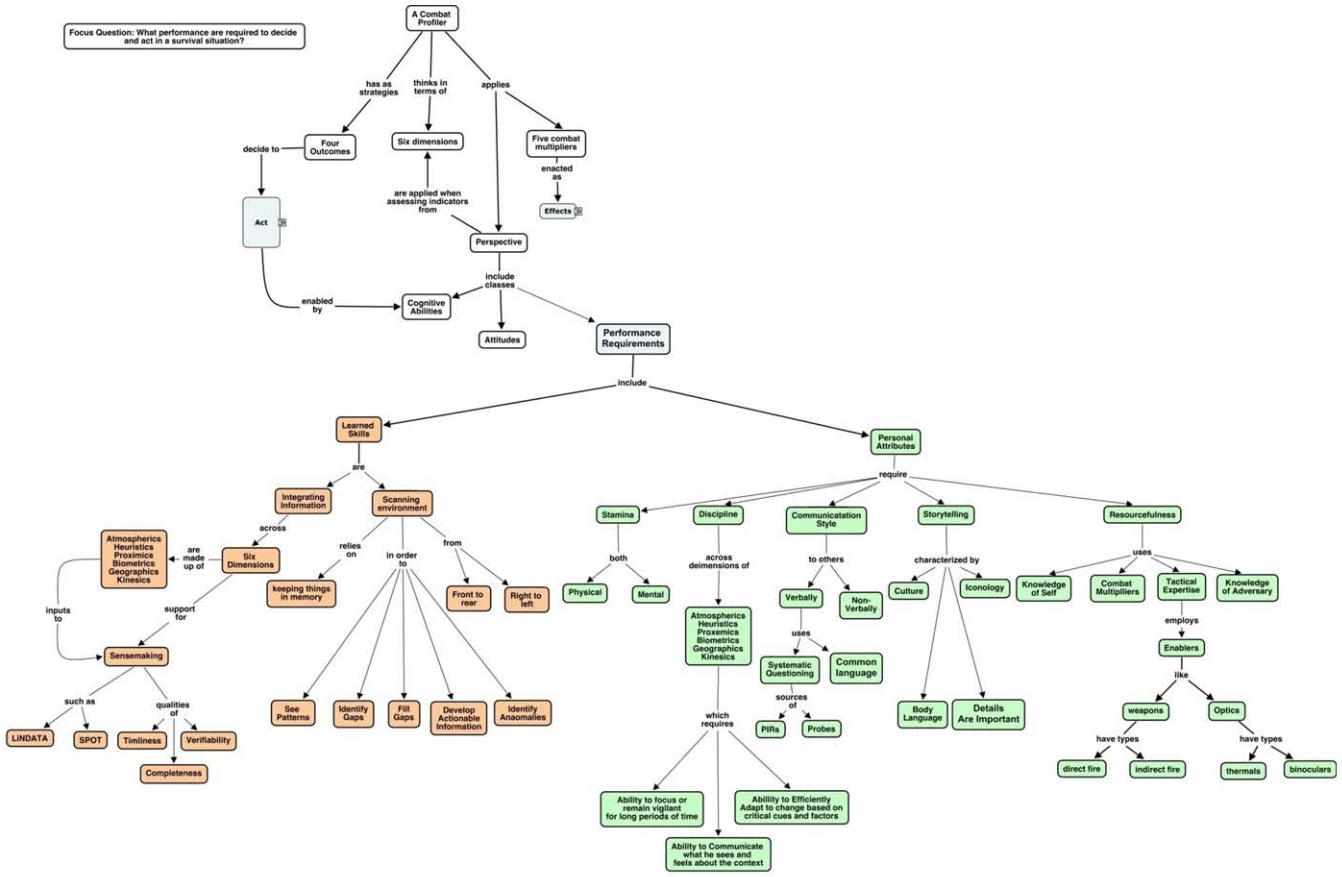

Figure G.9. Combat Profiler Performance Requirements Concept Map

tion, and local leaders. The profiler considers the regional factions including criminal syndicates, tribes, and political parties. Ideology is another important consideration, often incorporating tenets of the local religion, culture, and politics.

Deciding to act is another key component of combat profiler expertise. An accurate assessment of the threat requires that the profiler avoid denial. Avoiding denial can be particularly challenging when the profiler is tired, hurried, or experiencing pressure from peers or superior to keep moving or avoid disrupting ongoing operations. Experienced profilers rely on the "Rule of 3" to avoid denial. The Rule of 3 simply states that if three anomalous events or cues have occurred, it is time to move beyond denial and take action.

The decision to act is governed by moral, ethical, and legal codes, as well as accurate predictions. Accurate predictions allow the profiler to prepare for the most likely course of action and the most dangerous course of action on the part of the adversary. These in turn affect the action script selected. Action scripts generally fall into one of four categories: kill, capture, contact, or monitor. Each leads to different end states. If the desired end state is not achieved the profiler must assess the actual end state, and take measures to manage both the intentional and unintentional outcomes and perceptions.

Combat profiler *attitudes* arise from a combination of *personal experience* and *professional development* (Figure G.8). *Personal experience* contributes to individual trust, expertise, intelligence, and self esteem. Trust is established through patience, instincts, and calmness under stress, all of which are developed and honed over time and with experience. Expertise allows the combat profiler to avoid denial, enjoy winning, and access relevant knowledge related to the adversary, the operating environment, and the culture. Self esteem leads to the self-confidence required to take appropriate risks.

Professional development provides a source of balance, scaffolding, and role models. Balance contributes to the willingness to take risks in appropriate circumstances. The balance is achieved via practice at studying human nature, judging character, and dealing with pressure. Scaffolding occurs when working with a role model. As the combat profiler gains experience and confidence, the role model encourages a willingness to take the initiative on the part of the profiler. The profiler continues to practice objectivity, decision making, and teamwork. Role models coach a willingness to learn by being self-aware and developing a Type A personality.

Professional development leads to desired *end states* that can be framed as empirical, critical, self-awareness, connected to the environment, mentally agile, creative, able to keep things in perspective, inner direction, and a team player.

Combat profiler performance requirements include *learned skills* and *personal attributes* (Figure G.9). *Learned skills* include integrating information and scanning the environment. Information is integrated across the six dimensions (atmospherics, heuristics, proximics, biometrics, geographics, and kinesics) in support of sensemaking. Sensemaking may include packages of information such as LiNDATA or SPOT reports, and includes qualities of timeliness, completeness, and verifiability.

Personal attributes require stamina, discipline, communication

style, storytelling, and resourcefulness. Stamina includes both physical and mental stamina. Discipline must be applied across the six dimensions which require:

- The ability to focus or remain vigilant for long periods of time
- The ability to efficiently adapt to change based on critical cues and factors
- The ability to communicate what the profiler sees and feels about the context.

Communication style refers to the ability to communicate to others both verbally and non-verbally. This includes systematic questioning using PIRs and probes, and requires that a common language be used.

Storytelling is characterized by culture, body language, and iconology, and emphasizes the importance of details.

Resourcefulness uses knowledge of self, combat multipliers (i.e., tactical cunning, tactical patience, geometry of fires, good shepherd, and guardian angel), tactical experience, and knowledge of adversary. Tactical experience, in particular, employs enablers such as weapons both direct fire and indirect fire, and optics including thermals and binoculars.

Profiling Incidents

Two incident narratives are included to provide a more detailed, context-rich view of profiling expertise. The first is recounted by a former noncommissioned officer who describes an event early in his career that resulted in the death of a squad member. The interviewee considered this incident an illustration of how denial can lead to increased risk and, at times, tragic outcomes. The second is another incident that takes place in a combat setting. In this incident an Army sniper team successfully predicted which vehicles in the convoy were likely to be transporting materials to create improvised explosive devices (IEDs).

Incident #3: The Blind Search for Insurgents

Situation. It is November in Iraq, another hot day in a highly threatening environment. As the patrol moved into the neighborhoods of Fallujah, they were prepared to deal with the bad guys. The Marines had been conducting block-by-block patrols (Figure 54) to clear neighborhoods of insurgents who were part of the Mahdi Militia. The intense battles have been raging for weeks with casualties on both sides. The patrols were always ready for a fight.

Fallujah had been contested for weeks. Neighborhoods were still occupied. But there were obvious signs of the fights that had been raging. There were bombed out buildings, rubble along the streets. There weren't many civilians, almost everyone was armed and a threat to the patrols. There are overhead lines everywhere, but none are working. There is no electricity and the telephones don't work, unless there is a wireless tower close by.

Most of the buildings were located in small walled compounds with gated entrances. The walls rose to 5 or 6 feet and were sometime topped with barbed wire or broken glass to deter us from climbing over. The two-story structures were concrete or cinderblocks typically about 12 inches thick and covered by dull stucco. Houses were from a couple of hundred square feet for poorer residents, to around 4000 square feet for the most rich and powerful. The alleys between buildings were narrow, sometimes as little as 2 feet wide. It definitely had the appearance of a Third World country.

The interiors were modestly furnished with little furniture, propane stoves, a few rugs spread along the bare concrete floor. The wealthier homeowners might have a refrigerator, a generator, and television. Each house had a kitchen, and there was often the smell of fresh cooking when the squads entered. There were always unusual smells from spices to laundry smells that greeted the Marines when they entered.

The Incident. This is about an incident where the use of Combat Hunter profiling skills might have altered the outcome. The mission involved entering and clearing buildings. If there were insurgents willing to fight, the task was to take them down. This normally meant a fire fight. The squad had left its combat outpost early in the morning and followed a routine of entering, searching, clearing, and marking buildings. These operations normally took place during the daylight due to the added risks.

Squads considered each house they cleared a potential ambush site. They wanted to ensure that they were not creating a "kill zone" for themselves, so they carefully thought through the situation before committing to the search phase. What they often failed to consider was how the insurgent might view the house as a defensive position. For example rarely did they take the perspective of the enemy when considering the house as a fighting position: was it defensible; were there field of observation and fire; were there egress routes; and, could the position be reinforced with fires or forces? The patrol was so locked-in or focused on the mission, which they failed to consider the perspective of the insurgent when conducting these search and clear missions. This was such a patrol.

When the FRAGO is issued to the patrol, they review it over a map. The recon and rehearsal were brief, after all this patrol is like all the others, e.g., "go to Block X, and clear house 4". We knew it was a high risk operation because the Battalion Commander told the formation to expect casualties. We were told to expect 50 insurgents in the area today. Our stress levels went up knowing we had information about insurgents. I wasn't as stressed because I didn't have a wife and kids—I was single. I was focused on the mission.

This mission might have us clearing as many as 75-100 houses in this block. We have options. We could soften the target with air before going in, or conduct cordon and search of suspicious houses. A suspicious house is one that has signs of activity... graffiti, a Mahdi flag, human activity, barriers and so forth.

Normally, the three fire teams rotated roles for the cordon, security and search. There was a lot of potential danger. And because the patrolling went on day after day like this, everyone had to deal with physical fatigue. This went on for 18 days straight.

We went to the first house listed in the FRAGO. It's been marked on the map. As we approach things look normal. The entrance gate is closed and locked. We used C4 to breach the gate and moved across the courtyard to the residence. My team begins to clear, bottom floor "Clear" while securing the top floor. Then we proceed to clear the top floor with two guardian angels positioned to cover us in case it was an ambush. Once we cleared, we notified the Squad Leader, marked the house with an "X" and updated the map. No problem, move on. Meanwhile the other fire teams have already moved to next house. We continued to "bound" along in this manner throughout the mission.

Around 1000, we came to an old factory building. The intelligence said there would be insurgents here so we took the precaution of calling in an airstrike. When we entered the bombed out remnants, we found no one in the building. More bad intelligence! We pushed on to other houses. As the afternoon approached, we began our movement into one of the last targeted neighborhoods for this mission.

It was around 1530 and the patrol seemed routine. We moved into the neighborhood, the baseline began to change but we didn't realize it or adjust our thinking. Instead of abandoned houses, we recognized signs of occupants. We began to find fresh bedding, there was an occasional expended AK47 shell casing, and unspoiled vegetables. Common sense should have suggested there were people (atmospherics), but we didn't connect the dots. It should have meant, get ready for a fight, but it didn't! We were in denial because the insurgents wouldn't be this careless or in the open. Oddly, the more activity we observed, the less obvious the cues became. We kept moving south into the danger. We ignored all the indicators and continue to clear houses and create our own kill zone.

As we approached what appeared to be an abandoned house, we encountered a very old woman. She said through the interpreter that she lived there alone. The males had left weeks ago she reported. Through the interpreter she said, "I am too old to leave the city." I thought, "Why haven't you been murdered, the Mahdi are killing everyone left in the city." I ignored signs of more people… the food being cooked, the clothes in the house, the table settings. We went cleared her house as I thought of my own grandmother in Colorado.

When we got the next house, the gate was unlocked and slightly opened. Right there we should have known that there was someone inside. Instead of entering, it would have been better to conduct sustained observation and look for other indicators, but we didn't. We entered the compound and found the door to the house unlocked, another indicator off the baseline for this city. We ignored this indicator and entered the first floor and found signs of people that we took seriously; however, we chose to ignore the risk and proceeded. After all, this is what we've been finding in these houses and it was getting late. After clearing the bottom floor, my roommate and I went to clear the upstairs. I was point, and he was behind me. I did a rolling point across the door and he stopped to kick it in. When he did, automatic weapons fire from three weapons opened up and killed him instantly. In the ensuing fight, the three insurgents died and we suffered only minor wounds. Our combined firepower was over whelming. Our stupidity however had cost the life of a Marine.

We succumbed to denial, complacency and mission focus. Combined, these factors blinded us from the obvious.

Incident #2: Jingle All the Way Down Highway 4

Situation. It is early Fall in Afghanistan, and Combat Hunter training has just wrapped up for the day. It's about 2200 and time for the teams to put into practice what they have just learned. To some, the enhanced observation and profiling skills make a lot of sense. To others, they need proof. The students are all highly trained sniper teams, who must observe movements along Highway 4, a remnant of the Soviet occupation of the region.

It is a heavily trafficked road, where smugglers, merchants and insurgents move materiel from neighboring countries into the marketplaces and hideouts along the route. There is round the clock activity, which requires constant monitoring and surveillance.

One technique used to thwart the flow of arms into the region is to establish control points along main supply routes, where the convoys can be stopped and searched before goods are delivered.

The Incident. This is about an incident where the use of enhanced observation skills combined with sensemaking revealed information about IED components. The Army sniper team was on an operation along Highway 4. The route was known as a traditional route where smugglers had for years moved contraband—materiel and human across the international border. The goods were moved in large trucks, which the GIs called jingle trucks because of their ornate decorations. Every driver wanted his truck to be the most covered with iconology and chrome. It was a real spectacle.

Convoys would form up at the border crossings and move toward the population centers. By moving in convoys, there was less likelihood of attack by the warlords and security was important.

These convoys also posed a threat to the Coalition forces as they could be used to transport materiel and supplies used by insurgents. Therefore, convoy operations were always monitored and sometimes actions were taken to inspect the cargo.

Tonight's operations involved sniper teams who had received training on how to detect suspicious vehicles and predict which ones might have contraband. The operation was conducted with Afghan National Police and US Soldiers manning a Vehicle Control Point, which was located several kilometers from the border. On the high ground, along the route, a sniper team was observing the convoy. The two-person team had a sniper scope, binoculars and thermal devices that could be used to profile the vehicles as they passed. When a jingle truck was "off the baseline", the team would radio ahead to the VCP, where the vehicle would be searched. The snipers were exercising the option of contacting instead of killing or capturing the suspect vehicle.

So, what were the observers looking for? All jingle trucks are about the same. They are large cargo trucks, operated by local drivers not foreign national contractors. Long before they could be seen in the rough terrain along Highway 4, the team could hear the clamor of approaching vehicles. As they approached, the highway sounds would mask any conversation with the team, which was positioned close to the road in a concealed position. As the convoy lights shown above the horizon, the spotter and the sniper used binoculars to capture a glimpse of the convoy. The trucks bounced and bounded along the road in a rhythmic pattern. Rays of light flashed through the dust and produced an eerie glow as the trucks approached. They were closely bunched, hardly a tactical movement with seemingly no concern for IEDs. They maintained a constant speed, perhaps as much as 50 *kph* on the straight-aways and down slopes.

SGT "Pete" believed that the trucks of interest could be easily spotted or detected. He and his spotters began scanning the convoy from a considerable distance, once the vehicles began to descend slowly towards them. Even at a distance, some of the vehicles appeared different to the observers. In the low light conditions, the dust clouds that billowed up from the vehicles tended to set them apart. Larger clouds suggested larger loads. And because it was around midnight, he believed that thermal signatures would be a critical cue. As the trucks lumbered by beneath them, Pete used his thermals to scan the trucks. He focused on the engine compartments trying to determine what loads might be the greatest. He also listened for the high pitched growl of those engines that were straining to keep up. As they trucks passed one by one, he noted two that seemed off the baseline thermally. These same vehicles called out for relief as their engines whined under the load in a lower gear than the rest. He keyed his mike and issued a report to the VCP that lay along the route ahead of the convoy. He identified the trucks as number 9 and 10 in the convoy. He couldn't look inside the cargo trucks, but sensed that they should be checked further.

At the VCP, SGT "Sam" and his team eagerly awaited the convoy's arrival. Their job of manning the VCP was routine. Halt the convoy, check the paperwork, and look for contraband. Day in and day out, it was all the same.... Only 47 days until his re-deployment stateside!

As the convoy approached, the ANP flagged down the lead vehicle and it ground to a halt, and behind him the vehicles closed in and stopped. The dust cloud soon came through in a gentle rush. The drivers all complained, "...we need time, why must we wait, we are already late." The ANP was patient and persistent as he and other members of his squad began to walk the line of trucks.

Sam is accompanied by a fire team as he and an Afghan National Police (ANP) sergeant approach vehicle 9. Their flashlights brush over the vehicle. Brightly colored like all the rest, with an accent of green. The driver is not native Afghan... no hat, a light mustache and a no jacket. As he opens the door at the direction of the ANP the smell of hashish wafts from the cab. He is unarmed. He replies to questions from the ANP in a Pashto, but the interpreter accompanying Sam advises he is not native. Probably a Pakistani from the border region, he thinks. The ANP asks simple questions to confirm identity, type of cargo. Each of these questions is answered by another question from the driver. He knows the drill, but is struggling to answer in a straightforward manner. "Why do you ask, I am with the convoy, I go to Kabul?", "What do you mean, my cargo. It is like always, grain for the hungry people of Afghanistan?" and so forth. All of these responses are indicators of someone trying to deceive. Another man emerges from the cab; he's been asleep and is groggy... perhaps from the intoxicant, maybe as a result of sleeping. It is unclear.

As Sam surveys the truck he notes the condition of the occupants and the contents of the cab. To him, this looks normal and he wants to ignore his instincts. But things aren't adding up... if these are normal drivers and trucks, why evasive answers? What was Pete so concerned about... what did hear, see and smell that caused him to select this truck? It should be no big deal, but he asks the ANP about a search. The two men from the cab begin to clamor that they don't know anything about the cargo. They begin to distance themselves from the cargo.

Sam brings the dogs forward. The dogs are used to assist in the search. When the ingredients for home made explosives are present, the dogs are effective in finding them. The dogs alert on the truck almost as soon as the cargo is exposed.

Profiler Decision Requirements

Profiler decision requirements tables take the same form as the tracker decision requirements tables, highlighting the critical decisions and key contextual elements associated with each phase of profiling. Four phases of profiling examined are: Observing the Baseline, Recognizing Anomalies, Deciding to Act, and Recalibrating.

For the *Observing the Baseline Phase*, critical decisions focus largely on assessment and planning. Examples include:

- Determining tasks to be performed that set the conditions for interacting with the environment
- Developing situation awareness within a short period of time
- Communicating information and concepts about profiling to others
- Developing a baseline for a particular situation or context
- Determining when to recalibrate the baseline

Many types of errors can and do commonly occur in observing the baseline. Failures to accurately assess the situation, share information with the team, or even organize the team can have negative consequences. Common errors reported in the incidents we studied include:

- Not sharing essential information needed to organize and direct the team
- Not getting in the mind of the adversary to appreciate and anticipate how he is likely to behave
- Not clearly assigning roles
- Not knowing what to pay attention to
- Focus blindness
- Inability to keep things in memory accurately or completely
- Insufficient practice using the skills makes you pick up bad habits
- Bias
- Inability to attach meaning to subtle differences in the behaviors and actions of others
- Difficulty using tactical patience (i.e., take action instead of backing off to observe)
- Following the same pattern without considering that insurgents may be targeting that pattern
- Misread or ignore the heuristics and atmospherics in a situation
- Making assumptions instead of looking for information to fill the gaps
- Using templated solutions instead of generating prototypes that explain enemy actions
- A tendency to act impulsively and not rely on training or rehearsal
- Lack of attention to detail
- Use of ethnocentric markers to classify threat behaviors. They are different for a reason.
- Relying too much on the interpreter to build relationships with others

Table G.4 presents a decision requirements table summarizing the observing the baseline phase critical decisions and important contextual information surrounding each.

Table G.4. DECISION REQUIREMENTS TABLE FOR THE OBSERVING THE BASELINE PHASE OF PROFILING

Observing the Baseline							
This table summarizes critical decisions combat profilers must face during the Observing the Baseline Phase							
Critical Decision	**Decision Triggers**	**Challenges/Why is it Difficult?**	**Cues and Factors**	**Action/Strategy**	**Information Sources**	**Common Errors**	**Cognitive Abilities**
Determine tasks to be performed that set the conditions for interactions with the environment	Unit is conducting a combat patrol that might involve insurgent activities. This is based on information provided in the patrol order and is consistent with lived experiences in the area. Predictive analysis of a area of operations indicates that the insurgents have the capability to conduct ambushes.	The terrain is rough and the insurgent forces have knowledge of the terrain and our operating methods. Several things might be changing at once. Distinguishing between change due to our presence and change due to intentions of the insurgent or threat.	Observations from other squads. Individuals observing our movements. Vehicles slow down or park along roadway. Groups of children greet the patrol. Activity in the habitual areas consistent. Contact with civilians indicates anger and frustration with our presence, Patrol conducted by an experienced squad that has seen combat. Observation skill that includes use of optics. Terrain covered with vegetation, plus irrigation ditches. Context includes local noncombatants and insurgents. Info sets expectations: activity level of insurgents, IED reports, location of suspected criminal activity.	Look for changes from the baseline: is activity level the same; are the neighborhoods different; do parked cars appear serviceable, and so forth. Confirm or reject information about enemy presence. Contact or capture individuals suspected of tracking the patrol. Paint in the missing pieces. Read the behavior of children; they are more likely to pass unfiltered information about the situation.	What you detect visually. Information available at anchor points, like the new wall, the public communications office, or in the market place. Radio traffic from adjacent units or Operations Center. The observed behaviors of individuals you encounter- eye contact, head movement, hand movement, speed at which they approach or leave an area.	Not sharing essential information needed to organize and direct the team. Not getting in the mind of the adversary to appreciate and anticipate how he is likely to behave. Not clearly assigning roles	Rapidly assimilate information about the situation and share it with team members- common grounding Visualizing what to expect-mental simulation Quickly evaluating skills of personnel available- assessment Applying tacit knowledge and current knowledge of the situation to explain what is happening-mental modeling
Developing situational awareness within a short period of time	Mission requires you to enter a new neighborhood and defeat the insurgent. (A meeting engagement of sorts.)	Cognitive dissonance--things like IEDs hiding in plain site "...you can't see what you're not looking for" Denial interferes with one's ability to recognize cues in the environment	Learned to act independently at a young age "Gift of Fear" 18 consecutive days of patrolling meant that things looked familiar Denial is the inability to acknowledge the truth simply because you are satisfied with the status quo Everything looks like a Third World country; different than the States Behaviors or actions don't fit with the scene Presence of civilians in the city No electrical service to the city Paved and dirt roads within the city Every house has a laundry-like smell lots of overhead lines, many down to the ground	Don't accept things because they are routine- question them and overcome denial. Knowing what to look for in a situation- baseline and anomalies. Continuously practice the skills needed to characterize the cues in the environment	Atmospherics, geographics, heuristics, proximics, biometrics, and kinesics from the context	Not knowing what to pay attention to; focus blindness can also occur.	Rapidly assimilate information about the situation and share it with team members- common grounding Orienting, leading and directing the efforts of a team to accomplish a set of specified and implied tasks- coordinating actions Quickly evaluating skills of personnel available - assessment Applying tacit knowledge and current knowledge of the situation to explain what is happening-mental modeling
Communicating information and concepts about profiling to others	Manning an OP and trying to determine the intention of others (adversaries) in a village	People are unaware of how to assess context in terms that describe changes from the baseline. Lack of training on observation or perceptual skills.	Urban masking-- wearing sunglasses or common items of clothing Doing normal activities to cover real intent Many things happening at once in the situation	Speak in the language that marines understand Provide testimonials [first person experiences] Take the perspective of others. Teach not by telling but by demonstrating that you have the craft or skill. Use a common set of terminology	Training on the tasks used to exchange information	Inability to keep things in memory accurately or completely Insufficient practice using the skills allows bad habits to form	Rapidly assimilate information about the situation and share it with team members- common grounding Orienting, leading and directing the efforts of a team to accomplish a set of specified and implied tasks- coordinating actions

Observing the Baseline							
This table summarizes critical decisions combat profilers must face during the Observing the Baseline Phase							
Critical Decision	**Decision Triggers**	**Challenges/Why is it Difficult?**	**Cues and Factors**	**Action/Strategy**	**Information Sources**	**Common Errors**	**Cognitive Abilities**
Developing a baseline for a particular situation or context	When the squad depends on the pointman on a combat patrol	High stress and high risk	Condition of the entrance- locked or open Raised in an environment where there were many risks Survival skills used Willingness to learn and practice new skills Cultural differences and similarities Most houses were 2-story and were surrounded by 12; thick walls	Keep things in memory using a background story Use several senses at once to get a better picture of what's normal Don't rely on a sixth sense- "I don't believe it exists"	ASCOPE and census information Country studies and information about the culture, religion, and politics of the groups that make up the population along the baseline	Bias and inability to attach meaning to subtle differences in the behaviors and actions of others	Willingness and ability to challenge or question assumptions based on observations and use critical thinking skills See the situation from other's perspective and paint the picture using that information- perspective taking and mental simulation Visualizing what to expect or anticipate in a complex situation- mental simulation Quickly sizing up the situation and adjusting your plan to deal with new factors or information- replanning or adapting Applying tacit knowledge and current knowledge of the situation to explain what is happening- mental modeling
Developing a baseline for a particular situation or context	Entered an area that had all the signs of being occupied in an otherwise desolated city.	Fatigue of continuous patrolling Mission focus lock and denial Denial is the first thing that pops into your head when you are in a situation.	Signs of life--cooking Fresh bedding indicated more people in the area Expended shell casings Entrance to the compound and house were open and unlocked. House was furnished and appeared lived in. Carpets, propane, bedding Moving from neighborhood to neighborhood based on the FRAGO Up to 100 houses/ buildings per day were cleared by the squad Fatigue had set in late in the day; checks were less thorough or more routine.	Guardian Angels to provide back up. Back off and observe; don't force a firefight when the facts are unclear Use other means to soften the target. Clear house using TTP; rolling pointman.	The old woman told us she was alone. Mission brief indicated the presence of insurgents.	Tactical patience- back off and observe instead of taking action Followed the same pattern and didn't think through the possibility of insurgents Misread or ignore the heuristics and atmospherics in a situation making assumptions instead of looking for information to fill the gaps using templated solutions instead of generating prototypes that explain enemy actions	Willingness and ability to challenge or question assumptions based on observations and use critical thinking skills See the situation from other's perspective and paint the picture using that information- perspective taking and mental simulation Visualizing what to expect or anticipate in a complex situation- mental simulation Quickly sizing up the situation and adjusting your plan to deal with new factors or information- replanning or adapting Applying tacit knowledge and current knowledge of the situation to explain what is happening- mental modeling

Observing the Baseline							
This table summarizes critical decisions combat profilers must face during the Observing the Baseline Phase							
Critical Decision	**Decision Triggers**	**Challenges/Why is it Difficult?**	**Cues and Factors**	**Action/Strategy**	**Information Sources**	**Common Errors**	**Cognitive Abilities**
Use knowledge and experience to define a usable baseline	Crossed the line of departure and have entered the operating environment… an Afghan village of 150 or so occupants.	Difficult to slow down in kinetic situations; adrenaline and training kick-in. We are likely to deny what we see or ignore things that are hiding in plain site. It is extremely difficult to remain vigilant for long periods of time; things blend in or are ignored. The culture is different from ours. Language can't be used to detect anger or frustration. We don't understand.	Sounds and sights of habitual areas are good cues. Look for changes that warn of danger. The presence of children provided assurance that the threat of an IED attack was not high. Access to buildings was limited. Gates locked, windows shuttered or covered. Look for those who are leaders or have authority over others: i.e., entourage, mimic, adoration and direction are signs Compare individuals' reactions to our presence: eye contact, facial expressions, hand movement The walls around the houses are 6 feet high. Alleys are narrow- 24-30 inches. Houses that have been cleared are marked with a large "X" Had been in country for 3 months. It was Nov. Most profilers exhibit Type "A" personality--action oriented, energetic, persistent, and are competitive The baseline is defined by behaviors or observations that operate along one of six dimensions: Atmospherics, Heuristics, Geographics, Kinesics, Proxemics or Biometrics. The setting always changes based on reactions to our presence. An ASCOPE assessment has been performed. It provides details about the area, structures, capabilities, organizations, people and events.	Stand back and observe; don't impulsively move into unknown situations without first visualizing and observing. Ask yourself, "Is this what I expect?" Assess the atmospherics. Look for signs of deception or deceit. Learn whom you can trust. Read the kinesics. Assess lines of drift and identify anchor points and habitual areas. Gathering points have markers that reveal who's been hanging out. Take time to learn something about the other culture. Survival language skills can be lifesavers and allow you to build relationships. Recognize and use the significance of icons and colors to inform your judgment. Bounce assessments off of other team members that you trust.	Your senses and information from other squad members. Country studies and CA estimates that describe the culture and language. Language cards.	A tendency to act impulsively and not rely on training or rehearsal Lack of attention to detail. Use of ethnocentric markers to classify threat behaviors. They are different for a reason. Relying too much on the interpreter to build relationships with others. Failing to keep things in memory.	Mentally simulate or predict outcomes Verifying predicted outcomes against actuals; updating mental models Seeing the situation from the eyes of another; perspective taking and sensemaking

For the *Recognizing Anomalies Phase*, critical decisions continue to address assessment and planning. However, focus has shifted subtly from characterizing what is typical baseline behavior to recognizing something that is atypical or anomalous. Critical decisions include:

- Making sense of indicators that are off the baseline
- Developing situation awareness within a short period of time
- Communicating information and concepts to others without revealing information or intentions to the threat network
- Developing a baseline for a new situation or context
- Determining when to Recalibrate a baseline

Not surprisingly, many of the same types of errors occur in observing the baseline and in recognizing anomalies. Failures to accurately assess the situation, share information with the team, or even organize the team continue to have potentially negative consequences. Common errors reported in the incidents we studied are listed below.

- Denial, inability, or unwillingness to sense tactical cunning (things hiding plain sight)
- Inability to observe subtle differences in a situation and adjust one's perception of the situation
- Inability to see the situation from the perspective of a non-combatant or insurgent
- Not knowing what to pay attention to
- Focus blindness
- Trying to work with complex systems instead of recognizing the individual smaller elements
- Always looking for simple solutions or explanations for complex problems
- Not recognizing that subtle change might be a significant factor
- Not confirming or acknowledging that you understand
- Tunnel vision or mission focus result in you ignoring key information
- Not painting in or painting out information that would make a picture complete
- A tendency to act impulsively and not rely on training or rehearsal
- Lack of attention to detail
- Use of ethnocentric markers to classify threat behaviors. They are different for a reason.
- Relying too much on the interpreter to build relationships with others
- Failing to keep things in memory
- Difficulty using tactical patience (i.e., take action instead of backing off to observe)
- Following the same pattern without considering that insurgents may be targeting that pattern
- Misread or ignore the heuristics and atmospherics in a situation

Table G.5 presents a decision requirements table summarizing the recognizing anomalies critical decisions and important contextual information surrounding each.

Table G.5. DECISION REQUIREMENTS TABLE FOR THE RECOGNIZING ANOMALIES PHASE OF PROFILING

Recognizing Anomalies							
This table summarizes critical decisions combat profilers must face during the Recognizing Anomalies Phase							
Critical Decision	Decision Triggers	Challenges/ Why Difficult?	Cues and Factors	Action/ Strategy	Information Sources	Common Errors	Cognitive Abilities
Make sense of indicators that are off the baseline	Unit is conducting a combat patrol that might involve insurgent activities. This is based on information provided in the patrol order and is consistent with lived experiences in the area. Predictive analysis of a area of operations indicates that the insurgents have the capability to conduct ambushes.	The terrain is rough and the insurgent forces have knowledge of the terrain and our operating methods. Several things might be changing at once. Distinguishing between change due to our presence and change due to intentions of the insurgent or threat.	Radio reports from other squads describe what they are observing or encountering during patrols. We see individuals who appear to be observing our movements. Vehicles slow down, parked along the roadway. Children greet the patrol. Activity in the marketplace and other habitual areas is consistent with pattern. Contact with civilians through the interpreter indicates anger and frustration with our presence We have had several opportunities to observe the setting or context, and have used this information to create a baseline. Patrol conducted by an experienced squad that has seen combat. All have observation skills that include use of optics. Terrain is covered with vegetation and crossed with irrigation ditches. Context includes local non-combatant civilians as well as insurgents who are part of the scene. Information provided to the patrol sets expectations: activity level of insurgents, reports of IEDs, location of suspected criminal activity.	Look for changes from the baseline: is activity level the same; are the neighborhoods different; do parked cars appear service-able, and so forth. Confirm or reject information about enemy presence. Contact or capture individuals suspected of tracking the patrol. Paint in the missing pieces. Read the behavior of children; they are more likely to pass unfiltered information about the situation.	What you detect visually. Information available at anchor points, like the new wall, the public communications office, or in the market place. Radio traffic from adjacent units or Operations Center. The observed behaviors of individuals you encounter- eye contact, head movement, hand movement, speed at which they approach or leave an area	What you detect visually. Information available at anchor points, like the new wall, the public communications office, or in the market place. Radio traffic from adjacent units or Operations Center. The observed behaviors of individuals you encounter-- eye contact, head movement, hand movement, speed at which they approach or leave an area.	Willingness and ability to challenge or question assumptions based on observations and use critical thinking skills See the situation from other's perspective and paint the picture using that information- perspective taking and mental simulation Visualizing what to expect or anticipate in a complex situation-mental simulation Quickly sizing up the situation and adjusting your plan to deal with new factors or information- replanning or adapting Applying tacit knowledge and current knowledge of the situation to explain what is happening- mental modeling
Develop situational awareness within a short period of time [Baseline]	Mission requires you to enter a new neighborhood and defeat the insurgent. (A meeting engagement of sorts.)	Cognitive dissonance--things like IEDs hiding in plain site "...you can't see what you're not looking for" Denial interferes with your ability to recognize cues in your environment	Behaviors or actions don't fit with the scene Presence of civilians in the city No electrical service to the city Paved and dirt roads within the city Every house has a laundry-like smell Lots of overhead lines, many down to the ground "..at a very young age I was in touch with my environment" Learned to act independently at a young age "Gift of Fear" 18 consecutive days of patrolling meant that things looked familiar Denial is the inability to acknowledge the truth simply because you are satisfied with the status quo. Everything looks like a Third World country; different than the States	Don't accept things because they are routine- question them and overcome denial. Knowing what to look for in a situation-baseline and anomalies. Continuously practice the skills needed to characterize the cues in the environment	Atmospherics, geographics, heuristics, proxemics, biometrics, and kinesics from the context	Denial, inability or unwillingness to sense tactical cunning, things hiding in plain sight, or the use of masking. Inability to observe subtle differences in a situation and adjust one's perception of the situation. Inability to see the situation from the perspective of a non-combatant or an insurgent. Inability to recognize the leader or individual with authority.	Organize and assess information collected from the environment in order to identify the problem and take action. Develop awareness and create situation understanding among team members- sensemaking See the situation from the perspective of the insurgent. Get inside his decision cycle to degrade his network- perspective taking Use mental simulation to establish theories about cause and effect relationships and compare them to updated mental models of situations based on revised or re-calibrated baseline Use knowledge and experience to anticipate how events will unfold- mental simulation Assessing cues and factors to understand the situation before the ambush is triggered- identify and use leverage points in the scenario that can be exploited to defeat the insurgent

Recognizing Anomalies

This table summarizes critical decisions combat profilers must face during the Recognizing Anomalies Phase

Critical Decision	Decision Triggers	Challenges/ Why Difficult?	Cues and Factors	Action/ Strategy	Information Sources	Common Errors	Cognitive Abilities
Communicating information and concepts about profiling to others	Manning an OP and trying to determine the intention of others (adversaries) in a village.	People are unaware of how to assess context in terms that describe changes from the baseline. Lack of training on observation or perceptual skills. Environment has several indicators or possible danger: approaching vehicles, groups of civilians, icons, piles of rubble or abandoned vehicles	Urban masking- wearing sunglasses or common items of clothing Making eye contact with a team member and knowing what he means or intends (i.e., "I think there is a problem," "be careful" might be indicated when the team member looks and gestures about possible danger) Many things happening at once in the situation Individuals use standard non-verbal and verbal cues to exchange information Individuals acknowledge new information when it is provided	Describe what you observe in terms that accurately describe what you see. Use tactical cunning and tactical patience to deny the adversary information about your intentions and capabilities Verify and prove what you sense is danger. Take the perspective of others. Use a common set of terminology	What you detect visually. Information available at anchor points, like the new wall, the public communications office, or in the market place. Reports provided by other team members.	Not knowing what to pay attention to; focus blindness can also occur.	Collecting and disseminating information about a situation to all team members to ensure common grounding and mission focus See the situation from other's perspective and paint the picture using that information- perspective taking and mental simulation Confirming that information is consistent with the typical situation-mental modeling Quickly sizing up the situation and to identify whether there are information gaps or relationships that are familiar- pattern recognition and problem detection
Develop a baseline for a new situation or context	Pointman on a combat patrol, where the squad depends on you.	High stress and high risk	Condition of the entrance-locked or open Raised in an environment where there were many risks. Survival skills used included: -willingness to learn and practice new skills -cultural differences and similarities Most houses were 2-story and were surrounded by 12' thick walls	Keep things in memory using a background story Use several senses at once to get a better picture of what's normal. Don't rely on a sixth sense--"I don't believe it exists" Use optics to increase distance for observations	Observation of the six dimensions.	Not paying attention to detail Accepting the information as facts and not verifying sufficiently	Collecting and disseminating information about a situation to all team members to ensure common grounding and mission focus See the situation from other's perspective and paint the picture using that information- perspective taking and mental simulation Confirming that information is consistent with the typical situation-mental modeling Quickly sizing up the situation and to identify whether there are information gaps or relationships that are familiar- pattern recognition and problem detection
Verify the baseline	Entered an area that had all the signs of being occupied in an otherwise desolated city.	Fatigue of continuous patrolling Mission focus lock and denial Denial is the first thing that pops into your head when you are in a situation.	Signs of life- cooking Fresh bedding indicated more people in the area Expended shell casings Entrance to the compound and house were open and unlocked. House was furnished and appeared lived in. Carpets, propane, bedding. Moving from neighborhood to neighborhood based on the FRAGO Up to 100 houses/ buildings per day were cleared by the squad Fatigue had set in late in the day; checks were less thorough or more routine.	Guardian Angels to provide back up. Back off and observe; don't force a firefight when the facts are unclear Use other means to soften the target. Clear house using TTP; rolling pointman.	The old woman told us she was alone. Mission brief indicated the presence of insurgents	Tactical patience- back off and observe instead of taking action Followed the same pattern and didn't think through the possibility of insurgents Misread or ignore the heuristics and atmospherics in a situation	Determine when it is necessary to adapt to new conditions in order to maintain clarity of direction and purpose Coordinate changes with team in order to maintain common grounding Update mental model to include new patterns and relationships that affect decision making and problem solving Quickly assessing the new situation to identify whether there are information gaps or relationships that are familiar- pattern recognition and problem detection

Recognizing Anomalies

This table summarizes critical decisions combat profilers must face during the Recognizing Anomalies Phase

Critical Decision	Decision Triggers	Challenges/ Why Difficult?	Cues and Factors	Action/ Strategy	Information Sources	Common Errors	Cognitive Abilities
Makes sense of indicators that are off the baseline	Entered a house with an old woman who told us she was alone	"even without combat profiling, it made sense that there are people in the area" [atmospheric] Denial was a factor that allowed us to disregard the obvious	Intelligence estimate indicated only insurgents in the town	Fresh bedding in the common areas Unspoiled and partially eaten vegetables in plain site stray rounds from AK 47 bodies of civilians killed with 5.56 ammunition; but not our guys- probably Mahdi militia "it was rare to find an unlocked gate"	Back off and conduct some form of sustained observation	Not paying attention to detail. Accepting the information as facts and not verifying sufficiently.	Collecting and disseminating information about a situation to all team members to ensure common grounding and mission focus See the situation from other's perspective and paint the picture using that information- perspective taking and mental simulation Confirming that information is consistent with the typical situation- mental modeling Quickly sizing up the situation and to identify whether there are information gaps or relationships that are familiar- pattern recognition and problem detection
Anticipate insurgent actions and operate left of bang		Making judgments too quickly. Terrain is urban and rubbled.	Use geographics to detect patterns of movement (lines of drift) in an urban neighborhood Movement patterns around buildings and in neighborhood See the whole situation in a glance. Keep things in memory--it's almost photographic. You make the best decision you can- must weigh being effective and processing information efficiently	Being a good profiler requires you to make sense of your environment and the willingness to acknowledge it- unbiased. Be an excellent judge of character. Be reflective- think about yourself and your experiences Use indicators to determine what is off the baseline(s) Use tactical cunning to deceive enemy of your intent and actions	SigActs Intelligence reports Patrol reports		See the situation from other's perspective and paint the picture using that information- perspective taking and mental simulation Confirming that information is consistent with the typical situation- mental modeling Assimilate information needed to update situation understanding and provide an appreciation of the operating environment-- sensemaking

For the *Decision to Act Phase*, critical decisions show a greater emphasis on issues associated with deciding including predicting outcomes and strategic considerations. Critical decisions include:

- Acting like the hunter instead of the hunted in a survival situation
- Using observations to predict adversary actions
- Applying the Rule of 3
- Using knowledge of a situation to make a decision and act in a survival situation
- Making a moral, ethical, and legal decision
- Employing combat multipliers

Common errors associated with the *Decision to Act Phase* include acting without adequately assessing the situation or considering the consequences of actions. Common errors reported in the incidents we studied are listed below. Those that are also associated with other phases of profiling are indicated in **bold.**

- Creating your own kill zone
- Not using indirect fires to soften the attacking force
- A tendency to act impulsively and not rely on training or rehearsal
- Lack of discipline
- Denial often prevents one from considering all the factors and keeping things in perspective
- Failing to recalibrate the baseline might make your predictions wrong
- Not using tactical patience in situations that might be unclear or ambiguous
- Not weighing risk and benefits to friendly force before acting
- Not accounting for cultural differences when drawing conclusions
- Inability to keep things in memory completely or accurately
- Insufficient practice using the skills makes you pick up bad habits
- Letting emotions interfere with judgment
- Not reviewing ROE with team to ensure common understanding
- Not integrating ANA/ANP in preparation and operations
- Difficulty using tactical patience (i.e., take action instead of backing off to observe)
- Following the same pattern without considering that insurgents may be targeting that pattern
- Misread **or ignore the heuristics and atmospherics in a situation**

Table G.6 presents a decision requirements table summarizing the deciding to act critical decisions and important contextual information surrounding each.

Table G.6. Decision Requirements Table for the Deciding to act Phase of Profiling

Deciding to Act							
This table summarizes critical decisions combat profilers must face during the Deciding to Act Phase							
Critical Decision	Decision Triggers	Challenges/Why is it Difficult?	Cues and Factors	Action/Strategy	Information Sources	Common Errors	Cognitive Abilities
Act like the hunter instead of the hunted in a survival situation	Insurgents initiate hostile acts against friendly patrols. Insurgents and plan and conduct complex ambushes designed to produce casualties and influence non-combatant civilian population.	Mission was to kill the insurgents/ terrorists. (Mahdi Militia)-- you didn't go in unless you were ready for a fight [stress] Intelligence might not be accurate or complete. Goal is to engage the insurgent left of bang.	Command wire IED emplaced along the patrol routes could be detected visually using optics. Civilian traffic seemed less than on typical days. (Civilians often have advance warning of an IED attack). Pattern for the attack is similar to earlier attacks: time of day, location, type of weapon, number of insurgents, egress routes Several patrols in the local area and village. Typically had few routes in and around the village. Insurgents were known to conduct ambushes in the same area to facilitate logistics of moving materiel to the kill zone. Weapons of choice were CW-IED and RPG 7. Insurgents tend to withdraw when TacAir is overhead. In a survival situation, one's instincts just kick in leading one to act. Insurgents had templated our response to ambushes. They had a good idea of how long it took to get indirect fires onto their positions.3-5 minutes. Patrol was dismounted. QRF was mounted and was located at the FOB.	Look for opportunity to seize the initiative. Instead of walking into the ambush, soften the firing positions with indirect or have CAS on station. View the ambush as part of a network, and act against its most susceptible parts/ nodes.	Take the perspective of the insurgent and determine how and why he would engage the patrol. Read the atmospherics and heuristics in the area. Senses and information from other squad members contribute to understanding. Indications of civilian vehicle and foot traffic in the area. UAV sensings are passed to the squad by its platoon. Information provided by locals who have knowledge of the attack.	Creating your own kill zone. Not using indirect fires to soften the attacking force. A tendency to act impulsively and not rely on training or rehearsal Lack of discipline	Using predictions about the adversary to decide and act in a moral, ethical and legal manner- **decision making** See the ambush from the perspective of the insurgent. Get inside his decision cycle to degrade his network- **perspective taking** Update mental models of situations based on revised or recalibrated baseline Use knowledge and experience to anticipate how events will unfold- **mental simulation** Assessing cues and factors to understand the situation before the ambush is trigger- identify and use leverage points in the scenario that can be exploited to defeat the insurgent

Deciding to Act

This table summarizes critical decisions combat profilers must face during the Deciding to Act Phase

Critical Decision	Decision Triggers	Challenges/Why is it Difficult?	Cues and Factors	Action/Strategy	Information Sources	Common Errors	Cognitive Abilities
Use observations to support prediction of adversary actions	Observe an action that is inconsistent with baseline observations. .	Baselines are dynamic and continuously changing problem contexts; we disrupt the context and the adversary is always adapting. Mental models of less experienced individuals lack the detail required to make good judgments. Difficult to share mental models and keep the team on the same plan when things begin to change	Individual behavior was suspicious- he had a swivel head, speed of movement, and dress made him stand out in the situation Iconology: colors, for example, have meaning in context. black-- martyrdom red-- sacrifice green-- Islam yellow-- forgiveness or heaven white-- purity blue-- water Graffiti: the style suggests a good deal about anchor points and habitual areas This was same area where previous ambushes had taken place Young men running and trying to evade contact Lots of things happening at once in the situation. Anomalies are present, absence or change of something from the baseline or typical state. "... everything that was going on happened right in front of me..." [like a magnet] Each environment has a frequency or rhythm that can be identified Patterns and recent activity indicate whether threat has a capacity and willingness to act Most people lack situational awareness, they rely on memory or experience instead of paying attention Ideology for the region or group (politics, religion, culture) COIC/CLIC reported presence and activity of a HVT on the BOLO	Use heuristics to characterize the things you see. Define a most likely and most dangerous course of action Look for explanations and a rationale to include rather than excluding relevant information	Assessments of the actions and behaviors of residents Atmospherics, geographics, heuristics, proxemics, biometrics, and kinesics from the context	Denial often prevents one from considering all the factors and keeping things in perspective Failing to recalibrate the baseline might make your predictions wrong	Leveraging of similar experiences to understand how and why events are unfolding in a predictable sequence- **mental modeling** Use knowledge and experience to anticipate how events will unfold- **mental simulation** Assessing information about the environment and combining it with knowledge of the region collected as part of the ASCOPE evaluation- **sensemaking** When things don't add up or there are anomalies identified, they highlight a need to change tactics or make a decision- **problem detection** and **generating leverage points**

Deciding to Act

This table summarizes critical decisions combat profilers must face during the Deciding to Act Phase

Critical Decision	Decision Triggers	Challenges/Why is it Difficult?	Cues and Factors	Action/Strategy	Information Sources	Common Errors	Cognitive Abilities
Apply the rule of 3	Baseline + anomaly = decision Suspicious behavior is reported which might threaten the unit or team An informant has identified an individual who is part of insurgent network	Indicators might not occur over a short period of time. The Rules of Engagement might preclude action or a decision that involves lethal force EOF decisions are made under time pressure and the squad or team is often moving and not in a stationary position.	Behaviors or actions don't fit with the scene Presence of civilians in the city might result in collateral damage. Normally people walk; these young guys were running from us Young men did not appear to be armed... verified with scopes. The streets were narrow and there were walls and buildings all around us There were men drinking tea who didn't seem to take notice that we were in the area "I had a feeling we were being followed or observed by this guy." Adversary knows the terrain and can hide in plain sight. Operating at a distance from the person of interest makes it difficult to assess behaviors and actions with certainty. Everything looks like a Third World country; different than the States. Team lacks cultural awareness. Battle Update/ SITREP set expectations that insurgent was preparing to conduct attacks, i.e., complex ambushes or IED attacks Vehicles approach quickly and don't respond to instructions to pull over and stop.	If you observe three indicators of a threat, take an action. Don't reject things because they are routine... question them and overcome denial. Knowing what to look for in a situation- baseline and anomalies. Continuously practice the skills needed to characterize the cues in the environment Prove it before acting or deciding. If you can't, it might not be legal, moral or ethical. Avoid causing civilian casualties or damaging their property whenever possible.	Atmospherics, geographics, heuristics, proxemics, biometrics, and kinesics from the context	Not using tactical patience in situations that might be unclear or ambiguous Not weighing risk and benefits to friendly force before acting Not accounting for cultural differences when making conclusions	When things don't add up or there are anomalies identified, they highlight a need to change tactics or make a decision- **problem detection** and **generating leverage points** Using predictions about the adversary to decide and act in a moral, ethical and legal manner- **decision making** Use knowledge and experience to anticipate how events will unfold- **mental simulation** Assessing cues and factors to understand the situation as it is unfolding- **sensemaking**

Deciding to Act

This table summarizes critical decisions combat profilers must face during the Deciding to Act Phase

Critical Decision	Decision Triggers	Challenges/Why is it Difficult?	Cues and Factors	Action/Strategy	Information Sources	Common Errors	Cognitive Abilities
Use knowledge of the situation to make a decision and act	Detect at least three indicators that are non-standard anomalies and create a predictive match or combat profile. Unable to match the observed behavior or action with a construct or framework that is part of the baseline.	Team members are inexperienced in pattern matching, a technique for assessing events in context and comparing them to the baseline. Baseline is dynamic and must be re-calibrated to account for change.	Body language: indicators of deception such as pain muscle, symmetrical smiles, position of the eye brows, eye contact and eye motion. Nervous gestures: touching ear, covering mouth, rubbing back of head Individual might be stoned on a drug and behaving erratically. Presence or absence of children. What the kids tell you is important. Traffic patterns and lines of drift within a town. Occupants of anchor points or habitual areas. How an individual responds to a tactical question: directly or with considerable detail or explanation. When we operate under stress, the cognitive capacity for making assessments quickly and accurately is reduced. What we perceive depends on whether there is light, motion and edge to the object.	Use terminology for describing the changes in terms of the six dimensions which make up the context. Use pattern matching to rapidly assess whether an anomaly exists. It just has to be a good enough match to move on. [Heuristic]	What you sense when you make observations across the six dimensions. Knowledge of culture, politics and religion within a region.	Inability to keep things in memory accurately or completely Insufficient practice using the skills allows bad habits to form	When things don't add up or there are anomalies identified, they highlight a need to change tactics or make a decision- **problem detection** and **generating leverage points** Assess network relevant information to recognize patterns and their underlying relationships Update mental models of situations based on revised or re-calibrated baseline Use knowledge and experience to anticipate how events will unfold- **mental simulation** Assessing cues and factors to understand the situation as it is unfolding- **sensemaking**
Make moral, ethical, and legal decisions	Detect at least three indicators that are non-standard anomalies and create a predictive match or combat profile. Unable to match the observed behavior or action with a construct or framework that is part of the baseline.	High stress and high risk Cues might not be conclusive	Person of interest appears suspicious because of heuristic and kinesics Person of interest is among non-combatants at a *shura* Profiler identifies anomalies-- - entourage - indiv avoids direct contact w/ squad or ANA - HUMINT sources express concern that he is a stranger and risk to US Forces - situated in an anchor point that is likely to host non-supporters - when questioned, has verbal diarrhea and unable to hide anger ROE, Law of Land Warfare and UCMJ govern the conduct of military team members. Operations often involve law enforcement or Coalition forces. Who governs their behavior and actions? Cultural differences can create tension or frustration when communications break down. Actions include: Kill, Capture or Contact	Rely on common sense and knowledge of the culture to judge of character. Apply core values and use understanding of right and wrong to guide behavior.	SOP, Cdr's guidance	Letting emotions interfere with judgment. Not reviewing ROE with team to ensure common understanding. Not integrating ANA/ANP in preparation and operations.	Using predictions about the adversary to decide and act in a moral, ethical and legal manner, **decision making** When things don't add up or there are anomalies identified, they highlight a need to change tactics or make a decision- **problem detection** and **generating leverage points** Assess network relevant information to recognize patterns and their underlying relationships Update mental models of situations based on revised or re-calibrated baseline Using predictions about the adversary to decide and act in a moral, ethical and legal manner- **decision making** Use knowledge and experience to anticipate how events will unfold- **mental simulation** Assessing cues and factors to understand the situation as it is unfolding- **sensemaking.**

Deciding to Act

This table summarizes critical decisions combat profilers must face during the Deciding to Act Phase

Critical Decision	Decision Triggers	Challenges/Why is it Difficult?	Cues and Factors	Action/Strategy	Information Sources	Common Errors	Cognitive Abilities
Employ combat multipliers	Made a decision to engage with a person of interest based on assessment of Rule of 3. Opportunity to participate in the *shura*, where a person of interest has been identified as being off the baseline.	Operations conducted on complex terrain. Rules of engagement (ROE) are restrictive to minimize damage and casualties.	Person of interest is among non-combatants at a *shura* Tribal leaders and elders are present at the *shura* Profiler identifies anomalies-- - entourage - indiv avoids direct contact w/ squad or ANA - HUMINT sources express concern that he is a stranger and risk to US Forces - situated in an anchor point that is likely to host non-supporters - when questioned, has verbal diarrhea and unable to hide anger Insurgents have the ability to blend in and use populace as a shield. (Hide in plain sight) Missions are planned and led by the squad leader. He understands the timeline and can exercise judgment. Fires geometries include organic and supporting weapons as well as sensors that can be tasked to support the patrol on request. Planning provides for QRF and other support, should the situation require. The squad would prepare for Guardian Angel and Good Shepherd actions.	Assign Guardian Angels to provide back up. Back off and observe; don't force a firefight when the facts are unclear Use other means to soften the target. Engage in dialogue to size up the person of interest. Notify squad members to be prepared to detain the individual should he decide leave.	Local civilians Reliable HUMINT sources Person of interest provides kinesics, proxemics and heuristic cues. They cannot be ignored.	Tactical patience-- back off and observe instead of taking action Followed the same pattern and didn't think through the possibility of insurgents Misread or ignore the heuristics and atmospherics in a situation	Using predictions about the adversary to decide and act in a moral, ethical and legal manner- **decision making** When things don't add up or there are anomalies identified, they highlight a need to change tactics or make a decision- **problem detection** and **generating leverage points** Update mental models of situations based on revised or re-calibrated baseline Use knowledge and experience to anticipate how events will unfold- **mental simulation** Assessing cues and factors to understand the situation as it is unfolding- **sensemaking**.

For the *Recalibration Phase*, critical decisions are a subset of those exhibited in the other three phases. Critical decisions include:

- Making sense of indicators that are off the baseline
- Developing situational awareness within a short period of time
- Communicating information and concepts to others without revealing information or intentions to the threat network
- Developing a baseline of a new situation or context
- Determining when to recalibrate a baseline
- Using knowledge and experience to define a usable baseline
- Make sense of the indicators that are off the baseline

Common errors associated with the *Recalibration Phase* can all be found in the previous phases as well. Common errors reported in the incidents we studied are listed below.

- Denial, inability, or unwillingness to sense tactical cunning (things hiding plain sight)
- Inability to observe subtle differences in a situation and adjust one's perception of the situation
- Inability to see the situation from the perspective of a non-combatant or insurgent
- Inability to see recognize the leader or individual with authority
- Not knowing what to pay attention to
- Focus blindness
- Trying to work with complex systems instead of recognizing the individual smaller elements
- Always looking for simple solutions or explanations for complex problems
- Not recognizing that subtle change might be a significant factor
- Not confirming or acknowledging that you understand
- Tunnel vision or mission focus result in you ignoring key information
- Not painting in or painting out information that would make a picture complete
- A tendency to act impulsively and not rely on training or rehearsal
- Lack of attention to detail
- Use of ethnocentric markers to classify threat behaviors. They are different for a reason.
- Relying too much on the interpreter to build relationships with others
- Failing to keep things in memory
- Difficulty using tactical patience (i.e., take action instead of backing off to observe)
- Following the same pattern without considering that insurgents may be targeting that pattern
- Misread or ignore the heuristics and atmospherics in a situation

Table G.7 presents a decision requirements table summarizing the recalibration critical decisions and important contextual information surrounding each.

Table G.7. Decision Requirements Table for the Recalibration Phase of Profiling

Recalibration							
This table summarizes critical decisions combat profilers must face during the Recalibration Phase							
Critical Decision	Decision Triggers	Challenges/Why is it Difficult?	Cues and Factors	Action/Strategy	Information Sources	Common Errors	Cognitive Abilities
Make sense of indicators that are off the baseline	Unit is conducting a combat patrol that might involve insurgent activities. This is based on information provided in the patrol order and is consistent with lived experiences in the area. Predictive analysis of an area of operations indicates that the insurgents have the capability to conduct ambushes.	The terrain is rough and the insurgent forces have knowledge of the terrain and our operating methods. Several things might be changing at once. Distinguishing between change due to our presence and change due to intentions of the insurgent or threat.	Radio reports from other squads describe what they are observing or encountering during patrols. We see individuals who appear to be observing our movements. They are painted in too many scenes along the patrol route. Vehicles slow down as they approach the patrol. Vehicles parked along the roadway. Small groups of children greet the patrol. Activity in the marketplace and other habitual areas is consistent with pattern. Contact with civilians through the interpreter indicates anger and frustration with our presence. We have had several opportunities to observe the setting or context, and have used this information to create a baseline. Patrol conducted by an experienced squad that has seen combat. All have observation skill that includes use of optics. Terrain is covered with vegetation and crossed with irrigation ditches. Context includes local non-combatant civilians as well as insurgents who are part of the scene. Information provided to the patrol sets expectations: activity level of insurgents, reports of IEDs, location of suspected criminal activity.	Look for changes from the baseline: is activity level the same; are the neighborhoods different; do parked cars appear serviceable, and so forth. Confirm or reject information about enemy presence. Contact or capture individuals suspected of tracking the patrol. Paint in the missing pieces. Read the behavior of children; they are more likely to pass unfiltered information about the situation.	What you detect visually. Information available at anchor points, like the new wall, the public communications office, or in the market place. Radio traffic from adjacent units or Operations Center. The observed behaviors of individuals you encounter- eye contact, head movement, hand movement, speed at which they approach or leave an area.	Denial; inability or unwillingness to sense tactical cunning, things hiding in plain sight, or the use of masking. Inability to observe subtle differences in a situation and adjust one's perception of the situation. Inability to see the situation from the perspective of a non-combatant or an insurgent. Inability to recognize the leader or individual with authority.	Willingness and ability to challenge or question assumptions based on observations and use **critical thinking** skills See the situation from other's perspective and paint the picture using that information- **perspective taking** and **mental simulation** Visualizing what to expect or anticipate in a complex situation- **mental simulation** Quickly sizing up the situation and adjusting your plan to deal with new factors or information- **replanning** or **adapting** Applying tacit knowledge and current knowledge of the situation to explain what is happening- **mental modeling**

Recalibration

This table summarizes critical decisions combat profilers must face during the Recalibration Phase

Critical Decision	Decision Triggers	Challenges/Why is it Difficult?	Cues and Factors	Action/Strategy	Information Sources	Common Errors	Cognitive Abilities
Develop situation awareness within a short period of time	Mission requires you to enter a new neighborhood and defeat the insurgent. (A meeting engagement of sorts.)	Cognitive dissonance- things like IEDs hiding in plain site "...you can't see what you're not looking for" Denial interferes with your ability to recognize cues in your environment	Behaviors or actions don't fit with the scene Presence of civilians in the city No electrical service to the city Paved and dirt roads within the city Every house has a smell- laundry-like Lots of overhead lines, many down to the ground "...At a very young age I was in touch with my environment" Learned to act independently at a young age "Gift of Fear" 18 consecutive days of patrolling meant that things looked familiar Denial is the inability to acknowledge the truth simply because you are satisfied with the status quo. [14/19] Everything looks like a Third World country; different than the States	Don't accept things because they are routine... question them and overcome denial. Knowing what to look for in a situation; baseline and anomalies. Continuously practice the skills needed to characterize the cues in the environment	Atmospherics, geographics, heuristics, proxemics, biometrics, and kinesics from the context	Not knowing what to pay attention to; focus blindness can also occur. Trying to work with complex systems instead of recognizing the individual smaller elements. Always looking for simple solutions or explanations for complex problems.	See the situation from other's perspective and paint the picture using that information- **perspective taking** and **mental simulation** Visualizing what to expect or anticipate in a complex situation- **mental simulation** Assimilate information collected from the environment and interpret how it affects or illustrates insurgent actions; determine a new set of explanations that describe what is happening and why it is taking place-**sensemaking** Applying tacit knowledge and current knowledge of the situation to explain what is happening- **mental modeling**
Communicate information and concepts to team without alerting others	Manning an OP and trying to determine the intentions of others (adversaries) in a village.	People are unaware of how to assess context in terms that describe changes from the baseline. Lack of training on observation or perceptual skills. Environment has several indicators or possible danger: approaching vehicles, groups of civilians, icons, piles of rubble or abandoned vehicles	Urban masking- wearing sunglasses or common items of clothing Making eye contact with a team member and knowing what he means or intends (i.e., "I think there is a problem", "be careful", etc. might be indicated when the team member looks and gestures about possible danger) Many things happening at once in the situation Individuals use standard non-verbal and verbal cues to exchange information Individuals acknowledge new information when it is provided	Describe what you observe in terms that accurately describe what you see. Verify and prove what you sense is danger. Take the perspective of others. Use a common set of terminology	What you detect visually. Information available at anchor points, like the new wall, the public communications office, or in the market place. Reports provided by other team members.	Not recognizing that subtle change might be a significant factor. Not confirming or acknowledging that you understand. Tunnel vision or mission focus results in you ignoring key information. Not painting in or painting out information that would make a picture complete.	Collecting and disseminating information about a situation to all team members to ensure **common grounding** and mission focus See the situation from other's perspective and paint the picture using that information- **perspective taking** and **mental simulation** Confirming that information is consistent with the typical situation- **mental modeling** Quickly sizing up the situation to identify whether there are information gaps or relationships that are familiar- **pattern recognition** and **problem detection**
Develop a baseline for a particular situation or context	Pointman on a combat patrol, where the squad depends on you.	High stress and high risk	Condition of the entrance- locked or open Raised in an environment where there were many risks. Survival skills used included Willingness to learn and practice new skills. Cultural differences and similarities Most houses were 2-story and were surrounded by 12' thick walls	Keep things in memory using a background story Use several of your senses at once to get a better picture of what's normal. Don't rely on your sixth sense-"I don't believe it exists"	Your senses and information from other squad members. Country studies and CA estimates that describe the culture and language. Language cards.	A tendency to act impulsively and not rely on training or rehearsal Lack of attention to detail. Use of ethno-centric markers to classify threat behaviors. They are different for a reason. Relying too much on the interpreter to build relationships with others. Failing to keep things in memory.	**Mentally simulate** or predict outcomes Verifying predicted outcomes against actuals; updating **mental models** seeing the situation from the eyes of another; **perspective taking** and **sensemaking**

Recalibration							
This table summarizes critical decisions combat profilers must face during the Recalibration Phase							
Critical Decision	Decision Triggers	Challenges/Why is it Difficult?	Cues and Factors	Action/Strategy	Information Sources	Common Errors	Cognitive Abilities
Verify the baseline	Entered an area that had all the signs of being occupied in an otherwise desolated city.	Fatigue of continuous patrolling Mission focus lock and denial Denial is the first thing that pops into your head when you are in a situation.	Signs of life-cooking Fresh bedding indicated more people in the area Expended shell casings Entrance to the compound and house were open and unlocked. House was furnished and appeared lived in. Carpets, propane, bedding Moving from neighborhood to neighborhood based on the FRAGO Up to 100 houses/ buildings per day were cleared by the squad Fatigue had set in late in the day; checks were less thorough or more routine.	Guardian Angels to provide back up. Back off and observe; don't force a firefight when the facts are unclear Use other means to soften the target. Clear house using TTP; rolling pointman	The old woman told us she was alone. Mission brief indicated the presence of insurgents.	Tactical patience- back off and observe instead of taking action Followed the same pattern and didn't think through the possibility of insurgents Misread or ignore the heuristics and atmospherics in a situation	

Recalibration

This table summarizes critical decisions combat profilers must face during the Recalibration Phase

Critical Decision	Decision Triggers	Challenges/Why is it Difficult?	Cues and Factors	Action/Strategy	Information Sources	Common Errors	Cognitive Abilities
Use knowledge and experience to define a usable baseline	Crossed the line of departure and have entered the operating environment... an Afghan village of 150 or so occupants.	Difficult to slow down in kinetic situations. Adrenaline and training kick-in. We are likely to deny what we see or ignore things that are hiding in plain site. It is extremely difficult to remain vigilant for long periods of time; things blend in or are ignored. The culture is different from ours. Language can't be used to detect anger or frustration. We don't understand.	Sounds and sights of habitual areas are good cues. Look for changes that warn of danger. The presence of children provided assurance that the threat of an IED attack was not high. Access to buildings was limited. Gates locked, windows shuttered or covered. Look for those who are leaders or have authority over others: i.e., entourage, mimic, adoration and direction are signs Compare individuals' reactions to our presence: eye contact, facial expressions, hand movements The walls around the houses are 6 feet high. Alleys are narrow- 24-30 inches. Houses that have been cleared are marked with a large "X" Had been in country for 3 months. It was Nov. Most profilers exhibit Type "A" personality- action oriented, energetic, persistent and are competitive The baseline is defined by behaviors or observations that operate along one of six dimensions: Atmospherics, Heuristics, Geographics, Kinesics, Proxemics or Biometrics. The setting always changes based on reactions to our presence. An ASCOPE assessment has been performed. It provides details about the area, structures, capabilities, organizations, people, and events.	Stand back and observe; don't impulsively move into unknown situations without first visualizing and observing. Ask yourself, "Is this what I expect?" Assess the atmospherics. Look for signs of deception or deceit. Learn whom you can trust. Read the kinesics. Assess lines of drift and identify anchor points and habitual areas. Gathering points have markers that reveal who's been hanging out. Take time to learn something about the other culture. Survival language skills can be lifesavers and allow you to build relationships. Recognize and use the significance of icons and colors to inform your judgment. Bounce assessments off of other team members that you trust. [30/17]	Your senses and information from other squad members. Country studies and CA estimates that describe the culture and language. Language cards.	A tendency to act impulsively and not rely on training or rehearsal Lack of attention to detail. Use of ethno-centric markers to classify threat behaviors. They are different for a reason. Relying too much on the interpreter to build relationships with others. Failing to keep things in memory.	Assess new information that makes up the situation and adjust your plan to deal with new factors or information- **replanning** or **adapting** **Mentally simulate** or predict outcomes Verifying predicted outcomes against actuals; updating **mental model**s Seeing the situation from the eyes of another; **perspective taking** and **sensemaking**

Recalibration							
This table summarizes critical decisions combat profilers must face during the Recalibration Phase							
Critical Decision	Decision Triggers	Challenges/Why is it Difficult?	Cues and Factors	Action/Strategy	Information Sources	Common Errors	Cognitive Abilities
Make sense of indicators that are off the baseline	Entered a house with an old woman who told us she was alone	"Even without combat profiling, it made sense that there are people in the area" [atmospheric] [46/7] Denial was a factor that allowed us to disregard the obvious	Fresh bedding in the common areas Unspoiled and partially eaten vegetables in plain site Stray rounds from AK 47 Bodies of civilians killed with 5.56 ammunition; but not our guys- probably Mahdi militia "it was rare to find an unlocked gate" [48/5] Intelligence estimate indicated only insurgents in the town	Back off and conduct some form of sustained observation	Your senses and information from other squad members. Country studies and CA estimates that describe the culture and language. Language cards.	A tendency to act impulsively and not rely on training or rehearsal Lack of attention to detail. Use of ethno-centric markers to classify threat behaviors. They are different for a reason. Relying too much on the interpreter to build relationships with others. Failing to keep things in memory.	**Mentally simulate** or predict outcomes Verifying predicted outcomes against actuals; updating **mental models** Seeing the situation from the eyes of another; **perspective taking** and **sensemaking**

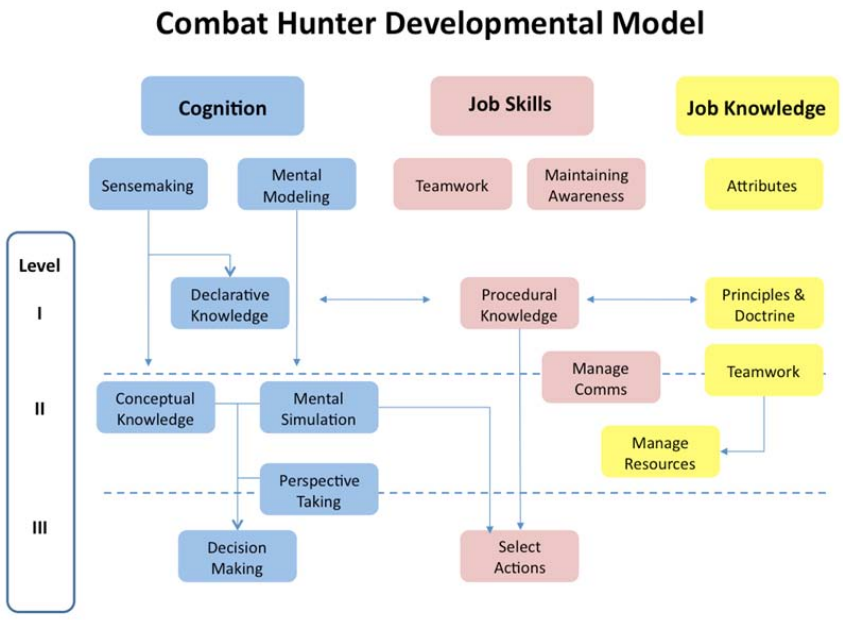

Figure G.10. Developmental Model Overview

Developmental Model

Figure G.10 presents an overview of the Combat Hunter developmental model. The attributes of the expert trackers and profilers were categorized as Cognitive Abilities, Job Skills, and Job Knowledge. Within each of these categories, three levels of learning objective were defined. Guided by this overview, a developmental framework for each domain was derived, as well as a set of core competencies, and detailed tracker and combat profiler developmental models.

The development model began with an initial *developmental framework* for each domain. From these frameworks, a set of *core competencies* common to both domains was developed. These core competencies characterize Combat Hunter expertise, including both tracking and profiling components. The core competencies then served as a structure for articulating the detailed *developmental models* for both tracking and profiling. Each stage of development is described in turn.

Developmental Frameworks

Development frameworks were initially developed for tracking and for profiling (Figures G.11 and G.12). These frameworks depict the specific learning outcomes articulated by tracking profiling instructors. Each learning outcome is categorized by learning outcome type and learning level.

Three learning levels were adapted from Bloom's *Taxonomy of Educational Objectives* (Bloom, 1956), where Level I represents learning and comprehension, Level II represents application and analysis, and Level III represents synthesis and evaluation. For the purpose of categorizing capabilities, each level was defined further.

Level I: Novice Performance

The acquisition and comprehension of knowledge that describes the principles and methods used to perform as a combat hunter. Acquire the skills to identify, characterize, and describe spoor, project likely lines of travel, and estimate the time-distance gap. Acquire the skills to observe and communicate information that is needed to construct or define the baseline conditions within an operational environment.

End State. Knowledge of principles is sufficiently complete to construct a usable mental model of combat hunting, the ability to collect LiNDATA, as well as information along the six dimensions that make up the profiler's baseline.

Level II: Intermediate Level of Performance

The application of knowledge and principles to identify and characterize the implications of LiNDATA and spoor features, as well as changes in the baseline. The ability to generalize principles to recognize anomalies and assess whether they create risk or uncertainty that might require a decision or action. Acquire the skill to analyze information in a broad range of problem contexts and mentally simulate workable course of action for implementation.

End State. A generalized mental model of combat hunting that can be used to apply principles and analyze information in order to reliably anticipate quarry or adversary actions and behaviors.

Level III: Expert Level Performance

The ability to flexibly apply skills in complex problems seamlessly, i.e., without consciously deciding. Demonstrate keen situational understanding that is continuously updated through perception and sensing within the context.

End State. The ability to rapidly assess and resolve situations by making legal, ethical, and moral decisions under pressing conditions.

Learning outcome types fall into three categories: Job Knowledge, Job Skills, and Cognitive Abilities. Job Knowledge refers to declarative, often foundational knowledge. Job Skills refers to procedural patterns

Tracker Development Framework

	Job Knowledge	Job Skills	Cognitive Abilities
I	Declarative knowledge: • Tracking terminology • Tracking goals and techniques • Essential information (LiNDATA) • Spoor Dynamics • Team Roles	Recognize ground spoor Characterize/measure prints Prepare data card Disseminate information Form a team Use navigation skills and optics Observe context	Estimate time–distance gap Maintain awareness of cues Attention management Predict likely lines of travel
II	Declarative knowledge: • Rules and procedure to derive LiNDATA • Define lost spoor procedures • Signs of aging • Signs of anti- and counter-tracking	Differentiate and interpret spoor Communicate LiNDATA information How to recover from lost spoor Establish and maintain last known spoor Collect evidence How to maintain control over tracking team	Analyze mission requirements Take the perspective of quarry Sensemaking • Quarry motivations • Aerial and ground spoor • Action indicators Assess tracking team performance Coordinate team tactics Adapt team tactics to situation
III	Case studies of LEA and military tracking cases	Share and exchange information for team's awareness How to use shortcuts, track traps, and local knowledge deploy security element How to react to an ambush	Visualize tracking operation based on evidence and experience Evaluate available evidence and behaviors of quarry to prepare a story (5W's) Decide to engage or monitor Decide to commit security force

Figure G.11. Tracker Development Framework Depicting Competencies Organized By Learning Outcome Type And Learning Level

that allow one to apply information in real-world contexts. Cognitive Abilities refers to the use of specific facts, procedural patterns, and concepts to accomplish macrocognitive activities such as assessing a situation, building a story, making a decision.

Core Competencies

Competencies for each domain were examined for points of convergence. A set of four core competencies common to both tracking and profiling were identified. These include Technical Capabilities (Table G.8), Tactical Capabilities (Table G.9), Teamwork and Coordination (Table G.10), and Getting Inside the Head of the Quarry/Adversary (Table G.11). Within each core competency, specific learning outcomes were identified. Many learning outcomes were drawn from the developmental frameworks. However, for this activity a more comprehensive approach was taken, in which we included more detailed learning outcomes found in the Combat Hunter course manuals, interview data, and course observations.

Technical Capabilities. Technical capabilities are highly specific to the domain of study. Sample technical capabilities for each domain are included in Table G.8 (for a complete list, see Tables G.12 and G.13). For tracking, they tend to focus on observing, measuring, and characterizing different aspects of the spoor or sign. For profiling, the technical capabilities described by instructors included learning relevant findings from cognitive psychology that can be used to inform observations and aid in the definition of a baseline and recognition of anomalies. Technical capabilities were emphasized more strongly in the tracking course than the profiling course, suggesting that skilled tracking requires a strong technical foundation.

Table G.8. Sample Technical Capabilities

Tracking	Profiling
• Ability to read spoor. This includes inferring characteristics of quarry (height, weight, gender, carrying something, etc.) based on spoor • Apply tracking terminology • Ability to select and use appropriate lost spoor procedures • Ability to estimate the time-distance gap • Describe the dynamics of a footprint (Primary Impact Point, Foot Roll, Terminal Point) • Describe the characteristics of human pace (Stride, Pitch Angle, Straddle, Pressure, Dwell Time)	• Describe the six dimensions of the baseline • Describe the process: Collect/assess/ exploit • Describe relevant brain functions (memory, information processing) • Define baseline based on classroom examples • Identify anomalies based on classroom examples • Construct a mental model of cause and effects • Describe 5 combat multipliers • Describe the Rule of 3 • Demonstrate tactical questioning methods • Innovate novel ways of using optics

Tactical Capabilities. While tactics play a big role in both tracking and profiling, the emphasis on tactics was greater in the profiling course. Sample tactical capabilities for each domain are included in Table G.9.

Profiler Development Framework

	Job Knowledge	Job Skills	Cognitive Abilities
I	Declarative knowledge: • Six dimensions of the baseline • Know the threat • Process: collect/assess/exploit • Know the culture • Optics • Brain functions (memory, chemicals, information processing)	Observe behaviors and objects Characterize observations Communicate Define baseline based on classroom examples Identify anomalies based on classroom examples	Construct a mental model of cause and effects Organize environmental information in a meaningful way Prioritize cues according to relevance and importance Apply knowledge in disciplined way
II	Declarative knowledge: • Five combat multipliers • Rule of three Tactical questioning methods	Define baseline in a range of real-world settings Identify anomalies in a range of real-world settings Assess risk or danger Recognize patterns/relationships Apply combat multipliers Question information source Re-calibrate baseline	Mental simulation • Diagnose how current situation evolved • Project forward to anticipate future events Sensemaking • ML COA, MD COA • Gaps, reliability, fusion Test hypotheses using hard data
III	Innovative ways of using optics and cameras for enhanced observation	Collaborate/teamwork Apply combat power Make decisions (M/E/L) The the initiative/lead Apply CH skills in chaotic situation	Take other perspectives Interpret other cultures Make decisions Assess CH performance Adapt/re-planning

Figure G.12. Profiler Developmental Framework Depicting Competencies Organized by Learning Outcome and Learning Level

Tracking tactics include tactics used by the adversary to evade or cover their tracks, as well as tactics used by the tracking team to effectively and efficiently track while maintaining adequate security. Profiling tactics covered in the course were much broader, focusing on strategies for interpreting and characterizing a range of activities in support of the definition of baseline and recognition of anomalies. Observing, sensemaking, adapting, and assessing are common themes in the profiling tactics (Table G.9).

Teamwork and Coordination. Teamwork and coordination play a big role in both profiling and tracking. Sample technical capabilities for each domain are included in Table G.10 (for a complete list, see Tables G.12 and G.13). Interestingly, teamwork was emphasized more in the tracking course than the profiling course. This may be because tracking is often considered to be an individual activity. The experienced tracking instructors, however, related anecdote after anecdote illustrating the use of teams for more effective tracking and security. In addition to the tactics described above, deliberate strategies for working effectively as a team, maintaining stealth, and managing security were articulated. In the profiling course, teamwork and coordination were clearly implied, but fewer deliberate strategies to support teamwork and coordination were offered. This may be because profiling has been applied most often to small-unit military teams who are already accustomed to working as teams and coordinating extensively with other units and chain of command.

Table G.9. Sample Tactical Capabilities

Tracking	Profiling
• Ability to select and implement appropriate tactics (team formations) • Ability to detect and recognize anti-tracking techniques (backward walking, 90-degree turn, cut the corner, slip the stream) • Ability to detect and avoid counter tracking efforts (ambush, snipers) • Ability to detect and recognize spoor reduction techniques (bomb shelling, break away groups, Collect evidence to support case • The tracker sets the pace of the follow-up • Decide to engage versus monitor • Decide to commit security force appropriately	• Observe behaviors and objects • Characterize observations • Organize environmental information in a meaningful way • Construct baseline in a range of real-world settings • Recognize anomalies in a range of real-world settings • Re-calibrate baseline • Apply CH skills in complex situations • Prioritize cues according to relevance and importance • Employ cognitive discipline

Table G.10. Sample Teamwork and Coordination Capabilities

Tracking	Profiling
• Ability to act as an integral part of the combat tracking team • Use hand signals to communicate to team • Ability to maintain a Common Tactical Picture across the combat tracking team • Ability to maintain team integrity when confronted with anti-tracking or spoor reduction techniques • plans/tasking to all participating agencies	• Take the initiative/Lead • Communicate to team • Collaborate

Getting Inside the Head of the Quarry/Adversary. Both tracking and profiling instructors describe taking the perspective of the quarry or adversary as critical to success. Sample capabilities within this category for each domain are included in Table G.11 (for a complete list, see Tables G.12 and G.13). This capability is characterized as one that must be acquired through experience and a deliberate shift in perspective. Phrases such as: build a story, project forward, anticipate, know the threat, and interpret other cultures are used to encourage students to shift perspectives.

Table G.11. Sample "Getting Inside the Head Of The Quarry/Adversary" Capabilities

Tracking	Profiling
• Apply tracking skills to search and rescue, tactical, and combat missions • Ability to build a story based on evidence available • Ability to project likely lines of travel • Always try to anticipate what your quarry will do • Never "force a track to conform with your own preconceptions	• Know the threat • Know the culture • Interpret other cultures • Take other perspectives • Sensemaking – anticipate most likely COA and most dangerous COA

Depending upon the student population and the types of missions they will address, different core competencies may take on greater importance. For example, small-unit military personnel such as Scouts, Snipers, Rangers, Infantry Squads, Special Operations Forces, Fire Support Teams, and Long Range Reconnaissance and Surveillance Teams will likely have a strong background in small-unit tactics, and teamwork and coordination. Such students may gravitate to the tactical and team elements of training because they already have knowledge structures and experience on which to build in these areas. They may benefit, however, from an increased emphasis on the less-familiar aspects of training such as the development of technical skills for tracking and profiling, and the need to take on other perspectives or get inside the head of the quarry/adversary. The reverse may be true for Border Patrol and Parks Service personnel who tend to have a stronger background with technical tracking and often work alone. An increased emphasis on tactics and teamwork may be most beneficial to Border Patrol and Parks Service personnel.

Tracker and Profiler Developmental Models

The developmental models, depicted in Tables G.12 and G.13, represent a summation of our analysis of learning outcomes. For each model, Core Competencies are linked to learning outcomes. Each learning outcome is classified according to the learning outcome type (i.e., Job Knowledge, Job Skills, and Cognitive Abilities), learning level (I, II, II) and candidate teaching/training methods. Candidate teaching/training methods considered include:

- Lecture – traditional classroom format
- Demonstration – present or show a concept or procedure via live actor(s) or filmed presentation
- Practical Exercise – live, hands-on exercise in which students are given an opportunity to practice new skills in a realistic setting
- Simulation – exercises of varying level of fidelity designed to provide students an opportunity to practice new skills in a live, constructive or virtual setting
- Distance Learning – learning that occurs with geographically distributed instructor(s) and student(s). May occur either synchronously or asynchronously.
- Coaching -- guided practice in which the instructor provides feedback to students, often used in conjunction with practical exercise or simulation
- Job Aids – devices or tools that provide a quick reference to learners and support them in completing a task

Our intent is that these developmental models will serve as the basis for future training development for Combat Hunter courses.

Table G.12. DEVELOPMENTAL MODEL FOR TRACKING
Learning Levels: I = Comprehension & Recall, II = Analysis and Application, III = Synthesis and Evaluation

CORE COMPETENCY	LEARNING OUTCOMES	LEARNING OUTCOME TYPE	LEARNING LEVEL	TEACHING/TRAINING METHOD
Capability that supports tracking expertise	Component skills	Job Knowledge Job Skills Cognitive Abilities	I, II, III	Lecture, Demonstration, Simulation, Practical Exercise, Distance Learning, Coaching, Job Aids
1. TECHNICAL TRACKING	Apply tracking terminology	Job Knowledge	I	Lecture, Distance Learning, Job Aid
	Describe the characteristics of human pace (Stride, Pitch Angle, Straddle, Pressure, Dwell Time)	Cognitive Abilities	I	Lecture, Demonstration, Distance Learning
	Determine the number of quarry.	Cognitive Abilities	I	Lecture, Practical Exercise
	Describe the dynamics of a footprint (Primary Impact Point, Foot Roll, Terminal Point)	Cognitive Abilities	I	Lecture, Demonstration, Distance Learning
	Identify footwear types (western, heels, flats, cleats/slugs, barefoot	Job Skills	I	Lecture, Demonstration, Distance Learning, Job Aids,
	Ability to manage attention (i.e., notice/attend to relevant cues)	Cognitive Abilities	I	Practical Exercise, Demonstration, Coaching
	Ability to estimate the time-distance gap	Cognitive Abilities	I/II	Lecture, Practical Exercise
	Ability to read spoor. This includes inferring characteristics of quarry (height, weight, gender, carrying something, etc.) based on spoor	Cognitive Abilities	II	Lecture, Demonstration, Practical Exercise
	Ability to select and use appropriate lost spoor procedures	Cognitive Abilities	II	Practical Exercise
	Ability to apply micro-tracking techniques	Job Skills	II	Coaching, Practical Exercise, Job Aid
	Ability to apply macro-tracking techniques	Job Skills	II	Coaching, Practical Exercise, Job Aid
	Ability to identify and interpret observable indicators (ground/aerial spoor, sign, litter, blood spoor, body waste, IED/Booby Trap, non-observable indicators	Cognitive Abilities	II	Lecture, Text, Practical Exercise
	Ability to assess the age of spoor and sign (stones, insects, cobwebs)	Cognitive Abilities	II	Lecture, Practical Exercise, Simulation
	Correctly ID the track you wish to follow	Job Knowledge	II	Practical Exercise, Simulation
	Never walk on top of ground spoor	Job Skills	II	Practical Exercise, Simulation
	Never overshoot your last known spoor	Job Skills	II	Demonstration, Practical Exercise Coaching
	When following aerial spoor, seek confirmatory evidence with a ground spoor indicator	Job Skills	II	Demonstration, Practical Exercise Coaching
	Ability to select and implement appropriate tactics (team formations)	Cognitive Abilities	II	Lecture, Distance Learning, Practical Exercise
	Ability to backtrack	Job Skills	III	Practical Exercise
	Ability to track effectively in different light conditions	Job Skills	III	Demonstration, Practical Exercise
2. TRACKING TACTICS	Mark and record grid reference of the starting point; prepare data card	Job Skills	I	Lecture, Practical Exercise, Coaching, Distance Learning
	Always know exactly where you are on the map & GPS	Job Skills	I	Lecture, Practical Exercise, Coaching, Distance Learning
	Use optics to support tracking effort	Job Skills	I	Practical Exercise, Coaching
	Ability to detect and recognize anti-tracking techniques (backward walking, 90-degree turn, cut the corner, slip the stream)	Cognitive Abilities	II	Lecture, Distance Learning, Practical Exercise, Simulation, Coaching, Job Aid
	Collect evidence to support case	Job Skills	II	Practical Exercise, Coaching
	Set the pace of the follow-up	Job Skills	II	Practical Exercise
	Ability to detect and avoid counter tracking efforts (ambush, snipers)	Cognitive Abilities	III	Lecture, Distance Learning, Practical Exercise, Simulation, Coaching, Job Aid
	Ability to detect and recognize spoor reduction techniques (bomb shelling, break away groups, drop-offs)	Cognitive Abilities	III	Lecture, Distance Learning, Practical Exercise, Simulation, Coaching, Job Aid
	Decide to engage versus monitor	Cognitive Abilities	III	Practical Exercise, Coaching
	Decide to commit security force appropriately	Cognitive Abilities	III	Practical Exercise, Coaching

CORE COMPETENCY	LEARNING OUTCOMES	LEARNING OUTCOME TYPE	LEARNING LEVEL	TEACHING/TRAINING METHOD
Capability that supports tracking expertise	Component skills	Job Knowledge Job Skills Cognitive Abilities	I, II, III	Lecture, Demonstration, Simulation, Practical Exercise, Distance Learning, Coaching, Job Aids
3. TEAM COORDINATION	Ability to act as an integral part of the combat tracking team	Job Skills/Cognitive Abilities	II	Practical Exercise, Lecture
	Use hand signals to communicate to team	Job Skills	II	Practical Exercise, Lecture
	Ability to maintain team integrity when confronted with anti-tracking or spoor reduction techniques	Cognitive Abilities	II	Practical Exercise, Coaching
	Accurately record and communicate LiNDATA	Job Skills	II	Job Aid, Distance Learning, Practical Exercise
	Always keep in visual contact with other team members	Job Skills	II	Practical Exercise
	State plans concisely	Job Skills	II	Practical Exercise, Simulation
	Allocate resources equitably	Job Skills	II	Practical Exercise, Simulation
	Clearly define responsibilities	Job Skills	II	Practical Exercise, Simulation
	Establish clear command relationships	Job Skills	II	Practical Exercise, Simulation
	Continuous cooperation	Job Skills	II	Practical Exercise, Simulation
	Disseminate information	Job Skills	II	Practical Exercise, Simulation
	Communicate changes to operational plans/tasking to all participating agencies	Job Skills	II	Practical Exercise, Simulation
	Ability to maintain team integrity when confronted with anti-tracking or spoor reduction techniques	Cognitive Abilities	II	Practical Exercise, Coaching
	Ability to maintain a Common Tactical Picture across the combat tracking team	Job Skills	III	Practical Exercise, Coaching
4. TAKE THE PERSPECTIVE OF THE QUARRY	Ability to project likely lines of travel	Cognitive Abilities	I	Practical Exercise, Demonstration
	Apply tracking skills to search and rescue, tactical, and combat missions	Job Skills	II	Practical Exercise, Simulation
	Always try to anticipate what your quarry will do	Cognitive Abilities	II/III	Practical Exercise, Distance Learning, Simulation
	Never "force a track to conform with your own preconceptions"	Cognitive Abilities	III	Practical Exercise, Distance Learning, Simulation
	Ability to build a story based on evidence available	Cognitive Abilities	III	Practical Exercise

Table G.13. DEVELOPMENTAL MODEL FOR PROFILING
Learning Levels: I = Comprehension & Recall, II = Analysis and Application, III = Synthesis and Evaluation

CORE COMPETENCY	LEARNING OUTCOMES	LEARNING OUTCOME TYPE	LEARNING LEVEL	TEACHING/TRAINING METHOD
Capability that supports profiling expertise	Component Capabilities	Job Knowledge Job Skills Cognitive Abilities	I, II, III	Examples: Lecture, Demonstration, Simulation, Practical Exercise, Distance Learning, Coaching, Job Aids
1. TECHNICAL PROFILING	Describe the six dimensions of the baseline	Job Knowledge	I	Lecture, Demonstration, Distance Learning
	Describe the process: Collect/assess/exploit	Job Knowledge	I	Lecture, Demonstration, Distance Learning
	Describe relevant brain functions (memory, information processing)	Job Knowledge	I	Lecture, Distance Learning
	Define baseline based on classroom examples	Job Skills	I	Lecture, Demonstration, Practical Exercise
	Identify anomalies based on classroom examples	Job Skills	I	Lecture, Demonstration, Practical exercise
	Adjust standoff distance as tactical situation changes	Cognitive Abilities	II	Practical Exercise, Simulation, Coaching
	Describe 5 combat multipliers	Job Knowledge	II	Lecture, Demonstration, Distance Learning
	Describe the Rule of 3	Job Knowledge	II	Lecture, Demonstration, Distance Learning
	Demonstrate tactical questioning methods	Job Knowledge	II	Practical Exercise, Simulation
	Stay within maximum effective range of your weapons system	Job Skills	II	Practical Exercise, Simulation
	Assess CH performance	Cognitive Abilities	III	Practical Exercise, Simulation
	Construct a mental model of cause and effects	Cognitive Abilities	III	Practical exercise, Simulation
	Innovate new ways of using optics and cameras	Job Skills	III	Practical Exercise, Simulation
2. PROFILING TACTICS	Observe behaviors and objects	Job Skills	I	Lecture, Demonstration, Practical Exercise, Coaching
	Characterize observations	Job Skills	I	Lecture, Demonstration, Practical Exercise, Coaching
	Use optics to support profiling	Job Skills	I	Demonstration, Practical Exercise, Simulation, Coaching
	Construct baseline in a range of real-world settings	Job Skills	II	Practical exercise, Simulation
	Recognize anomalies in a range of real-world settings	Job Skills	II	Practical exercise, Simulation
	Re-calibrate baseline	Job Skills	II	Practical exercise, Simulation
	Assess risk or danger	Job Skills	II	Practical exercise, Simulation, Coaching
	Recognize patterns/relationships	Job Skills	II	Practical exercise, Simulation, Coaching
	Apply combat multipliers	Job Skills	II	Practical Exercise, Simulation, Coaching
	Apply heuristics as tactical shortcuts	Job Skills	II	Practical Exercise, Simulation, Coaching
	Question an information source	Job Skills	II	Practical Exercise, Simulation
	Include guardian angel in security plan	Job Skills	II	Practical Exercise, Simulation
	Organize environmental information in a meaningful way	Cognitive Abilities	III	Practical exercise, Simulation, Coaching, Job Aids
	Apply CH skills in complex situations	Job Skills	III	Practical exercise, Simulation
	Prioritize cues according to relevance and importance	Cognitive Abilities	III	Practical exercise, Simulation, Coaching
	Employ cognitive discipline	Cognitive Abilities	III	Practical exercise, Simulation
	Diagnose how situation evolved	Cognitive Abilities	III	Practical exercise, Simulation, Coaching
	Project forward to anticipate future events	Cognitive Abilities	III	Practical exercise, Simulation, Coaching
	Sensemaking – Gaps, Reliability, Fusion	Cognitive Abilities	III	Practical exercise, Simulation, Coaching
	Test hypotheses using hard data	Cognitive Abilities	III	Practical exercise, Simulation, Coaching
	Apply combat power	Job Skills	III	Practical Exercise, Simulation, Coaching
	Ensure that you have Interlocking fields of fire, 360 security, no seams/gaps in your baseline, capable weapons coverage from ground zero to horizon	Job Skills	III	Practical Exercise, Simulation, Coaching
	Adapt/Re-Plan as situation changes	Cognitive Abilities	III	Practical Exercise, Simulation, Coaching
3. TEAM COORDINATION	Communicate to team	Job Skills	I	Practical Exercise, Simulation
	Collaborate	Job Skills	II	Practical Exercise, Simulation, Coaching
	Take the initiative/Lead	Job Skills/Cognitive Abilities	III	Practical Exercise, Simulation, Coaching

CORE COMPETENCY	LEARNING OUTCOMES	LEARNING OUTCOME TYPE	LEARNING LEVEL	TEACHING/TRAINING METHOD
Capability that supports profiling expertise	Component Capabilities	Job Knowledge Job Skills Cognitive Abilities	I, II, III	Examples: Lecture, Demonstration, Simulation, Practical Exercise, Distance Learning, Coaching, Job Aids
4. GET INSIDE THE HEAD OF THE ADVERSARY	Know the threat	Job Knowledge	I	Lecture, Demonstration, Practical Exercise, Simulation, Coaching
	Know the culture	Job Knowledge	I	Lecture, Demonstration, Practical Exercise, Simulation, Coaching
	Interpret other cultures	Cognitive Abilities	III	Practical Exercise, Simulation, Coaching
	Take other perspectives	Cognitive Abilities	III	Practical Exercise, Simulation,
	Sensemaking – anticipate most likely COA and most dangerous COA	Cognitive Abilities	III	Practical Exercise, Simulation, Coaching

Psychometric Findings

Comparison of scores between the participants indicated that there two areas where the instructors performed better than the students. One such area was in innovative thinking. These results suggest that when problem solving, Trackers are more open-minded, curious, and are willing to consider unconventional ideas and solutions more so than Combat Profilers or students in this sample.

The second area where instructors were high performers was in creativity as measured in the RAT. Both Trackers and Combat Profilers scored higher on average than the students in this dimension. In particular, Combat Profilers scored higher in creativity than the Trackers. These results suggest that instructors, in particular Combat Profilers, are better able to make sense of associations among various sets of data in order to assess a situation. Table G.14 below provides a more thorough breakdown of performance based on the three different groups evaluated.

Table G.14. Comparison of Participant's Scores On Assessments

Assessment	Participant Type	Top 5%	Top 10%	Top 20%
Remote Associates Test	Combat Profiler	CP1, CP3, CP4,CP7 (close)	0	CP6, CP8
	Tracker	0	T1, T5, T6	0
	Student	0	A010	0
Watson-Glaser	Combat Profiler	0	0	CP3, CP4
	Tracker	0	0	0
	Student	AO10, AO16, AO27, AO35	0	AO5, AO9, AO14, AO30, AO36
Ambition	Combat Profiler	0	0	CP1, CP3
	Tracker	0	T2, T6	0
	Student	AO19	AO20, AO22, AO36, AO40, AO41	AO17, AO35, AO37, AO39
Analytical Thinking	Combat Profiler	0	0	CP7
	Tracker	0	T2	0
	Student	A027, A036	AO16, AO19, AO20, AO41	AO8, AO24
Attention to Detail	Combat Profiler	0	0	CP1, CP3
	Tracker	0	0	0
	Student	AO16, AO19, AO27	0	AO9, AO20, AO30, AO36, AO40
Concern for Others	Combat Profiler	CP6	0	0
	Tracker	T1	0	T6
	Student	Ao14, A019, A025, A040	0	AO20, AO23, AO41
Democratic	Combat Profiler	0	0	0
	Tracker	0	0	T5
	Student	Ao20, A026, Ao33	AO17, AO23, AO25,	AO6, AO18, AO22, AO36, AO38, AO42
Dependability	Combat Profiler	0	CP1, CP3	0
	Tracker	0	T1	0
	Student	AO19, AO40	AO20, AO25, AO32, AO35, AO39,	
Energy	Combat Profiler	CP3	0	CP1
	Tracker	T6	0	0

	Student	AO25, AO32, AO35, AO36, AO40	0	AO8, AO11, AO21, AO39, AO41
Flexibility	Combat Profiler	0	0	0
	Tracker	T6	T1, T2	0
	Student	0	AO11, AO21, AO24, AO31, AO35,AO40,A041,	
Initiative	Combat Profiler	0	0	0
	Tracker	T6	0	0
	Student	AO19, AO25, AO31	0	AO35, AO40, AO41
Innovation	Combat Profiler	0	0	0
	Tracker	T1, T2, T6	0	0
	Student	AO36, AO40	0	AO8, AO10, AO11, AO19, AO24, AO27, AO41
Leadership	Combat Profiler	0	0	CP3, CP6, CP7, CP8
	Tracker	T6	0	0
	Student	AO8, AO19	AO31	AO1, AO5 AO6, AO9, AO13, AO22, AO25, AO37, AO40, AO42
Outgoing	Combat Profiler	0	0	CP1, CP8
	Tracker	T6	0	0
	Student	AO19, AO41	AO6	AO17, AO20, AO23, AO25, AO36, AO37, AO38, AO39, AO40
Persistence	Combat Profiler	0	0	CP8
	Tracker	0	0	T6
	Student	AO36, AO41	0	AO11, AO19, AO20, AO25, AO32, AO35, AO39, AO40
Rule-Following	Combat Profiler	CP1	0	CP8
	Tracker	0	0	0
	Student	AO19, AO20, AO32, AO40	AO27	AO12, AO15, AO22 , AO30, AO31, AO33, AO34, AO39
Self-Control	Combat Profiler	0	0	T6
	Tracker	0	T1	0
	Student	AO19, AO31	0	AO6, AO11, AO22, AO23, AO26, AO27, AO29, AO40, AO41
Social Desirability	Combat Profiler	0	0	0
	Tracker	T6	0	0
	Student	Ao19, Ao40	AO11, AO25, AO36, AO41	
Stress Tolerance	Combat Profiler	CP3	0	0
	Tracker	0	0	T1
	Student	AO25, AO31, AO36	0	AO8, AO11
Teamwork	Combat Profiler	0	0	0
	Tracker	T6	0	0
	Student	A019, AO20, AO25, Ao41	AO22	AO6, AO11, AO39, AO40

Appendix H: Study Apparatus

1. Trainee Demographics Survey
2. Trainee Daily Reactions Survey
3. Trainee Overall Reactions Survey (administered on the last day)
4. Trainee Situated Judgment Test (SJT)
    a. Combat Tracking SJT (Version 1)
    b. Combat Tracking SJT (Version 2)
    c. Combat Profiling SJT (Version 1)
    d. Combat Profiling SJT (Version 2)
5. Behavioral Observation Checklist (BOC)
    a. Combat Tracking BOC
    b. Combat Profiling BOC
6. Role-Players Demographics Survey
7. Longitudinal Study: Knowledge Questionnaires
8. Longitudinal Study: Reactions Survey

Date: ___/___/___ Participant Code: _____

BIOGRAPHICAL INFORMATION

Directions: Please supply basic demographic information by answering the following questions.

1. **Age:** _____

2. **Current service agency** (please circle): a. USA b. CBP c. FBI d. USMC

3. **Highest level of civilian education:** _____

4. **Military Billet/LEA Rank:** _____

5. **Length of Military/LEA Service:** _____

6. **MOS/Job Title:** _____

7. **Length of time in this MOS/position:** _____

8. **Tell us a little about the <u>most common</u> tasks you perform for your job?** _____

_____

_____

_____

9. **Tell us a little about the <u>most critical</u> tasks you perform for your job?** _____

_____

_____

_____

10. **Unit/Company:** _____

11. **Where are you currently stationed?** _____

12. **Have you been deployed to OIF/OEF?** (please circle) a. Yes b. No

If yes, can you tell how many times you were deployed to OIF/OEF? _____

If possible, can you tell us where you were stationed? _____

_____

13. **In what area(s) did spend your adolescence?** (please circle) a. Rural b. Suburban c. Large city

14. **How would you rate your expertise using <u>binoculars</u>?** (please mark one box)

None No bino experience	**Novice** Minimal exposure to bino use	**Initiate** Received introductory instruction	**Apprentice** Actively learning bino skills	**Journeyman** Uses binos under supervision	**Expert** Extensive bino experience	**Master** An elite expert, regarded as "the" expert
❑	❑	❑	❑	❑	❑	❑

15. **How would you rate your level of expertise as a <u>game hunter</u>?** (please mark one box)

None No hunting experience	**Novice** Minimal exposure to hunting	**Initiate** Received introductory instruction	**Apprentice** Actively learning hunting skills	**Journeyman** Goes hunting under supervision	**Expert** Extensive hunting experience	**Master** An elite expert, regarded as "the" expert
❑	❑	❑	❑	❑	❑	❑

16. **Have you engaged in activities where you learned to "read the signs of nature"?** (mark all that apply)

a. Boy Scouts b. Backpacking c. Bird Watching d. Sierra Club

e. Other: _____

17. **How many hours do you typically spend playing <u>video games per week</u>?** _____ Hours/Week

If you play video games, list games most recently played: _____

_____

_____

_____

_____

Scenario-based training emphasizes the role of "scenarios" in learning. In other words, it focuses on setting up *realistic* situations (or "stories") in which you can practice your skills. Scenario-based training forces you to think about all aspects of the situation, not just how to carry out your Tactics Techniques and Procedures. For instance, you might have to consider the downstream effects of engaging with an enemy or firing upon a potential criminal. Scenario-based training is also highly interactive; as you make decisions within a scenario, the scenario's situation responds accordingly. Often, when people think about scenario-based training, they consider high-fidelity simulators, but scenario-based training can be carried out through game-based training (e.g., like a training version of *Call of Duty*), or even through rock-drills and role-play.

18. **Have you had experience with scenario-based training?** (please circle) a. Yes b. No

*If yes, please describe your experience with scenario-based training?*_____

_____

_____

_____

*If yes, did you experience scenarios specific to OIF? OEF? Other? Please specify.*_____

_____

_____

_____

If yes, how would you describe these scenarios? _____

_____

_____

_____

Date: ___/___/___ Participant Code: _____

PAST TRAINING INFORMATION

Directions: Please tell us about your experience in the course subject matter by, first, reading about the course, and then answering the following questions.

ABOUT THE COURSE: The course you are about to attend trains for observation and pattern recognition/analysis skills to better identify friend from foe, reduce risk to non-combatant casualties, and contribute to the success and survivability in combat. Trainees are taught to detect anomalies in the normative behavior of common areas, such as a village, picking out irregularities and tracking people who may be insurgents.

During the first 10 days, you will learn about tracking, including the action indicators in tracks, the dynamics of footprints, the use of light and shadow in interpreting tracks, and many other "tricks of the trade" from a legendary tracker and hunter. You will receive classroom lessons along with outdoor exercises where you will follow tracks, analyze spoors, and adopt the mindset of a tracker.

During the second 10 days, you will learn about enhanced observation and human terrain pattern recognition. The enhanced observation instruction covers observation theory. This portion of the course will also teach you how to make the best use of your optics and thermal devices. Then you will put your observation skills to use in the human-terrain portion of the course. The human-terrain instruction will cover the six domains that converge to define any behavioral profile: heuristics, biometrics, geographics, atmospherics, proxemics, and kinesics (body language). After learning about these topics, you will put these lessons to work outside the classroom, as you observe a village of role-players acting out various scenarios.

19. **Have you attended the USMC "Combat Hunter" before?** (please circle) a. Yes b. No

If yes, where was the course taught? _____

If yes, when was the course taught? _____

If yes, what was the duration of the course? _____

20. **Have you attended any course that taught tracking before?** (please circle) a. Yes b. No

If yes, where was the course taught? _____

If yes, when was the course taught? _____

If yes, what was the duration of the course? _____

If yes, how useful was the course? _____

21. **How often do you use <u>tracking</u> when working in the field?** (please mark one box)

Never	**Rarely** less than 10% of the time	**Occasionally** about 30% of the time	**Sometimes** about 50% of the time	**Frequently** about 70% of the time	**Usually** about 90% of the time	**Every Time**
❑	❑	❑	❑	❑	❑	❑

*If you use tracking, could you tell us about your <u>most recent</u> tracking experience?*_____

_____

_____

_____

22. **Based upon what you know about the <u>tracking</u> portion of the course, how relevant does it seem for your use in the field?** (please mark one box)

Extremely <u>NOT</u> Relevant	**NOT Relevant**	**Somewhat NOT Relevant**	**Neutral**	**Somewhat Relevant**	**Relevant**	**Extremely Relevant**
❑	❑	❑	❑	❑	❑	❑

23. **How would you rate your <u>tracking</u> expertise?** (please mark one box)

None No experience	**Novice** Minimal exposure to it	**Initiate** Received introductory instruction	**Apprentice** Actively learning these skills	**Journeyman** Does this work under supervision	**Expert** Extensive experience	**Master** An elite expert, regarded as "the" expert
❑	❑	❑	❑	❑	❑	❑

24. **Have you attended any course that taught <u>enhanced observation</u> before?**

(please circle) a. Yes b. No

*If yes, <u>where</u> was the course taught?*_____

*If yes, <u>when</u> was the course taught?*_____

*If yes, what was the <u>duration</u> of the course?*_____

*If yes, how <u>useful</u> was the course?*_____

25. **How often do you *currently* use <u>enhanced observation</u> when working in the field?**

Never	**Rarely** less than 10% of the time	**Occasionally** about 30% of the time	**Sometimes** about 50% of the time	**Frequently** about 70% of the time	**Usually** about 90% of the time	**Every Time**
❑	❑	❑	❑	❑	❑	❑

*If you use enhanced observation, could you tell us about your <u>most recent</u> observation experience?*_____

_____

_____

_____

26. **Based upon what you know about the <u>enhanced observation</u> portion of the course, how relevant does it seem for your use in the field?** (please mark one box)

Extremely <u>NOT</u> Relevant	**NOT Relevant**	**Somewhat NOT Relevant**	**Neutral**	**Somewhat Relevant**	**Relevant**	**Extremely Relevant**
❑	❑	❑	❑	❑	❑	❑

27. **How would you rate your <u>enhanced observation</u> expertise?**

None No experience	**Novice** Minimal exposure to it	**Initiate** Received introductory instruction	**Apprentice** Actively learning these skills	**Journeyman** Does this work under supervision	**Expert** Extensive experience	**Master** An elite expert, regarded as "the" expert
❑	❑	❑	❑	❑	❑	❑

28. **Have you attended any course that taught <u>human terrain pattern recognition</u> before?**

(please circle) a. Yes b. No

*If yes, <u>where</u> was the course taught?*_____

*If yes, <u>when</u> was the course taught?*_____

*If yes, what was the <u>duration</u> of the course?*_____

*If yes, how <u>useful</u> was the course?*_____

29. **How often do you *currently* use <u>human terrain pattern recognition</u> when working in the field?**

Never	**Rarely** less than 10% of the time	**Occasionally** about 30% of the time	**Sometimes** about 50% of the time	**Frequently** about 70% of the time	**Usually** about 90% of the time	**Every Time**
❑	❑	❑	❑	❑	❑	❑

*If you use human-terrain, could you tell us about your <u>most recent</u> human-terrain experience?*_____

_____

_____

30. **Based upon what you know about the <u>human terrain pattern recognition</u> portion of the course, how relevant does it seem for your use in the field?** (please mark one box)

Extremely <u>NOT</u> Relevant	**NOT Relevant**	**Somewhat NOT Relevant**	**Neutral**	**Somewhat Relevant**	**Relevant**	**Extremely Relevant**
❑	❑	❑	❑	❑	❑	❑

31. **How would you rate your <u>human terrain pattern recognition</u> expertise?**

None No experience	**Novice** Minimal exposure to it	**Initiate** Received introductory instruction	**Apprentice** Actively learning these skills	**Journeyman** Does this work under supervision	**Expert** Extensive experience	**Master** An elite expert, regarded as "the" expert
❑	❑	❑	❑	❑	❑	❑

REACTIONS

Directions: Please provide honest feedback about the instruction or practice exercise you just completed.

1. **Date:** _____ **Time** (please circle): a. Morning b. Afternoon c. Evening

2. **Type(s) of Instruction** (please circle): a. Lecture b. Demonstration c. Hands-On Exercise

3. **Current service agency** (please circle): a. USA b. CBP c. FBI d. USMC

4. **Primary Topic of Instruction:** _____

5. **Please mark one box per item, indicating whether you agree or disagree with the statement:**

	Strongly Disagree ☹	Disagree	Somewhat Disagree	Neutral 😐	Somewhat Agree	Agree	Strongly Agree ☺
7. This instruction is relevant to my job.	❑	❑	❑	❑	❑	❑	❑
8. I disliked today's instruction.	❑	❑	❑	❑	❑	❑	❑
9. The instructor's teaching ability affected my opinion of the instruction.	❑	❑	❑	❑	❑	❑	❑
10. I plan to use today's instruction in my job (at least in the field)?	❑	❑	❑	❑	❑	❑	❑
11. I was poorly prepared for this class; I lacked the prerequisite knowledge.	❑	❑	❑	❑	❑	❑	❑
12. Other personnel in my agency could benefit from this instruction.	❑	❑	❑	❑	❑	❑	❑
13. If taught by a less interesting instructor, this content would still be valuable.	❑	❑	❑	❑	❑	❑	❑
14. I received copies of all notes, slides, and other materials that I needed.	❑	❑	❑	❑	❑	❑	❑
15. Today's instruction really kept my attention.	❑	❑	❑	❑	❑	❑	❑
16. The instructional materials (e.g., slides) were insufficient/poor quality.	❑	❑	❑	❑	❑	❑	❑
17. The instruction would have been better if notes/handouts had been supplied.	❑	❑	❑	❑	❑	❑	❑
18. I became a little bored during today's instruction.	❑	❑	❑	❑	❑	❑	❑

19. Overall, I would rate today's instruction as:

Extremely Poor	Poor	Slightly Poor	Neutral	Slightly Good	Good	Extremely Good
❑	❑	❑	❑	❑	❑	❑

20. **What was the most valuable part of today's instruction?** _____

_____

21. **What was the least valuable part of today's instruction?** _____

_____

Participant ID: _____ Team Number: _____

OVERALL BORDER HUNTER COURSE REACTIONS

Directions: Now that you have completed the full 20-day Border Hunter course, let us know what you thought of it. Please provide honest feedback about the ***overall*** Border Hunter experience.

1. **Current service agency** (please circle): a. USA b. CBP c. FBI d. TX Ranger e. Parks Ranger

Looking back at the **Combat Tracking** portion of the course, please mark one box per item, indicating whether you agree or disagree with the statement:	Strongly Disagree ☹	Disagree	Somewhat Disagree	Neutral 😐	Somewhat Agree	Agree	Strongly Agree ☺
2. If **different instructors** taught the tracking, the course **wouldn't be as good**.	❑	❑	❑	❑	❑	❑	❑
3. The tracking instruction was **useful**. I can use it in my job (at least in the field).	❑	❑	❑	❑	❑	❑	❑
4. I **enjoyed** the tracking instruction.	❑	❑	❑	❑	❑	❑	❑
5. The tracking **instructional materials** (e.g., slides, handouts) were good.	❑	❑	❑	❑	❑	❑	❑

6. Overall, I would rate the **Combat Tracking** portion of the course:

Extremely Poor	Poor	Slightly Poor	Neutral	Slightly Good	Good	Extremely Good
❑	❑	❑	❑	❑	❑	❑

7. If you could improve one **logistical issue** about the Combat Tracking portion of the course, what would you change and why? _____

_____

_____

8. If you could improve one **instructional issue** **(i.e., *not logistical*)** about the Combat Tracking portion of the course, what would you change and why? _____

_____

_____

_____

_____

Participant ID: _____ Team Number: _____

Looking back at the **Combat Profiling** portion of the course, please mark one box per item, indicating whether you agree or disagree with the statement:	Strongly Disagree ☹	Disagree	Somewhat Disagree	Neutral 😐	Somewhat Agree	Agree	Strongly Agree ☺
9. If **different instructors** taught the profiling, the course **wouldn't be as good**.	❑	❑	❑	❑	❑	❑	❑
10. The profiling instruction was **useful**. I can use it in my job (at least in the field).	❑	❑	❑	❑	❑	❑	❑
11. I **enjoyed** the profiling instruction.	❑	❑	❑	❑	❑	❑	❑
12. The profiling **instructional materials** (e.g., slides, handouts) were good.	❑	❑	❑	❑	❑	❑	❑

13. Overall, I would rate the **Combat Profiling** portion of the course:

Extremely Poor	Poor	Slightly Poor	Neutral	Slightly Good	Good	Extremely Good
❑	❑	❑	❑	❑	❑	❑

14. If you could improve one **logistical issue** about the Combat Profiling portion of the course, what would you change and why? _____

_____

_____

15. If you could improve one **instructional issue** **(i.e., *not logistical*)** about the Combat Profiling portion of the course, what would you change and why? _____

_____

_____

_____

_____

DIRECTIONS: Looking back at the **full 20-day Border Hunter** course, please respond to the following:

16. As a supervisor/commander, if you could enroll your personnel in a 20-day Border Hunter course, would you do so? Why? _____

17. Do you intend to teach your teammates at home any of the Border Hunter content? If so, how will you do it?

18. What was the most useful lesson you learned during Border Hunter? _____

19. If you could make one improvement to Border Hunter, what would you change? Why? _____

If you have additional comments for the researchers, instructors, or course organizers, please use the back of this page!

SITUATIONAL JUDGMENT SURVEY

Participant Code _____

Date _____

Instructions: *Please answer the following survey items to the best of your ability. Each item will be begin with a brief "scenario" that describes the background and context in which a Combat Tracking activity is occurring. You will then be given a series of judgments or actions that could be taken by members of the Combat Tracking Team. We ask that you rate the effectiveness of each option on the five-point scale attached to the item. Please note that, while we are asking for your name, this survey is an assessment of the course not your performance. We will be using the survey results to improve the content and delivery of the course in the future. Thank you for your participation.*

Survey Item #1

You've been tracking a small (4-5) band of insurgents for several days. Their rate of travel has been fairly constant but you can now tell from the age of their ground spoor that their rate has recently slowed to about half of what it was. No other aspects of the ground spoor look different than before. You know from your EEIs that several of the quarry have tracking experience. Your tactical support element is about 3 klicks behind you. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Increase your rate of travel to close the time/distance gap quickly

[ ] Bring the tactical support element closer to your rear, say within 1 klick

[ ] Call C2 on the net and arrange for backtracking to start from your current position

[ ] Alter your formation and begin looking for signs of IEDs

[ ] Check around for aerial spoor indications that one of the quarry might have been injured

[ ] Check for signs that an ambush might be imminent

Survey Item #2

Your tracking team is headed North in pursuit of a 4-person, well-armed, band of insurgents. From the last set of tracks, you estimate a time/distance gap of 2 hours maximum. You come to a narrowing of the trail where there is stony ground to the East and a stream to the West. At this point you no longer see any ground spoor. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Change to a half-Y tactical formation

[ ] Call HQ to get a cut-spoor team 10 klicks to the North

[ ] Call for aerial spotting several klicks ahead

[ ] Send your flanker trackers ahead 1 klick to look for water transference off the stream and dirt transference on the stony ground

[ ] Initiate a 360-degree lost spoor procedure

[ ] Get a second team to back-track from the last known spoor to see where the quarry might have come from originally

Survey Item #3

Your team has been tracking an experienced, well-armed band of insurgents for several days. The time/distance gap has been slowly closing to where it is now about 8 hours. Your come upon where their tracks should be but they have been obliterated by tracks of local cattle that cut through the ground spoor from several directions. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Have one of your flanker trackers and the rear security tracker back track to the point where the cattle came from to see if the quarry's tracks are intermixed with them

[ ] Initiate a 360-degree lost spoor procedure

[ ] Look at surrounding tree branches in the immediate area for aerial spoor to estimate if/when the quarry had been there

[ ] Change to a Ranger/single file formation to look for any quarry ground spoor that might have escaped obliteration by the cattle

[ ] Change your tracking direction to follow the cattle path with the highest density of tracks

[ ] Slow pace of tracking movement to prepare for counter-tracking tactics

Survey Item #4

You've been doing a counter-drug ops in deep backcountry for several days. You're trailing a group known to cultivate marijuana. On the second day out you find their tracks, which have been heavily brushed out. The time/distance gap is not known precisely, but is likely between 2-4 hours. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Alter your tactical formation to prepare for intense counter-tracking tactics

[ ] Go to an extended line formation to find where their trail picks up

[ ] Call C2 on the net and arrange for a cut spoor team to be dropped several km ahead

[ ] Initiate a box search lost spoor procedure, after map study to estimate where the quarry might be heading

[ ] Send the flankers ahead several km and initiate a track trap search lost spoor procedure

[ ] Reduce the pace of tracking and wait for the tactical support element to catch up to your position

Survey Item #5

You've been trailing a 2-person (armed and dangerous) quarry for the better part of a day. The time/distance gap has closed to approximately 2 hours when you notice – for the first time – blood mixed in with the ground spoor. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Take a sample of the blood and send it back to the rear so it can be taken to a lab to see if it matches one of the quarry's blood type

[ ] Look for ground spoor that might indicate the presence of an injured animal

[ ] Examine the relative ages of the ground spoor and the blood to determine if it might have occurred prior to or after the quarry came through that spot

[ ] Have your tracking support element move up closer in case counter-tracking measures are being taken

[ ] Examine surrounding trees and branches for aerial spoor that might indicate one of the quarry was just injured

[ ] Examine the dynamics of the ground spoor to determine if one of the quarry intentionally injured the other one

Survey Item #6

You're on a CSAR op for a downed pilot and passenger who's abandoned the plane in a densely forested area. You estimate the time/distance gap is closing at a rate of 30 min. per 2 hours. At present, they're probably about 2-4 hours ahead. The trail is shifting progressively to the right at about a 45 degree angle, where this angle is increasing. From the toe-first primary impact point and uneven stride, and increasing pressure of one of the tracks, you surmise that one of the party is injured, perhaps seriously. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] You begin running on the spoor to close the time/distance gap

[ ] You split up your team by sending the right flanker to the right, anticipating the party will be traveling in circles as they become further disoriented due to injury

[ ] You fire a shot in the air in the hopes they will hear you

[ ] You keep trailing in the same direction and pace since you've been closing the gap

[ ] You go to an extended line formation to cover more ground laterally as you move ahead

[ ] You radio base ops to have a cut-spoor team sent 10 km to the right of your position since you expect they will reach them sooner

SITUATIONAL JUDGMENT SURVEY

Participant Code _____

Date _____

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Survey Item #1

Your team has just been called out to an Initial Commencement Point to begin tracking a band of insurgents of unknown number. Unfortunately, your tactical support element arrived before you and inadvertently messed up the ground spoor with their own footprints. You really want to know how many quarry you are tracking as you begin the process. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Have each of the TSE members take off their shoes so you can compare their patterns to the ones in the messed-up ICP where, by process of elimination, you can deduce the quarry tracks

[ ] Mark off two lines roughly 36-in. apart so you can use the average pace method to determine the number of tracks in the ICP and then subtract out the TSE members to get the quarry party size

[ ] Ask the lead TSE member for his recollection of what the spoor looked like before they walked through it

[ ] Leave the ICP area as quickly as possible to find a suitable area ahead to use as the ICP for the remainder of the tracking op

[ ] Keeping one team member at the ICP, have the rest of your party back track to determine where the quarry might have come from and use that area, once found, to determine the number in the party

[ ] Mark off a larger area to the side of the ICP and use the comparison method to get a rough estimate of the number of tracks, and then subtract out the TSE members from that estimate

Survey Item #2

Your tracking team is called to an area that might become an ICP, depending on an age of spoor assessment to determine whether it is an active or passive track. At the site, there is clear evidence that something or someone was there, as indicated by some trampled grass, churned up vegetation,

some scuffs on tree bark, and so forth. You want an age assessment to determine if it is worthwhile to pursue the track or declare it "passive" and get reassigned somewhere else. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Check the ground spoor to see if there is any edges left in any of the tracks, indicating that the trail is still worth pursuing

[ ] Look for any stones out of place and see if the likely originating holes have been filled in, indicating that the trail is now passive

[ ] Compare the color of the natural vegetation to that which is churned up, where the degree of match is another indication that the trail is now cold

[ ] Have someone wait and see how long it takes the trampled grass to return to its original state, where the longer it takes the colder the trail

[ ] Look for any signs of more recent activity in the surrounding aerial spoor, such as brambles or thorns, that might have signs of the quarry party attached to them

[ ] Get accurate estimates of wind and moisture in the area during the last 24 hours to determine how much discoloration you'd expect to see if no one had gone through there in the last day

Survey Item #3

Your team has been trailing a small band of insurgents for several days. As you follow the track line, you notice that the primary impact point for most footprints is now on the toe, where the heel rarely touches down. Also, the stride is longer and the dwell has decreased. There is a freeway about 4 km ahead of this point; your estimated time/distance gap has closed to about 1km or so. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Begin running on the spoor to keep your time/distance gap constant or perhaps decrease it

[ ] Do a quick map study to see the most likely area where the quarry will break out to the freeway and contact C2 to see about getting that area blocked off

[ ] Reduce your pace of travel to prepare for possible counter-tracking tactics

[ ] Initiate a quickened pace but alter your tactical formation to an extended line

[ ] Radio an updated LNDAT to HQ which includes a Foxtrot addendum that the quarry may be attempting to run out of the tracking area and meet up with associates on the freeway

[ ] Request a cut-spoor team by sent to the edge of the freeway and begin working its way back toward you

Survey Item #4

You've received an EEI from the Ops Center that indicates the 3-person insurgent band you're trailing always travels together. You come upon the next set of tracks and only see two distinct shoe patterns in the ground spoor. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Check the pressure of the prints in the ground spoor to see if one of the insurgents has begun to carry one of the others either due to injury or for spoor concealment

[ ] Send your flanker trackers up the trail, on each side, to see if the third shoe pattern emerges from a hard surface

[ ] Do a quick map study to identify likely rally points and send a cut spoor team to the most likely RP

[ ] Examine the shoe patterns you do see in the ground spoor and compare with EEIs from HQ to identify which insurgent's tracks are missing

[ ] Get a party to do some backtracking to see if the missing insurgent is circling back to engage in counter-tracking activity

[ ] Alter your tactical formation to a single/Ranger file up the trail to locate the missing insurgent's tracks as quickly as possible

Survey Item #5

Your team has just been deployed on an urban tracking mission. You've been tasked to find an insurgent who has just been suspected of firing an RPG at a local police station. The village is very "third world," with open sewage running in the street. The smells are so overpowering that you are not able to rely on your ability to smell cordite or other signs of recent firing in following the trail of the shooter. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Contact the Ops Center and obtain any EEI concerning use of tobacco, gum, or other chewing habits of the shooter that might appear as oral ejecta

[ ] Look around for recently discarded litter for indications of booster wrappers, ammo clips, or spent shells

[ ] Look around the area for changes in the behavior of the local population that indicates a person of danger is nearby

[ ] Listen for signs that a disruptive event has just occurred, such as dogs barking, shop doors closing, or livestock moving

[ ] Look for visible signs that might be present in the atmosphere, such as smoke, flies, or birds flying away

[ ] Examine the surrounding terrain for signs of ground spoor, such as on oil patches, splattered puddles, or footprints embedded in feces

Survey Item #6

You've been trailing a 4-person armed band of insurgents in an urban tracking op for the better part of several hours. They had at least a 30-min. head start on you, where you're operating in a third-world village with unpaved roads and a mix vehicle traffic and animals. Your five-person team reaches an open intersection where the tracks just simply "vanish." Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Look for recently-left tire tracks, with signs of high acceleration, as an indication that the group may have been picked up by a vehicle

[ ] Split your team and begin asking villagers (once a TERP translator is available) if they saw anyone suspicious walking or running through that area in the last thirty minutes

[ ] Break your team into pairs and begin moving slowly in three directions – ahead, to the left, to the right – to pick up the tracks again assuming they have begun using spoor concealment procedures

[ ] Backing up to the last known spoor site, initiate a 360-degree lost spoor procedure with overlapping circles of coverage by your flanker trackers

[ ] Request a second tracking team be brought in to help cover more ground more quickly

[ ] Do a quick study of a map of the village to identify likely rally points in case the insurgents have split up using spoor reduction procedures

SITUATIONAL JUDGMENT SURVEY

Participant Code _____

Date _____

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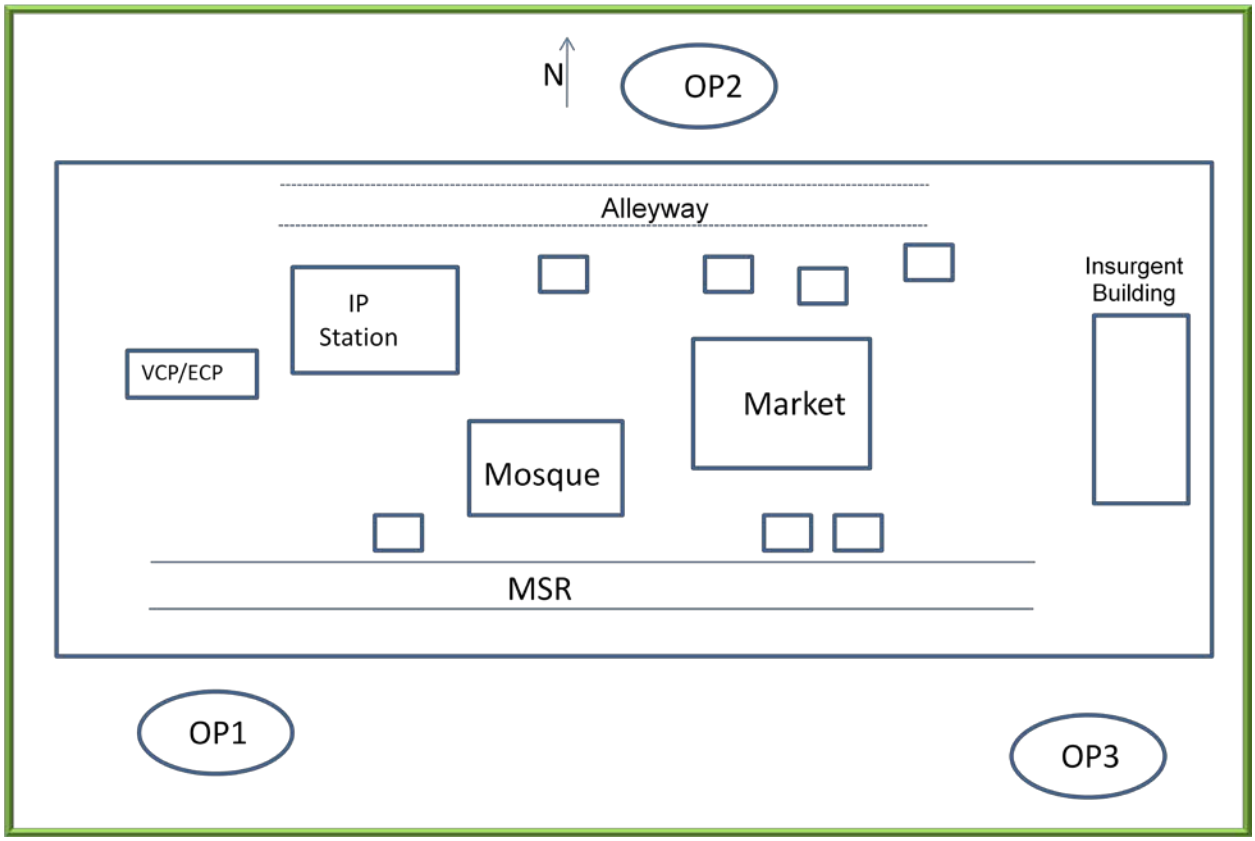

Situation Overview

The figure above provides a crude sketch of the ville that your platoon has been assigned to observe in a clandestine fashion. You divide into three squads, with each squad watching a section of the ville from one of three OPs. OP1 has a good view of the checkpoint and Iraqi Police (IP) station area, as well as the East part of the mosque. OP2 can see the mosque and the market area. OP3 has a good vantage point of the West-end building which is a known hangout for insurgents in the area. All of the survey items will make reference to this sketch.

Survey Item #1

From your position in OP3, you see someone placing what appears to be an IED on the Southeast corner of the market early in the morning. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Call the IPs and have it dug up and/or detonated right away

[ ] Keep a visual on the suspect and see where he goes next and who he might be working for

[ ] Call in the UAV or GBOSS and have the area kept under surveillance before the market opens

[ ] Contact OP2 and see if they have any other sightings of suspicious planting of objects

[ ] Call the IPs and have the suspect detained for questioning

[ ] Visually scan around the area for anyone who might be holding a remote detonator

Survey Item #2

From your position in OP1, you see a car drive through the ECP/VCP quickly, without stopping. The IPs seem unconcerned and immediately go about their business. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Contact OP2 and OP3, and tell them to keep the car under surveillance and see where it goes

[ ] Call in a UAV and consider launching a Hellfire since there are likely to be insurgents in the car

[ ] Keep the IPs and IP station under observation to see if any of them call someone on their cell phone

[ ] Observe the area near the IP station to see if any of the local population act differently now, either happy or angry

[ ] Radio the other OPs to begin watching for any signs of a possible next stage of a more complex insurgent operation

[ ] Contact the IP station and have them give chase to the vehicle, so the driver may be detained

Survey Item #3

From OP2, you've been observing the crowded market place on a midday Friday. There's so many people that it is difficult to focus on any one person for any length of time. Over the net, you get a report that "something may be going down" soon in the area. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Call in the GBOSS to get a high magnification image of the areas with the highest density of people

[ ] Contact the IPs to find out if they have had any recent thefts of anything weapons-related in the area

[ ] Contact OP1 and OP3 to see if they have any sightings of anything suspicious on their ends of the ville

[ ] Observe the market place to see if there are "negative space" areas that people seem to purposely avoid

[ ] Since it's a hot day, get as many thermals as you can on the people in the market to determine if anyone has an unusually cool heat signature around their middle

[ ] Observe the crowd using your memory of last week's bazaar as the baseline against which to compare the current atmospherics of the crowd's mood, i.e., a greater or lesser than normal amount of festivity)

Survey Item #4

From your vantage point in OP2, you see a group of 5-6 young men playing soccer in an open area between the mosque and the East end of the market. As several IPs approach them, the young men scatter, running off in different directions. As the young men were leaving, it looked like one of them may have dropped something in the area. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Radio the IPs and tell them not to touch anything in the area until EOD has been brought in

[ ] Check with the Ops Center to have any UAV or GBOSS footage of the area replayed to see if it can be determined what the young men were doing

[ ] Observe the people around the playing area to see if anyone was trying to shield the young men when they ran by

[ ] Have OP3 place the East side of the insurgent building under in-depth observation to see if any of the young men end up there

[ ] Send out inquiries to any local contacts for the identities of the young men to ascertain if any have known ties to any insurgent groups

[ ] Contact OP1 to determine if any of the young men have run into the mosque seeking protection

Survey Item #5

Working out of OP2, you get a report from OP3 that the insurgents may be expanding their area of influence, further East into the ville, beyond the insurgent building. You want to identify likely areas where they may have been meeting so you can make your subsequent observations more systematic

and focused. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Look for well-worn paths into an enclosed area

[ ] Look for signs of litter or any recently-left refuse

[ ] Look for areas where local villagers seem to actively avoid

[ ] Look for areas that have easily accessible ingress and egress routes

[ ] Look for areas, like the alleyway, that are "off the beaten path" and are hidden from plain view

[ ] Look for areas that can be readily overwatched by 1 or 2 lookouts

Survey Item #6

You're working out of OP3, keeping the insurgent building under observation. You receive a report that there may be a leader from another insurgent group in the ville, visiting, but who'll be trying to blend in with the rest of the people. There are many new people in the ville due to an upcoming celebration. You want to get a PID on this leader as soon as possible. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Observe the crowds of people in the West end of the ville who appear to be adopting similar mannerisms, and then try to find the object of that mimicry

[ ] Scan the people near the insurgent building who seem to be acting as though directed by someone

[ ] Contact OP1 and have them report on the different vehicles that have entered through the ECP/ VCP in the past day, focusing on cars where there was someone of importance sitting in the back seat

[ ] Observe the crowds for someone who is directly interacting with them, and then back off your observations from that person to ID the individual who might be controlling him

[ ] Contact OP2 to determine if they have had any meetings at the mosque between the local Imam and someone new to the ville who has status

[ ] Observe the crowds at the West end of town for anyone who has distinctive clothing that indicates someone with regal status

SITUATIONAL JUDGMENT SURVEY

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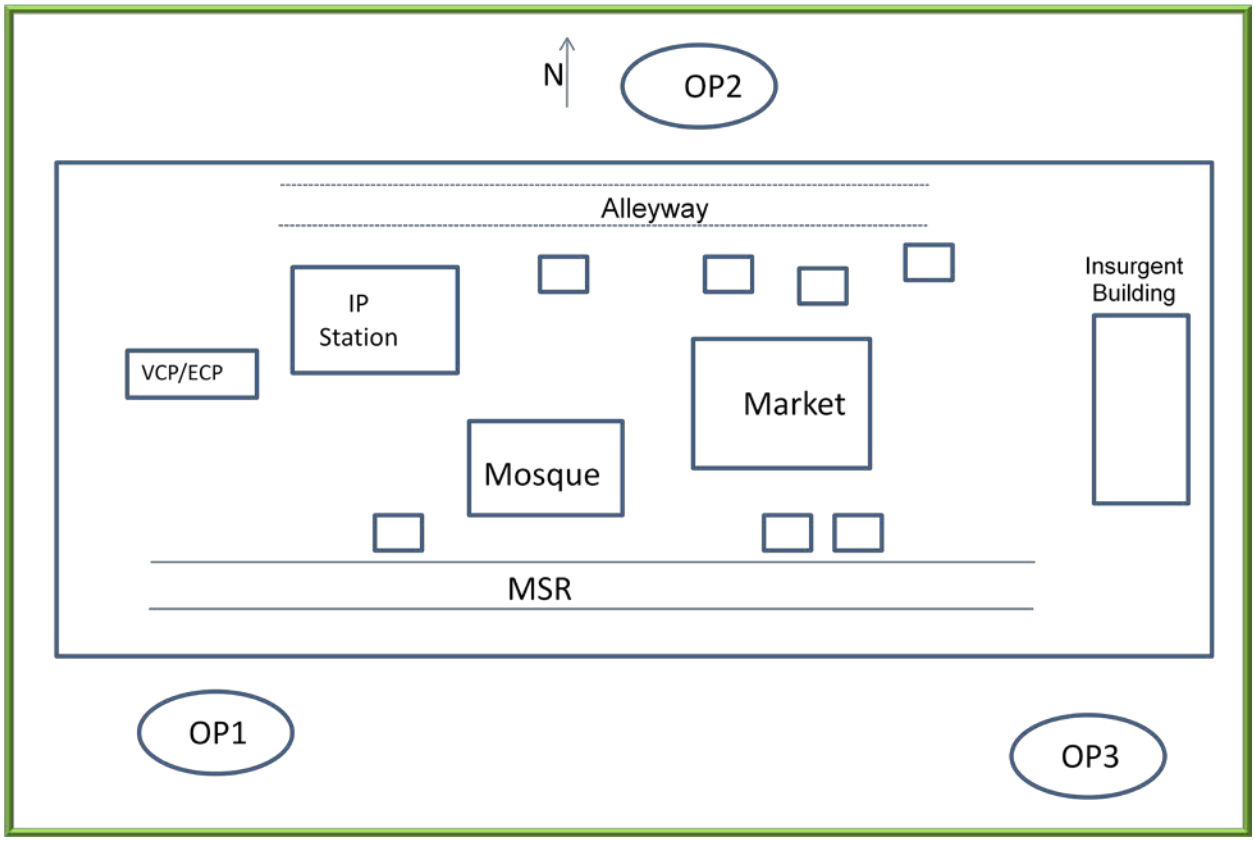

Situation Overview

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Survey Item #1

From your position in OP2, you observe that the market – which is normally quite busy and active by midday – is today, eerily quiet. There are very few customers, which is highly unusual. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Focus your observations on the few people who are at the market, to determine if they have anything in common

[ ] Contact the other OPs to determine if, they too, are seeing signs of unusual inactivity

[ ] Request UAV/GBOSS support to get high resolution imagery of the market area to ID any potential IED placements

[ ] Check out other parts of the ville to determine if there is some other event where people might be congregating

[ ] Focus your optics – including thermals – to determine if the market keepers have anything suspicious on their person

[ ] Begin scanning the vehicles in the area to determine how long each has been parked there and whether there is anything about them that appears unusual or different

Survey Item #2

Working in OP2, you receive a report that a "small red vic" has just gone through the ECP/VCP normally, but that upon passing through, the car was driving very slowly. As you pick him up from your position, you see the car driving through the alleyway. His movement is somewhat erratic, and finally he slows to the point where he is almost stopped. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Contact the IPs and have them approach the vehicle in their own car and block him from moving further

[ ] Since the car was headed west, their destination is likely the insurgent building so the occupants should be taken out

[ ] Request high resolution imagery (via GBOSS or UAV) of the occupants to see if they match the description of any outstanding BOLOs

[ ] Engage in lateral comm. with OP3 to create an interlocking field of observation to track the car's movement once it starts up again

[ ] Do nothing – just assume it's someone who's new to the ville and is just trying to "get their bearings"

[ ] Start a systematic observation of the houses in the area around the vehicle to determine if anyone is watching them or signaling to them in some way

Survey Item #3

Working from OP1, you get a report over the net that a shot was fired near the market. Though no one was hurt, it was particularly disturbing since the shot seemed to have "come out of nowhere." Since no one was seen running from the scene, other possibilities are being considered. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Get on the net to get a report on the type of weapon that was used in order to get an estimate of possible range

[ ] Assuming a maximum range – say 400 yards – start putting vehicles under observation that are within 400 yards of the shot and note if any of them move within the next hour

[ ] Using all available optics, and working with OP2, start scanning windows of houses facing the market, looking for convenient vantage points and possible heat signatures

[ ] Get high resolution imagery of vehicles to see if any of them have tail lights or rear windows punched out to support a sniper platform

[ ] Coordinating with OP2, start scanning the market area for anyone who seems to be having a serious, focused conversation on their cell phone

[ ] Contact the IPs and have them cordon off the market area where the shot was fired so a detailed forensics analysis can be performed

Survey Item #4

Working from OP3, you start seeing signs of suspicious activity at the insurgent building. They have posted armed guards outside the building, covered the windows, and blocked access to the area via the MSR. In the past hour, a number of people have entered the building – some known insurgents and others yet to be IDed – and no one has left. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Use your optics to scan around the building to see if any iconography, such as black/red banners or flags, have appeared that might indicate an event is impending

[ ] Working with OP2, put the areas around the building under observation in case sniper teams are being deployed

[ ] Contact the IPs to determine if any bomb-building related material has been reported stolen in the last several days

[ ] Get on the net to determine if any BOLOs match the un-IDed people that have just entered the insurgent building

[ ] Scan the market place and other habitual areas to determine if the mood of the people is indicative of impending trouble

[ ] Using your optics, particularly thermals, start scanning people around the insurgent building for biometric signs of agitation, fear, or anger

Survey Item #5

Operating out of OP2, you've been told that the insurgents may be planning to violently disrupt an upcoming meeting of local dignitaries at the mosque. The locals want the meeting to occur with a minimum of security presence to show that they have the ville under control. OP3 will be watching the insurgent building, putting anyone who leaves the building under surveillance. Your OP has responsibility for the area around the mosque and the market. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] Have the IPs cordon off the alleyway and MSR so no further vehicle traffic is allowed

[ ] Put areas by the mosque where foot traffic is naturally canalized under observation, for signs of possible IED placement

[ ] Get high resolution imagery (via GZBOSS, UAV, your own optics) for every parked vehicle that is within range of causing injury or death from explosion

[ ] Observe individuals as they walk near the mosque for biometric signs of fear or anger

[ ] Have the IPs conduct a hand search of every vehicle that has been parked near the mosque and not moved within the past several days

[ ] Observe the flow of people at the market to determine if the pattern of movement has shifted, indicating the possible appearance of an insurgent anchor point

Survey Item #6

While working at OP1, you notice a lone individual walking past the mosque and toward the IP station. He isn't looking around or saying anything to anyone, but is simply staring straight ahead, blankly. Please rate the effectiveness of the following six decision options using this five-point scale. Don't hesitate to use the entire scale in judging these choices.

5 = highly effective 4 = moderately effective 3 = neutral 2= moderately ineffective 1 = highly ineffective

[ ] He's clearly a body bomber so you would have one of your snipers take him out immediately

[Get your binos on him right away to see if there are any biometric signs of sweating or histamine flush

[ ] Call the IP station and have them evacuate the building immediately

[ ] Put thermals on him to see if his chest cavity appears “cold,” thus indicating an explosives vest

[ ] Start scanning the people around the individual to see if they are avoiding him or walking quickly in the opposite direction

[ ] Working with OP2, start scanning the people near the mosque and market to determine if there is someone watching the individual or who might be holding a cell phone

Rater: Date: Time: Team #:

TRAINING SCENARIO

Describe the scenario:

Describe the training objective:

Was the training objective achieved? .....1–2 –3–4–5

OBSERVATION POST

Describe the OP:

Viewing conditions of the OP:.....1–2 –3–4–5

1 = Very good (close-in, covers much of the ville, all optics and naked eye useful)
2 = Good (fairly close-in, good coverage of ville)
3 = Medium (moderate distance from ville, most optics useful, noticeable gaps in coverage)
4 = Poor (far away, partial coverage of ville)
5 = Very Poor (very far-away, only limited coverage of ville, little seen w/ naked eye)

PROCEDURAL EXECUTION EFFECTIVENESS

Spread-loaded optics (evenly distributed)..... 0–1–2
Sector responsibility/discipline..... 0–1–2
Distributed observer/recorder duties..... 0–1–2
Establish stable, accurate baseline 0–1–2
Use of profiler language and terminology 0–1–2
Use of cluster of clues to make PID 0–1–2

0=Disregarded, not done 1=Partially achieved 2=Completely achieved

HIGH-LEVEL BEHAVIORS

Mindset of the insurgent .....1–2 –3–4–5
Detecting basic events (HVI, vic).....1–2 –3–4–5
Interpreting complex events (ambush, kidnapping).....1–2 –3–4–5
External (TOC) communication .....1–2 –3–4–5
Internal (intra-team) communication .....1–2 –3–4–5
Tactical Patience .....1–2 –3–4–5
Anticipating Events ("left of bang") .....1–2 –3–4–5

1 = Poor 2=Weak 3=Moderate 4=Good 5=Very Good

Problems Observed (e.g., Missed events, dropped comms, failure to record)

Emergent Skills Observed (e.g., Scenario Recreation, Connecting the dots, Patience)

Six Combat Domains: Are atmospheric shifts noticed? Are geographics considered to identify anchor points and habitual areas? Are heuristics applied to interpret novel activities or events? Are proxemics exploited to identify leaders and HVIs? Are kinesics utilized to infer emotions or intent? Can biometrics be used in any capacity?

Team Effectiveness: Do certain individuals stand out as unusually important for team success? Do individuals stand out for not contributing to the team effort? Are key tasks missing or not done by the team? Are some tasks being redundantly performed by multiple team members?

Instructional Effectiveness: What techniques does the SME instructor use to help the team during the scenario? Is any one-on-one instruction given? Does the instructor take a "hands on" approach to giving feedback? Are certain trainees allowed to "fall through the cracks" and do little or nothing during the scenario? Does the instructor prompt the trainees to "dig deeper" into what's going on in the ville?

Debrief:

KEY EVENTS (e.g., spot sniper, see VBIED planted, observe IED rehearsal)

Time	Event	Comments

Rater: Date: Time: Team #:

TRAINING EVENT

Describe the event:

Describe the training objective:

Was the training objective achieved? .....1–2 –3–4–5

TERRAIN

Describe terrain:

Challenge level of the terrain:.....1–2 –3–4–5

1 = 80-100% visible spoor (e.g., soft sand)
2 = 60-80% visible spoor (e.g., sand and vegetation with some rocks)
3 = 40-60% visible spoor (e.g., rocky terrain with some track traps)
4 = 20-40% visible spoor (e.g., scree on a hillside)
5 = 0-20% visible spoor (e.g., dry leaf cover)

PROCEDURAL EXECUTION EFFECTIVENESS

Marked and recorded grid reference of the start point 0–1–2
Avoided walking on spoor, when possible..... 0–1–2
Did not overshoot last known spoor..... 0–1–2
Team kept visual contact with one another 0–1–2
Tracker never "on-point" (i.e., beyond flanks) 0–1–2
Noted LiNDATA at the start point..... 0–1–2

0=Completely disregarded 1=Somewhat achieved 2=Completely achieved

HIGH-LEVEL BEHAVIORS

Mindset of the quarry (i.e., anticipating).....1–2 –3–4–5
Tactical decision making .....1–2 –3–4–5
Read dynamics of footprint .....1–2 –3–4–5
Team communication .....1–2 –3–4–5
Team control .....1–2 –3–4–5
Team situational awareness – near beginning .....1–2 –3–4–5
Team situational awareness – near end.....1–2 –3–4–5

1 = Poor 2=Weak 3=Moderate 4=Good 5=Very Good

Problems Observed (e.g., Missed LiNDATA, Missed Action Indicators)

Emergent Skills Observed (e.g., Scenario Recreation, Connecting the dots, Patience)

Lost spoor handling: When spoor is lost what lost spoor procedures are used? What does the team do while the tracker (or others0 are conducting LSP? How long does it take to recover the spoor? Does the team mark, or stay at, the last known spoor location? How does ht team communicate during LSP? Is the team under control?

Tactical decision making: What tactics does the team use? How do they decide upon tactics? What formations are used? When silence is necessary, is the team quiet? When appropriate, does the team "process the area," looking for intel? Is the team analyzing, or just following, the spoor?

Debrief:

KEY EVENTS (e.g., lost/found spoor, update LiNDATA, find intel)

Time	Event	Comments

Date: ___/___/___ Participant Code: _____

BIOGRAPHICAL INFORMATION

Directions: Please supply basic demographic information by answering the following questions.

1. **Age:** _____

2. **Current service agency** (please circle): a. USA b. CBP c. FBI d. USMC

3. **Highest level of civilian education:** _____

4. **Military Billet/LEA Rank:** _____

5. **Length of Military/LEA Service:** _____

6. **MOS/Job Title:** _____

7. **Length of time in this MOS/position:** _____

8. **Tell us a little about the <u>most common</u> tasks you perform for your job?** _____

_____

_____

_____

9. **Tell us a little about the <u>most critical</u> tasks you perform for your job?** _____

_____

_____

_____

10. **Unit/Company:** _____

11. **Where are you currently stationed?** _____

12. **Have you been deployed to OIF/OEF?** (please circle) a. Yes b. No

If yes, can you tell how many times you were deployed to OIF/OEF? _____

If possible, can you tell us where you were stationed? _____

_____

13. **In what area(s) did spend your adolescence?** (please circle) a. Rural b. Suburban c. Large city

14. **How would you rate your expertise using <u>binoculars</u>?** (please mark one box)

None No bino experience	**Novice** Minimal exposure to bino use	**Initiate** Received introductory instruction	**Apprentice** Actively learning bino skills	**Journeyman** Uses binos under supervision	**Expert** Extensive bino experience	**Master** An elite expert, regarded as "the" expert
❑	❑	❑	❑	❑	❑	❑

15. **How would you rate your level of expertise as a <u>game hunter</u>?** (please mark one box)

None No hunting experience	**Novice** Minimal exposure to hunting	**Initiate** Received introductory instruction	**Apprentice** Actively learning hunting skills	**Journeyman** Goes hunting under supervision	**Expert** Extensive hunting experience	**Master** An elite expert, regarded as "the" expert
❑	❑	❑	❑	❑	❑	❑

16. **How many hours do you typically spend playing <u>video games per week</u>?** _____ Hours/Week

If you play video games, list games most recently played: _____

_____

_____

_____

_____

17. **How would you rate your level of expertise as an <u>actor</u>?** (please mark one box)

None No experience	**Novice** Minimal exposure	**Initiate** Received introductory instruction	**Apprentice** Actively learning acting skills	**Journeyman** Can act under supervision	**Expert** Extensive acting experience	**Master** An elite expert, regarded as "the" expert
❑	❑	❑	❑	❑	❑	❑

Date: ___/___/___ Participant Code: _____

18. **How would you rate your level of expertise with <u>role-playing games</u> (*not* on a computer), e.g., Dungeons & Dragons, Vampire the Masquerade?** (please mark one box)

None No RPG experience	**Novice** Minimal exposure to RPGs	**Initiate** Received introductory instruction	**Apprentice** Actively learning RPGs skills	**Journeyman** Can do RPGs under supervision	**Expert** Extensive RPG experience	**Master** An elite expert, regarded as "the" expert
❑	❑	❑	❑	❑	❑	❑

Scenario-based training emphasizes the role of "scenarios" in learning. In other words, it focuses on setting up *realistic* situations (or "stories") in which you can practice your skills. Scenario-based training forces you to think about all aspects of the situation, not just how to carry out your Tactics Techniques and Procedures. For instance, you might have to consider the downstream effects of engaging with an enemy or firing upon a potential criminal. Scenario-based training is also highly interactive; as you make decisions within a scenario, the scenario's situation responds accordingly. Often, when people think about scenario-based training, they consider high-fidelity simulators, but scenario-based training can be carried out through game-based training (e.g., like a training version of *Call of Duty*), or even through rock-drills and role-play.

19. **Have you had experience with scenario-based training?** (please circle) a. Yes b. No

*If yes, please describe your experience with scenario-based training?*_____

_____

_____

_____

*If yes, did you experience scenarios specific to OIF? OEF? Other? Please specify.*_____

_____

_____

_____

If yes, how would you describe these scenarios? _____

_____

_____

_____

Date: ___/___/___ Participant Code: _____

PAST TRAINING INFORMATION

Directions: Please tell us about your experience in the course subject matter by, first, reading about the course, and then answering the following questions.

ABOUT THE COURSE: The course you are about to attend will teach you how to realistically act like a character in a Middle Eastern village. For instance, you may play the role of a shopkeeper, an insurgent, or a helpful imam. While you are acting-out your scrip, fellow Soldiers, Marines, and Law Enforcement agents (who are students in another course) will be observing your actions. They will try to use their advanced observation and pattern recognition/analysis skills to identify who is acting as the friend from who is the foe. These trainees will try to spot the anomalies in the normative behavior of common areas, such as a village, to pick out irregularities and figure out who may be the insurgents.

20. **I am looking forward to playing a character in these upcoming acting exercises.** (please mark one box)

☹			😐			☺
Strongly **Disagree**	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly **Agree**
❑	❑	❑	❑	❑	❑	❑

21. **Have you attended the USMC "Combat Hunter" before?** (please circle) a. Yes b. No

If yes, <u>where</u> was the course taught? _____

If yes, <u>when</u> was the course taught? _____

If yes, what was the <u>duration</u> of the course? _____

22. **Have you attended any course that taught <u>enhanced observation</u> before?**

(please circle) a. Yes b. No

If yes, <u>where</u> was the course taught? _____

If yes, <u>when</u> was the course taught? _____

If yes, what was the <u>duration</u> of the course? _____

If yes, how <u>useful</u> was the course? _____

23. **How often do you *currently* use <u>enhanced observation</u> when working in the field?**

Never	**Rarely** less than 10% of the time	**Occasionally** about 30% of the time	**Sometimes** about 50% of the time	**Frequently** about 70% of the time	**Usually** about 90% of the time	**Every Time**
❑	❑	❑	❑	❑	❑	❑

*If you use enhanced observation, could you tell us about your <u>most recent</u> observation experience?*_____

_____

_____

_____

24. **Based upon what you know about the <u>enhanced observation</u> portion of the course, how relevant does it seem for your use in the field?** (please mark one box)

Extremely <u>NOT</u> Relevant	**NOT Relevant**	**Somewhat NOT Relevant**	**Neutral**	**Somewhat Relevant**	**Relevant**	**Extremely Relevant**
❑	❑	❑	❑	❑	❑	❑

25. **How would you rate your <u>enhanced observation</u> expertise?**

None No experience	**Novice** Minimal exposure to it	**Initiate** Received introductory instruction	**Apprentice** Actively learning these skills	**Journeyman** Does this work under supervision	**Expert** Extensive experience	**Master** An elite expert, regarded as "the" expert
❑	❑	❑	❑	❑	❑	❑

26. **Have you attended any course that taught <u>human terrain pattern recognition</u> before?**

(please circle) a. Yes b. No

*If yes, <u>where</u> was the course taught?*_____

*If yes, <u>when</u> was the course taught?*_____

*If yes, what was the <u>duration</u> of the course?*_____

*If yes, how <u>useful</u> was the course?*_____

27. **How often do you *currently* use <u>human terrain pattern recognition</u> when working in the field?**

Never	**Rarely** less than 10% of the time	**Occasionally** about 30% of the time	**Sometimes** about 50% of the time	**Frequently** about 70% of the time	**Usually** about 90% of the time	**Every Time**
❑	❑	❑	❑	❑	❑	❑

*If you use human-terrain, could you tell us about your <u>most recent</u> human-terrain experience?*_____

_____

_____

28. **Based upon what you know about the <u>human terrain pattern recognition</u> portion of the course, how relevant does it seem for your use in the field?** (please mark one box)

Extremely <u>NOT</u> Relevant	**NOT Relevant**	**Somewhat NOT Relevant**	**Neutral**	**Somewhat Relevant**	**Relevant**	**Extremely Relevant**
❑	❑	❑	❑	❑	❑	❑

29. **How would you rate your <u>human terrain pattern recognition</u> expertise?**

None No experience	**Novice** Minimal exposure to it	**Initiate** Received introductory instruction	**Apprentice** Actively learning these skills	**Journeyman** Does this work under supervision	**Expert** Extensive experience	**Master** An elite expert, regarded as "the" expert
❑	❑	❑	❑	❑	❑	❑

BORDER HUNTER QUESTIONNAIRE

Date: ___/___/___

Participant Code: _____

Directions: After you are told to begin, turn to the next page. You will be asked to first respond to a series of images. Then you will be asked to respond to a series of short-answer and essay-style questions, and finally you will be asked to complete 20 multiple-choice questions (no time limit). Complete each section in order, and do not return to a previous section once you have completed it. If you have questions or are not sure what a word means, you may ask the researcher (however, he/she may not answer all questions!).

Note: This survey is an assessment of the Border Hunter course instruction. It is not a measure of your personal performance, and your score will not be associated with your personal file.

QUESTIONNAIRE (PART 1)

1. **Look at the footprints below.** What information would you include about these prints in a SITREP? What might be happening, based upon the tracks? Also, how many people are walking together, and how can you tell? Use your Combat Tracking vocabulary. Think about what information might be mission relevant. You may draw on the image, but make sure you also write the words you would communicate! (*There is space to answer on the next page.*)

(From previous page)

1a. What information would you include about these prints in a SITREP?

1b. What might be happening, based upon the tracks?

1c. How many people are walking together, and how can you tell?

2. **Look at the footprints below.** What information would you include about these prints in a SITREP? What might be happening, based upon the tracks? Describe the scene. Use your Combat Tracking vocabulary. Think about what information might be mission relevant. You may draw on the image, but make sure you also write the words you would communicate! (*There is space to answer on the next page.*)

(From previous page)

2a. What information would you include about these prints in a SITREP?

2b. What might be happening, based upon the tracks?

3. **From an operational perspective how would you describe this scene?** Use your Combat Profiling vocabulary. Think about what information might be mission relevant. You may draw on the image, but make sure you also write the words you would communicate!

4. **From an operational perspective how would you describe this scene?** Use your Combat Profiling vocabulary. Think about what information might be mission relevant. You may draw on the image, but make sure you also write the words you would communicate!

QUESTIONNAIRE (PART 2)

Directions: Answer the following short-answer and essay items to the best of your ability. You may not return to the previous section.

1. (Short answer) When is the worst time of day to conduct tracking operations? Why?

2. (Short answer) For Combat Profiling, what is an "ideology"?

3. (Short answer) Give two examples of kinesics as it is used in Combat Profiling.

4. (Short answer) What does the five-man tracking team formation look like?

5. (Short answer) What are two ways to determine the age of a track?

6. (Short answer) In Combat Profiling, what does *Baseline + Anomaly = Decision* mean?

7. (Short answer) Name two (of the five) Combat Multipliers from Combat Profiling.

8. (Short answer) What are two ways to effectively obscure your tracks?

1. (Longer answer) How can you determine, from tracks, whether someone was carrying a load?

2. (Longer answer) What are the components of the Combat Tracking "LiNDATA"?

3. (Longer answer) What does "urban masking" mean, and what are <u>two</u> examples of it?

4. (Longer answer) How can you tell if someone is really smiling (or just faking a smile)?

QUESTIONNAIRE (PART 3)

Directions: Circle the best (single) answer for each multiple choice question. There is only one correct answer for each question. You may not return to the previous section.

1. Which of the following is **not** an established Lost Spoor Procedure?

a) Wedge
b) Three Sixty
c) Box Search
d) Likely Lines
e) Expanding Corner Search

2. What is "focus lock"?

a) It is the mental obsession a person gets when he is trying to solve a problem.
b) It is the "tunnel vision" that occurs under stress.
c) It is when a person stops thinking because they are fatigued.
d) It is when a person cannot think clearly; when his/her focus is blocked.
e) It is the moment just before a squad/team decides to act on a target.

3. Which of the following is an example of the "geographics" domain of Combat Profiling?

a) A private conversation on a cell phone in a crowded marketplace
b) Strangers crossing paths at a busy train station
c) A yearly parade in a small town
d) A street corner where criminals routinely gather
e) Flared nostrils

4. Which of the following is a Flank Tracker task?

a) Protect the Tracker and Team Leader from ambush
b) Operate the GPS
c) Provide rear protection
d) Physically look for and closely follow a set of tracks
e) Determine the movements and formations of the team

5. In tracking, what is a "terminal point"?

a) The end of a track line
b) The conclusion of a follow-up
c) The last place of the foot to leave the ground
d) The heal of a boot print
e) The toe-end of a boot print

6. Which of the following is an example of the “biometrics” domain of Combat Profiling?

a) When someone sweats because he/she is nervous
b) When insurgents “hide in plain sight”
c) When one person’s body language is mimicked by others
d) Gang graffiti in an alleyway
e) The typical look, sounds, and smells of a place

7. What is “tactical patience”?

a) Taking multiple steps to execute a coordinated plan
b) Creating a shared understanding among distributed team members
c) Waiting to react until the enemy moves first
d) Concentrating on potential bad guys and good guys, while ignoring the neutrals
e) Avoidance of a short-term gains in lieu of a better, long-term reward

8. Which of the following is a legitimate anti-tracking procedure?

a) Move so quickly that the tracker will never have an opportunity to close the time/distance gap
b) Remove your shoes, so that your bare footprints blend in with the natural environment
c) Walk backwards, so that the trackers mistake the direction of movement
d) Drag a large branch or leaf (like a palm frawn) behind you
e) Scoot or shuffle your feet to disguise the outline of your prints

9. What is “geometry of fires”?

a) Clusters of cues creating a specific storyline
b) Having multiple units triangulate on an area for maximum firepower
c) Using multiple skills to kill, capture, or contact the enemy
d) Having one or two other team members provide over-watch of your location
e) Viewing a sequence of events and creating a unified story

10. In Combat Tracking, what is an action indicator?

a) The point on the ground where a tracking team commences following the track line
b) A hand-signal from the Team Leader to perform a certain action (e.g., halt, employ binoculars)
c) Marks on the ground that indicate a quarry is moving, that the tracks are “hot”
d) Marks on the ground indicating that a certain identifiable action has taken place
e) The features of a footprint, such as the foot roll and heal strike

11. What is a “prototypical match”?

a) The known, the unknown, and comparison of the two
b) A categorical match, when your brain says “close enough”
c) When you do something automatically without thinking about it
d) Images that show up on the edges of your vision
e) When you look for a specific person or thing, like a BOLO (“Be On the LookOut for…”)

12. In Combat Tracking, what is “stride”?

a) The rhythm and balance of a track line
b) Amount of time the foot is on the ground in the same spot
c) Distance between the inside edge of the left foot to the inside of the right foot
d) The angle the foot pitches out from the line of travel
e) Distance from one heel to the other heel

13. What is “channel capacity”?

a) The limit of how many things a person can pay attention to
b) Sharp, focused vision, about the size of a quarter at arm’s length
c) All of the visual information your eye perceives at a given time
d) When objects form a pattern
e) The physiological response that occurs when a person becomes stressed

14. Which of the following is true about mesopic vision?

a) It is the clearest kind of vision
b) It is another name for “night vision”
c) It happens when you can’t fully see something and your brain fills in the details
d) It occurs when the sunlight is bright, causing colors to appear very vivid
e) It is a combination of night and day vision, like at dusk

15. What is “spoor”?

a) The interpretation and analysis of footprints
b) A set of tracks laid upon the ground and visible to a tracker
c) Tracks or other evidence, left on the ground that are indisputably left by the quarry
d) A point on the ground where the fugitive group splits up into more than one distinct group
e) The established, natural state of the ground unaffected by any tracks or sign

16. Which of the following is true about the limbic system?

a) It is the white part of your eye
b) It takes over during fight/flight/freeze events, forcing you to make quick decisions
c) It is the system in your eye that allows you to interpret color
d) It is the “thinking center” of your brain, which makes careful decisions
e) It is the part of your brain that interprets vision

17. Which of the following is an example of “visual fill”?

a) In low-light conditions, your eye can make out shapes but cannot see color very well
b) When you look at other people, your central vision becomes focused on their face
c) When you glance at something, your brain fills in the details of what you expect to see
d) On a sunny day, colors look rich and full; grass seems greener and the sky seems bluer
e) In a chaotic marketplace there are too many people to watch, your vision becomes “full”

18. In tracking, what is “shine”?

a) Liquid sign, like a wet footprint that reflects the light
b) Bruised or broken vegetation
c) Tracks or other evidence, left on the ground that are indisputably left by the quarry
d) A type of track left behind by the flattening of vegetation or another surface, leaving behind no print
e) A set of prints or “sign” left on the ground

19. Which of the following might be a “track trap”?

a) An orchard that is fenced-in on all four sides
b) An open plain with spongy, green grass
c) A small dry creek bed that cuts a small gash into a dusty plain
d) A pine-needle covered forest floor
e) A hard, rocky hillside covered with many large boulders

20. Which of the following is **not** a rule of tracking?

a) Never overshoot your last known spoor
b) The tracker sets the pace of the follow-up
c) Always know exactly where you are on the map and GPS
d) Never run on the track line
e) Never “force” a track to conform to your own preconceptions

BORDER HUNTER QUESTIONNAIRE

Date: ___/___/___

Participant Code: _____

Directions: After you are told to begin, turn to the next page. You will be asked to first respond to a series of images. Then you will be asked to respond to a series of short-answer and essay-style questions, and finally you will be asked to complete 20 multiple-choice questions (no time limit). Complete each section in order, and do not return to a previous section once you have completed it. If you have questions or are not sure what a word means, you may ask the researcher (however, he/she may not answer all questions!).

Note: This survey is an assessment of the Border Hunter course instruction. It is not a measure of your personal performance, and your score will not be associated with your personal file.

QUESTIONNAIRE (PART 1)

1. **Look at the footprints below.** What information would you include about these prints in a SITREP? What might be happening, based upon the tracks? Also, who is carrying a load, and how can you tell? Use your Combat Tracking vocabulary. Think about what information might be mission relevant. You may draw on the image, but make sure you also write the words you would communicate! (*There is space to answer on the next page.*)

(From previous page)

1a. What information would you include about these prints in a SITREP?

1b. What might be happening, based upon the tracks?

1c. Who is carrying a load, and how can you tell?

2. **Look at the footprints below.** What information would you include about these prints in a SITREP? What might be happening, based upon the tracks? Describe the scene. Use your Combat Tracking vocabulary. Think about what information might be mission relevant. You may draw on the image, but make sure you also write the words you would communicate! (*There is space to answer on the next page.*)

(From previous page)

2a. What information would you include about these prints in a SITREP?

2b. What might be happening, based upon the tracks?

3. **From an operational perspective how would you describe this scene?** Use your Combat Profiling vocabulary. Think about what information might be mission relevant. You may draw on the image, but make sure you also write the words you would communicate!

4. **From an operational perspective how would you describe this scene?** Use your Combat Profiling vocabulary. Think about what information might be mission relevant. You may draw on the image, but make sure you also write the words you would communicate!

QUESTIONNAIRE (PART 2)

Directions: Answer the following short-answer and essay items to the best of your ability. You may not return to the previous section.

1. (Short answer) From Combat Tracking, give two examples of the dynamics of a footprint.

2. (Short answer) From Combat Profiling, what is a "habitual area"?

3. (Short answer) Give two examples of biometrics as it is used in Combat Profiling.

4. (Short answer) What is best angle of the sun for Combat Tracking?

5. (Short answer) How can you estimate a person's height from his/her footprint?

6. (Short answer) In addition to supporting night vision, give two other examples of how thermal optics can be used to assist Combat Profiling.

7. (Short answer) Ideally, how many vehicle stops or check-point "pat downs" should someone perform before he/she is switched out with a fresh Soldier/Law Enforcement Agent? Why?

8. (Short answer) Name two established Lost Spoor Procedures.

1. (Longer answer) How can you determine, from tracks, whether someone was moving at a fast run?

2. (Longer answer) For groups of 12-15people, how can you determine, from their tracks, the number of people walking together?

3. (Longer answer) What is the Seven-Step Terrorist Planning Cycle, and what are the seven steps?

4. (Longer answer) If a man was wearing a suicide bomber vest and planning to detonate it in a busy marketplace, what Combat Profiling indicators might he give off?

QUESTIONNAIRE (PART 3)

Directions: Circle the best (single) answer for each multiple choice question. There is only one correct answer for each question. You may not return to the previous section.

1. Which of the following is an example of ground spoor?

a) Broken twigs on bushes
b) Spit and phlegm
c) Discarded articles or equipment
d) Cigarette smoke
e) Uniform tread patterns

2. What is "central vision"?

a) The key subject matter of a scene
b) Sharp vision from your fovea, about the size of a quarter at arm's length
c) The way your eye fills-in detail when you look quickly at a scene
d) The vision processed by your Prefrontal Cortex
e) A mental, categorical match to something you see, when your brain says "close enough"

3. Which of the following is an example of the "heuristics" domain of Combat Profiling?

a) You see a well worth path between two buildings and realize this must be a common pathway.
b) You discuss a business arrangement with a man. He smiles and agrees to your conditions, but his smile is symmetrical and his face is not creased. You think he might not be entirely trustworthy.
c) You see two children playing with a small dog, so you assume the dog is a stray.
d) You see a car pulled over on the side of the road with its hood up. A man is walking away from the car, frustrated and talking on his phone, so you assume his vehicle is broken down.
e) Two people are walking toward you. They are pressed close to one another, so you assume they must be good friends.

4. Which of the following is a Tracker task?

a) Advise the Team Leader of any developing tactical variances he/she can read from the spoor
b) Assist in reconnaissance tasks
c) Operate the GPS and maintain the team's location on a map
d) Control the follow-up and all tactical movement decisions
e) Provide the "institutional memory" for the tracking team

5. Which of the following is **not** an example of aerial spoor?

a) Turned over leaves showing lighter side
b) Dew knocked off vegetation (early morning)
c) Animal or bird alarms or disturbances
d) Crushed or bruised leaves, plants and twigs
e) Vegetation "out of balance" with surrounding vegetation

6. Which of the following is an example of the “atmospherics” domain of Combat Profiling?

a) Bullet holes and “rubbling” in an alleyway
b) Two people walking closely together with their heads bent together in a private conversation
c) Pupil dilation that occurs when someone sees an item of interest
d) The “aura” around a person who is giving off a certain emotion, like anger or frustration
e) Profuse sweating, reddening or flushing of the face

7. What is “tactical cunning”?

a) The use of over-watch while executing Combat Profiling operations
b) The use of interconnecting fields of fire
c) Controlling the pace of events and contact
d) Being able to see and interpret your surroundings
e) The art of learning to “think like the enemy”

8. What is back-tracking?

a) Following a track line from its end to its beginning, in order to gather intelligence
b) A Lost Spoor Procedure, used if you overshoot the Last Known Spoor
c) A Lost Spoor Procedure, led by the Rear Security tracking team member
d) A tactic where two tracking teams are used to box-in a quarry
e) A tactic where azimuths and circumstantial intel are used to estimate the quarry’s end goal

9. Which of the following is true about the concept of “memory/emotion link”?

a) Dopamine is released when you become emotional
b) You can create very vivid memories by giving them emotional significance
c) When you become overly emotional, your memory becomes fuzzy
d) Your brain is likely to create physiological illusions when you become stressed
e) The link is a cognitive illusion, which you can only overcome through focused concentration

10. In Combat Tracking, what is the hand signal for Lost Spoor?

a) Raising your arm straight up and making a fist
b) Holding both arms out at 90 degrees (like a “T”)
c) Holding your hand loosely, palm down (as if you were slowly dribbling a basket ball)
d) Holding your hand loosely, palm up (as if you were holding a soft ball)
e) Holding your arm up, with your fingers pressed together flat, and making a circle with your hand

11. In Combat Profiling, what is a “Guardian Angel”?

a) The back-up Team Leader, who acts as a “sounding board” for the actual Team Leader
b) Team members providing over-watch from a covert, ambush-ready location
c) An expert Combat Profiler who is embedded with each small unit team
d) A team leader who makes sure his personnel maintain appropriate situational awareness
e) A team member with a duplicate role to another teammate, who steps in when fatigue sets in

12. In Combat Tracking, what is “dwell time”?

a) The time when a quarry stops moving but the tracking team continues pursuit
b) The amount of time a quarry is actively on the move
c) The amount of time a quarry stops to rest at a given location
d) The weight of a person’s body, through the foot, putting pressure onto the ground
e) The amount of time a foot is on the ground in the same spot

13. What are “Cooper’s Color Codes”?

a) They reflect different levels of awareness, e.g., white is completely unaware, orange is “ready”
b) They reflect the common meanings of colors across cultures, e.g., black represents death or murder
c) They reflect different levels of activity, e.g., a crowded marketplace would be white
d) They reflect the meanings of colors within the Middle East, e.g., red is the color of sacrifice
e) They reflect different categories of combatants, e.g., enemies are red, friendlies are blue

14. Which of the following is true about scotopic vision?

a) It is not sharply focused, but it picks up the colors of a scene
b) It is a person’s peripheral vision, which includes a person’s entire field of view
c) It is the clearest form of vision, where shapes and colors are most vivid
d) It is another word for “day vision”
e) It is another word for “night vision”

15. In Combat Tracking, what is a “quarry”?

a) It is the leader of the group being tracked
b) It is an alternative word for the “fugitive,” “target,” or “the pursued”
c) It is an alternative word for the track line or spoor
d) It is used to signify that multiple people are being pursued
e) It is used to signify that a vehicle (of any kind) is being pursued

16. Which of the following is true about the dopamine?

a) It is a steroid released in your body when your heart-rate becomes elevated
b) It is a chemical released in your brain, providing feelings of enjoyment and reinforcement
c) It is a steroid released in your brain when you become highly emotional
d) It is a chemical released in your brain, enabled very focused concentration
e) It is a chemical released in your nervous system, creating a sleepy feeling

17. Which of the following best describes “automaticity”?

a) Your brain fills-in details that your eye cannot see
b) Understanding of an overall scene, gained from small amounts of information
c) Automatic response patterns, such as driving a car or riding a bicycle
d) Using heuristics or “tactical short-cuts” to establish a baseline
e) A physiological (i.e., eye-based) illusion that causes a cognitive (i.e., brain-based) illusion

18. Which is an example of “counter tracking”?

a) Using camouflage and concealment to hide your visual outline
b) Pulling livestock behind you, so that they obscure your footprints
c) Using soft foot coverings to disguise the shape of a footprint
d) Emplacing a booby-trap (e.g., IED) on a path, to harm the trackers in pursuit
e) Employing a secondary tracking team to “leap frog” ahead of the quarry

19. In tracking, what is a Vibram?

a) A linear boot-print pattern
b) A spiral pattern found on Panama boots
c) A hardy work boot
d) A worn sole that creates a distinct print pattern
e) An anti-tracking boot

20. Which of the following is **not** a rule of tracking?

a) Mark and record the grid reference of the start point
b) Always try and anticipate what your quarry will do
c) Correctly identify the tracks you wish to follow
d) When possible, avoid night tracking operations
e) Record the grid reference of the Initial Commencement Point

BORDER HUNTER QUESTIONNAIRE

Date: ___/___/___

Participant Code: _____

Directions: After you are told to begin, turn to the next page. You will be asked to first respond to a series of images. Then you will be asked to respond to a series of short-answer and essay-style questions, and finally you will be asked to complete 20 multiple-choice questions (no time limit). Complete each section in order, and do not return to a previous section once you have completed it. If you have questions or are not sure what a word means, you may ask the researcher (however, he/she may not answer all questions!).

Note: This survey is an assessment of the Border Hunter course instruction. It is not a measure of your personal performance, and your score will not be associated with your personal file.

QUESTIONNAIRE (PART 1)

1. **Look at the footprints below.** What information would you include about these prints in a SITREP? What might be happening, based upon the tracks? Also, what might be the age and gender of the quarry who made these tracks, and how can you tell? Use your Combat Tracking vocabulary. Think about what information might be mission relevant. You may draw on the image, but make sure you also write the words you would communicate! (*There is space to answer on the next page.*)

(From previous page)

1a. What information would you include about these prints in a SITREP?

1b. What might be happening, based upon the tracks?

1c. What might be the age and gender of the quarry who made these tracks, and how can you tell?

2. **Look at the footprints below.** What information would you include about these prints in a SITREP? What might be happening, based upon the tracks? Describe the scene. Use your Combat Tracking vocabulary. Think about what information might be mission relevant. You may draw on the image, but make sure you also write the words you would communicate! (*There is space to answer on the next page.*)

(From previous page)

2a. What information would you include about these prints in a SITREP?

2b. What might be happening, based upon the tracks?

1. **From an operational perspective how would you describe this scene?** Use your Combat Profiling vocabulary. Think about what information might be mission relevant. You may draw on the image, but make sure you also write the words you would communicate!

2. **From an operational perspective how would you describe this scene?** Use your Combat Profiling vocabulary. Think about what information might be mission relevant. You may draw on the image, but make sure you also write the words you would communicate!

QUESTIONNAIRE (PART 2)

Directions: Answer the following short-answer and essay items to the best of your ability. You may not return to the previous section.

1. (Short answer) From Combat Tracking, list two factors that affect which team formation is used.

2. (Short answer) In Combat Profiling, what is an “anchor point”?

3. (Short answer) Give two examples of atmospherics as they are used in Combat Profiling.

4. (Short answer) What is best angle of the sun for Combat Tracking?

5. (Short answer) List two visual factors that make things visible (i.e., the opposite of camouflage).

6. (Short answer) What is the difference between a “soft target” and a “hard target”?

7. (Short answer) In Combat Profiling, what is a “target reference point”?

8. (Short answer) What is the difference between anti-tracking and counter-tracking?

1. (Longer answer) What is the purpose of back-tracking? Give two examples of how it might be used.

2. (Longer answer) If you are tracking a group of more than 15 people, how can you estimate how many people are traveling together?

3. (Longer answer) In the Islamic culture, what is the significance of the colors black, white, red, green, and yellow?

4. (Longer answer) If an IED were placed as an ambush along a road, what Combat Profiling indicators might signify the presence of the explosive?

QUESTIONNAIRE (PART 3)

Directions: Circle the best (single) answer for each multiple choice question. There is only one correct answer for each question. You may not return to the previous section.

1. In Combat Tracking, what is the Time/Distance Gap?

a) The amount of time it takes for the track line to disappear beyond the Tracker's field of vision
b) The degradation of the track line that occurs naturally over time
c) The time lost when the quarry stops to rest
d) The principle that the faster the tracking team moves, the less controlled they become
e) The distance the fugitives move between the time of the incident and the beginning of the follow-up

2. What is "peripheral vision"?

a) A color-rich form of vision that uses optical "cone" cells
b) The non-central vision around the edges of a person's visual field
c) Another name for "tunnel vision"
d) A color-rich form of vision that uses optical "rod" cells
e) The edges of vision, which are unable to observe movement or gradations of shadow

3. Which of the following is an example of the "proxemics" domain of Combat Profiling?

a) Observable physiological cues that are most apparent when in close proximity to the target
b) The proximity of houses to certain habitual points that indicates neighborhood affiliations
c) When a leader displays a certain body language, those close to him are likely to mimic it
d) How close people stand to one another can indicate how friendly they are with one another
e) Learning to think like the enemy, getting into the "mind of the quarry"

4. What is a Combat Tracking team?

a) A five-man team consisting of a Tracker, Team Leader, two Flank Trackers, and Rear Security
b) A three-man team consisting of a Tracker, and forward and rear spotters
c) A point-team, leading a multi-squad tracking crew
d) A five-to-eight man squad moving in a T-formation
e) A platoon with three tracking squads

5. In tracking, what is a "primary impact point"?

a) The heal of a boot-print
b) The last part of the foot to strike the ground
c) The first part of the foot to strike the ground
d) The toe of a boot-print
e) The initial commencement point of a follow-up

6. Which of the following is an example of the “kinesics” domain of Combat Profiling?

a) When a person crosses his arms, it might indicate that he is forming a social barrier
b) If a person is nervous, he will sweat and become flushed
c) A pathway will form through commonly traveled areas
d) A “tactical shortcut” is used to make quick decisions
e) The closer an individual is to you, the better chance he can harm you

7. What is “Combat Rule of 3’s” from Combat Profiling?

a) The most dangerous times of day are dawn, dusk, and nightfall
b) Emotional, cognitive, and physiological indicators must all be considered
c) When you become stressed, you can only focus on three things at a time
d) One person should always have one Guardian Angel and one Good Shepherd
e) If you observe three anomalies, they should be used as an indicator for action

8. In Combat Tracking, what is contamination?

a) Tracks or other disturbances made by anyone other than the quarry that obscures the quarry’s spoor
b) The effects of weather, animals, and other natural elements on ground spoor
c) The continuous line of observable clues (indicators)
d) A point on the ground where the fugitive group splits up into more than one distinct group
e) The site of an incident, where the follow-up commences

9. What is “Fight/Flight/Freeze”?

a) The biological reaction to lying, where your brain “tries to tell the truth”
b) The biological response that occurs under great stress
c) The physiological reaction to a positive emotional event
d) The three options you have after you decide to take action on an observed target
e) The three actions of Combat Profiling, i.e., the Combat Profiling Rule of 3’s

10. In Combat Tracking, what is a box search?

a) A Lost Spoor Procedure, where the Flank Trackers cross and trade positions
b) A square (or rectangular) formation, used in areas without thick vegetation
c) A Lost Spoor Procedure where the Tracker systematically moves around the area, in a square
d) A systematic search for tracks around natural lines that surround a specific area
e) An eight-man tracking team formation, which uses front and rear Flank Trackers

11. In Combat Profiling, what is a “Good Shepherd”?

a) A leader who uses Combat Profiling in the operational theater
b) A mentor or leader who is focused on protecting his “flock” (i.e., the neutral civilians)
c) An Imam or Sheik who is friendly to the Allied Forces
d) A leader who holds power through the admiration of his followers
e) A terrorist who attempts to harm the population through deceit

12. In Combat Tracking, what is “pitch”?

a) An action indicator that suggests a person is running or sprinting
b) The weight of the body, through the foot, putting pressure onto the ground
c) The distance from one heel to the other heel
d) The distance between the inside edge of the left foot to the inside of the right foot
e) The angle a foot “pitches out” from the line of travel

13. In Combat Profiling, what is “sequencing”?

a) A cognitive illusion that occurs when a pattern develops and your brain expects it to continue
b) The art of observing an event, deciding it is an anomaly, and then making a decision
c) The escalation of contacting, capturing, and killing the enemy
d) The order of events in a scene that creates a heuristic (or “tactical shortcut”)
e) A Combat Profiling Multiplier, focusing on how distributed teams can over-watch each other

14. Which of the following is true about photopic vision?

a) It is a low-light form of vision, neither day vision nor night vision
b) It is a color-blind form of vision, most prevalent at dawn and dusk
c) It is most sensitive to blue-green colors
d) It is produced exclusively through rod cells, which are most sensitive to shape and movement
e) It is the vision of the eye under well-lit conditions

15. In Combat Tracking, what is a “follow-up”?

a) The strategic debrief that follows a (successful or unsuccessful) tracking operation
b) The active or passive pursuit of a quarry
c) A quick scan that the Tracker conducts immediately upon loosing the spoor
d) The primary job of the Team Leader, who confirms the track line identified by the Tracker
e) Seeking confirmatory evidence after aerial spoor is identified

16. Which of the following is true about the fovea?

a) It is the “white part” of the eye
b) It is a small pit in the eye that enables sharp, focused vision
c) It is the entire eye, which includes central and peripheral vision
d) It only becomes active in low-light conditions
e) It is a large complex of nerves that comprises the iris and enables color vision

17. What is “change blindness”?

a) A cognitive illusion that occurs due to the limitations of visual short-term memory
b) A cognitive illusion that occurs under high stress, when the mind denies what the eye sees
c) A phenomenon that occurs when a person viewing a scene fails to detect large changes in it
d) The shedding of extraneous visual information out of sensory memory
e) A cognitive illusion where vague and random images are perceived as significant

18. In tracking, what is “ghost spoor”?

a) Very subtle aerial spoor, such as broken cobwebs
b) Any non-visible spoor, like the smell of cigarette smoke or chirping of insets
c) Ground spoor that does not include clearly identifiable footprints
d) When you lose the track, and then start to imagine signs of spoor when none are truly present
e) Flatten vegetation or ground surfaces that “shine” because they has been smoothed down

19. In Combat Tracking, what are lugs and grippers?

a) Track traps around ground depressions or vegetation outcroppings
b) Ground impressions left by the quarry, other than their footprints
c) The raised tread pattern often found on work boots
d) Vegetation that is likely to capture transfer evidence of the quarry
e) Two different ways of walking: heal-to-toe movement versus toe-to-heal movement

20. Which of the following is **not** a rule of tracking?

a) Always try to anticipate what your quarry will do
b) Always know exactly where you are
c) Avoid walking on top of ground spoor
d) Always report KOCCOA to the Team Leader
e) Always keep in visual contact with other team members

Participant ID: _____ Team Number: _____

OVERALL BORDER HUNTER COURSE REACTIONS

Directions: Now that you have completed the full 20-day Border Hunter course and had time to reflect on the training, let us know what you thought of it. Please provide honest feedback about the experience.

1. Looking back at the **Combat Tracking** portion of the course, in retrospect, how would you rate it?

Extremely Poor	Poor	Slightly Poor	Neutral	Slightly Good	Good	Extremely Good
❑	❑	❑	❑	❑	❑	❑

2. Looking back at the **Combat Profiling** portion of the course, in retrospect, how would you rate it?

Extremely Poor	Poor	Slightly Poor	Neutral	Slightly Good	Good	Extremely Good
❑	❑	❑	❑	❑	❑	❑

Reflect on the course. Then mark one box per item, indicating whether you agree or disagree with the statement:	Strongly Disagree ☹	Disagree	Somewhat Disagree	Neutral 😐	Somewhat Agree	Agree	Strongly Agree ☺
3. I think the instruction was **useful**. I can use it in my job (at least in the field).	❑	❑	❑	❑	❑	❑	❑
4. I **enjoyed** the instruction.	❑	❑	❑	❑	❑	❑	❑
5. The **instructional materials** (e.g., slides, handouts) were good.	❑	❑	❑	❑	❑	❑	❑
6. Since April, I **have used** some of the training in some aspect of my job.	❑	❑	❑	❑	❑	❑	❑
7. Since April, I have **taught one or more of my teammates** some the material.	❑	❑	❑	❑	❑	❑	❑

14. In retrospect, do you think attending the course was a good use of your time? Why or why not? _____

_____

_____

_____

_____

_____

15. In retrospect, as a supervisor/commander, if you could enroll your personnel in a 20-day Border Hunter course, would you do so? Why? _____

16. In retrospect, what was the most useful lesson you learned during Border Hunter? _____

17. In retrospect, if you could make one improvement to Border Hunter, what would you change? Why? _____

If you have additional comments for the researchers, instructors, or course organizers, please use the back of this page!