Scientific
Research

Personnel Security outside the Box

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This study describes the theoretical and methodological bases of research of psycho-semantic spheres of the psyche of Dari speaking Afghani military personnel. 812 military personnel including 50 intelligence officers were subjected to two types of tests. The first questioner type investigation was the task where the individual was to provide some classification about a topic. The response was a judgment of similarity and/or other association. The second test was a subliminal probing, where the individual had no idea of topics being tested and was acting in a game like environment. The test measured the subject's response time to words or images (semantic stimuli) targeting the unconscious mind. A non-invasive, non-intrusive unconscious probing provided results which were highly corroborated by eight senior Military Intelligence officers' ratings. The questioner type test exposed a number of strategies of evading testing procedures overwhelmingly used by tested personnel, even by those who were cleared by subliminal probing and expert opinion. In addition to discussion of the probabilities of false positives and false negative responses; assessment of one's mental agility or ability to react and learn under stress; general psychological makeup of the population tested is discussed. We established that anyone can take a psycho-semantic unconscious probing test even illiterate people of any race, language or culture. A Semantic Stimuli Response Measurement (SSRM Tek.) test allows for large-scale screening operations to identify unknown threats to national security while serving as a deterrent to undesirable or illegal behaviours and helps to set high standards in personal conduct. Key words: security, military, personnel, unconscious, semantic, stress.

Keywords: Security; Military; Personnel; Unconscious; Semantic; Stress

Introduction

Human beings are frequently the "weakest link" in mitigating threats to national security and commercial industries. People can be manipulated to conduct espionage against their sworn nation, conduct sabotage operations against a government or commercial facility and even inflict mass casualties as a suicide bomber or carrier of a pathogenic biological agent. People are frequently influenced by harmful negative factors such as drugs, alcohol, and traumatic events which radically affect their performance and reliability.

In March of 2008, NATO and the Afghan Government signed an intelligence sharing agreement designed to facilitate joint military operations involving the Afghan National Army (ANA) and Coalition Forces. The Afghan Ministry of Defence subsequently issued a declaration (i.e., military order) that all military personnel must submit to a background investigation.

Unlike Western or developed countries, 30+ years of war have completely destroyed all remnants of the professional Afghan Army, to include its laws, policies, and procedures. Illiteracy is approximately 80% across the country and most new recruits don't know their actual birthday and many simply have one name—Abdul, son of Faisal. There are no financial records to speak of, no electronic connectivity in which to facilitate efficient and secure investigations and a society plagued with corruption issues that presently define this nation. Most Afghan citizens see themselves as being from a tribe as opposed to a nation. The Afghan National Army is working hard to integrate the various tribes into this national structure. Afghanistan is looking for a Personnel Security Program that pro-

vides standards across all organizations and effectively identifies issues such as Anti-Government Activities, Espionage, Corruption, and Drug/Alcohol Abuse. The psycho-semantic approach of testing using unconscious response measurement was chosen as the best fitting test in the Afghani environment and provides testing in the local Dari language; does not require any prior information about the subject tested; none or minimal familiarization with computers is required by the subject tested. Results of the testing cannot be affected by the subject tested or operator and immediate results are provided.

The mission of this study was to choose and test technologies capable of conducting investigation to determine the trustworthiness and suitability of literate and illiterate members of the Afghan Ministry of Defense (MoD) being the basis for granting Afghan MoD security clearances up to a top secret level.

Emerging and current technologies attempting to "detect" performance and reliability issues are as follows:

Polygraph Recordings of Human Vital Signs Assessed by a Polygraph Expert. This Approach Is Currently Widely in Use

The polygraph is commonly referred to as a lie detector, but it does not recognize lies. A specific physiological lie response has never been demonstrated and is unlikely to exist (NRC, 2003). The responses it measures are not unique to deception nor are they always provoked by it. The aim of the polygraph examiner is to establish a psychological set in the examinee that

will increase the likelihood that any observed arousal to specific questions is the result of deceptive responses (Kleiner, 2002; Grubin, 2010; Senter et al., 2010).

Use of polygraph examination in criminal investigations, employee screening and security vetting where the emphasis is on whether or not the individual has passed the test is an area of much controversy (NRC, 2003). In the event-related investigation polygraph performed well above chance level, an unacceptable level of false positive results during the screening, precluding its usage in employment and pre employment screening procedures (NRC, 2003). Confessions or disclosure of the individual as the result of either possibility or being a subject of polygraph testing is considered the highest proof of polygraph validity and reliability by the polygraph examiner and the polygraph community at large. Such a situation does not address the effect of Bogus Pipeline. The effect of Bogus Pipeline is the expectation that subjects will answer more honestly if they believe that the truth can be tested for accuracy even in the absence of such a test. Since 1971, when Jones and Sigall described a new paradigm for measuring affect and attitude and named it "The Bogus Pipeline" attempts to quantify its effect were undertaken. Damphousse et al. (2007) reported that in the study, where subjects were informed that their answers would be analysed by a lie detector, only 14% lied about recent drug use compared to 40% in the study where no lie detector was used or mentioned. Both studies participants were the subjects of urinary drug testing. It is important to point out that the remarkable outcome is the effect of informing the subjects about the use of a lie detector only. Whether the lie detector actually does anything or is even physically present is irrelevant. Telling the subjects that a lie detector will be used, but without actually using one, will have the same effect as long as the subjects believe that a lie detector is used. Future scientific validation of the basic principles of polygraph testing cannot be considered without factoring in the Bogus Pipeline effects of such testing.

Voice Stress Analysers That Are Also Currently in Use

What are the basic principles upon which voice stress analysers are claimed to be based and have these principals been verified in scientific studies? Voice stress analysers are based on the premise that there are tiny frequency modulations in the human voice called microtremors. When a test subject is lying, the automatic, or involuntary nervous system causes an inaudible increase in the microtremor's frequency. In 1970 Olaf Lippold discovered the muscle microtremor (Lippold, 1970, 1971). Lippold found that voluntary muscles in the arm generate a physiological tremor or micro-vibration at about 10 Hz when the subject is relaxed. When the subject is aroused or stimulated, the microtremor tends to disappear. There is no evidence in scientific literature that anyone has uncovered a microtremor in the throat and larynx muscles involved in voice production. Eriksson and Lacerda (2007) and Damphousse et al. (2007) summarised well the validity and reliability in the voice stress analysers field as follows: review of scientific studies shows that these machines perform at chance level when tested for reliability. Given such results and the absence of scientific support for the underlying principles, it is reasonable to view the use of these approaches as unjustified either for event related investigation, employment or pre employment screening.

Eye Movement Tracking to Identify Familiar/Unfamiliar Faces, Objects and Scenes

It is an emerging technology, though eye movement tracking by itself is a well technically developed field and is used in many areas of cognitive science. A pioneer in the field of study of eye movements, Yarbus (1967) wrote about the relationship between fixations and interest: The cyclical pattern in the examination of pictures "is dependent not only on what is shown on the picture but also on the problem facing the observer and the information that he hopes to gain from the picture".

Presently, we still cannot infer specific cognitive processes directly from a fixation on a particular object in a scene. For instance, a fixation on a face in a picture may indicate recognition, liking, dislike, puzzlement etc. Therefore, eye tracking would require to be coupled with other methodologies to address the meaning of the different pattern of fixation for the different pictures offered to the subject.

Thermal Facial Tracking, an Emerging Technology, Allows for a Wide Variety of Non Invasive Measurements: Respiration, Temperature, Heart Rate, Blinking.

The question is still the same as in the polygraph recording approach: which measurements, and based on what theory, can candidate variables be chosen for detecting deception and explain how their relations for situations of everyday life differ from the condition of deception?

All the above described methodologies currently used or emerging are addressing truth verification or credibility assessment efforts, previously known as lie detection of a different kind. To understand the premise and frame work of truth verification and credibility assessment work, we research literature for definitions of truth and credibility. According to the Stanford Encyclopaedia of Philosophy the definition of truth is based on nine different theories: correspondence, coherence, "http://en.wikipedia.org/wiki/Constructivist_epistemology", consensus, pragmatic, deflationary, performative, redundancy, pluralist. The purpose of this paper does not allow us to go into details of these theories, but in a survey of professional philosophers and others on their philosophical views which were carried out in November 2009 (taken by 3226 respondents, including 1803 philosophy faculty members and/or PhDs and 829 philosophy graduate students) 44.9% of respondents accept or lean toward correspondence theories, 20.7% accept or lean toward deflationary theories and 13.8% epistemic theories. There is also no consensus on the definition of lying and deception in the literature. Please entertain yourself with the well known liar paradox: if "This sentence is false" is true, then it is false, which would in turn mean that it is actually true, but this would mean that it is false, and so on to infinity. We believe the whole field of truth verification or credibility assessment efforts would greatly benefit if a unifying framework allowing characterization across various types of information resources and diverse information tasks including work problems and personal interests could be established.

Psycho-Semantic Methodologies

The name psycho-semantics derives from two words: PSYCHE defined in literature as nonphysical attributes of the human being, faculty for thought, judgment, and emotion; the

mental life, including both conscious and unconscious processes and SEMANTICS defined as study or science of meaning. Free association test was the first inroad into the field of psycho-semantics and still used since early 20th century by scientists, psychologists to investigate underlying perception and meaning, reasoning, and motivation, personality and its pathology. Basically the subject is told to say the first word that comes to mind in response to a stated word, concept, or other stimulus. If the word stated has no significant meaning the response will slightly fluctuate from other words presented, but when a stated word provokes an emotionally charged memory it may produce atypical or revealing associations or, more often, reaction time becomes either unusually long or unusually short.

The literature describes other approaches for psycho- semantic tests of people, including subjects influenced by harmful negative factors such as drugs, alcohol, and traumatic events which radically affect their performance and reliability. In psycho-semantic research, the task for the individual is to provide some classification about a topic. The response could be a judgment of similarity, an indication of the extent to which she or he agrees or disagrees with a statement, or some other association. George Kelly (1955) published a personal construct theory (PCT) where constructs are described as bipolar categories that people can use to understand the world. It postulated that people then behave according to how they construe the world around themselves. Osgood et al. (1957) described a technique for the measurement of meaning named semantic differential (SD). SD was designed to measure the connotative meaning of concepts. The connotations are used to derive the attitude towards the given object, event or concept. Since this time, PCT and SD were widely used in many areas of management studies, knowledge modeling in artificial intelligence, language and attitude studies and a wide range of other disciplines (Alford & Strother, 1990; Baker, 1986; Ball, 1983; Bayard, 1990; Cacioppo & Berntson, 1994; Cheshire, 1982; El-Dash & Tucker, 1975; Gaies & Beebe, 1991; Gallois & Callan, 1981; Heise, 2010). In 2010 a single test, PsyExpert, combining PCT (Kelly, 1955, 1970), SD (Osgood, 1959, 1967, 1976), Lentiev's theory of the emotion (Leontiev, 2002) and Luscher's color preferences approach was described (Ioffe & Yesin, 2010, 2011) and took the whole field of study of human psyche a step further. Instead of using an expert to uncover personal constructs as George Kelly described or create adjectival opposites as required for SD, in PsyExpert the subject being tested reveals his constructs automatically, associates it with colors from a pallet of 15 colors, using a concept of innate relations of human emotions and feelings with color. Evaluating the words and concepts by colors, the subject being tested does not suspect that he/she is actually "associating" each element with an individual specific emotion (the pole of the construct), thus openly revealing their inner world. All of the above described testing is done in one 30 to 60 minute procedure using PsyExpert. PCT, SD, PsyExpert and other questionnaire type tests use conscious mind responses to reveal unconscious roles, components, influences, actions etc. in human behaviour.

Unconscious Psycho-Semantic Methodologies

There are other researchers who have developed approaches to bypass consciousness all together (Shevrin & Fritzler, 1968; Shevrin et al., 1969; Dixon, 1971; Luriya & Vinogradova, 1971; Reingold & Merikle, 1980; Kunst-Wilson & Zajonc, 1980;

Kostandov, 1983; Kihlstrom, 1987; Greenwald, 1992; Esteves et al., 1994; Ohman & Soares, 1994; Epstein, 1994; Smirnov et al., 1995; Dijksterhuis et al., 2005; Dehaene et al., 2006; Ioffe et al., 2007a) and deal directly with the unconscious mind employing different masking techniques through use of a tachistoscope (Renshaw, 1945; Benschop, 1998) or computers (Holender, 1986; Ramachandran & Cobb, 1995; Ansorge et al., 2007). Tachistoscope can flash images as brief as 1 msec., but independently of the length of the exposure, the retina's afterimage trace persists approximately 40 msec. Therefore, the subject is reacting not to the stimuli but to the afterimage of the stimuli. Exposure time of a visual stimuli (word or picture) using computers is limited by a monitor's frequency and for LCD monitors a minimal exposure is between 13 and 16 msec. Different masking techniques are described in the literature (Ansorge et al., 2007) and though there is no universal agreement on which masking techniques are the best, forward masking, backward masking, four dots etc., each of them was validated and are successfully in use for their own purposes. Over the last four decades extensive scientific research was directed into unconscious mind mechanisms and its processes (Luriya & Vinogradova, 1971; Shevrin, 1973; Kunst-Wilson & Zajonc, 1980; Shevrin & Dickman, 1980; Dixon, 1981; Kostandov, 1984; Wedding & Stalans, 1985; Macmillan, 1986; Kihlstrom, 1987; Reingold & Merikle, 1988; Lang et al., 1990; Greenwald, 1992; Shevrin et al., 1992, 1996; Epstein, 1994; Esteves et al., 1994; Ohman & Soares, 1994; Wong et al., 1994, 1997; Smirnov et al., 1995; Waller and Mijatovich, 1998; Snodgrass, 2000; Dijksterhuis et al., 2005; Winkielman et al., 2005; Dehaene et al., 2006; Ioffe et al., 2007b; Ioffe & Konobeevsky, 2008; Ioffe & Yesin, 2010, 2011; Ioffe, 2011). In 1968 Howard Shevrin published (Shevrin & Fritzler, 1968) the first report of brain responses to unconscious visual stimuli, thus providing strong objective evidence for the existence of the unconscious mind. In the same study, he showed that unconscious perceptions are processed in different ways from conscious perceptions. Subsequently, Shevrin and his colleagues have shown brain markers for unconscious factors at work in producing social phobias. The literature presents many scientists from around the world working in the unconscious field, but we singled out an American psychoanalyst, Howard Shevrin, as he went beyond just the theoretical field into practical application and in 1987 applied for a patent for a system assessing verbal psychobiological correlates using tachistoscope for presentation of unconscious stimuli. During the same time, across the world, another scientist, a Russian psychiatrist, Igor Smirnov and his colleagues, have been studying the unconscious mind using the methodology of computer masking techniques of stimuli presentation and measured evoked potentials or visual motor reaction to such stimuli (Smirnov et al., 1995). In 1987 and 2002 they applied and received patents for methodology of psycho-ecology and a method of psycho-probing. Technology developed by Igor Smirnov moved studies of human psyche from the scientific laboratory into the medical field of diagnostics using probing of the unconscious mind.

In 2006 SSRM Tek was born by merging the principals of free association test with basic principles of masking and visual-motor response recording as described above (Ioffe et al., 2007a): we bypass the conscious mind and question the unconscious mind directly using subliminal stimuli and expecting that if a word shown subliminally provokes subject's emotionally charged memory, it will affect his/her reaction time the same

way it was affected in Free association test.

SSRM Tek is developed in the form of a non invasive computer-like game and requires minimum computer knowledge of the operator or subject being tested. Each and every one of methodical principals, of which the SSRM Tek. was created, are validated: Greenwald (1992) after reviewing all available literature before year 1992 for and against unconscious cognition, drew the conclusion that "unconscious cognition is now solidly established in empirical research". "Unconscious cognition occurs separately from conscious cognition" (Greenwald, Klinger, & Schuh, 1995), therefore unconscious mind processing of information is separate, independent phenomena from conscious mind and our approach to use subliminal stimuli for testing is valid. "Visually masked prime words were shown to influence judged meaning of following target words. Unconscious semantic activation is very short-lived (100 msec.). Unlike supraliminal stimulation, a subliminal leaves no memory trace that can be observed in response to the next stimuli" (Greenwald, Draine, & Abrams, 1996). Therefore our usage of the subliminal stimuli as perfect probes, which are short-lived and do not contaminate memory—leave no trace by the time next stimulus arrives, is not simply valid but is very prudent. "Results show that subliminal priming involves unconscious categorization of the prime" (Abrams, Klinger, & Greenwald, 2002), based on this study, our approach of describing experience in words and presenting it subliminally is credible. "Subliminal priming governs by both task context and long-term semantic memory" (Greenwald et al., 2003). This means that subliminal stimuli will produce a meaningful response only if a semantic memory of previous experience exists and subliminal stimuli can affect time response of pressing a button when a random row of numbers appears on the screen. "The present experiment measured an EEG indicator of motor cortex activation, the lateralized readiness potential (LRP). The LRP data showed that visually masked words triggered covert motor activations. These prime-induced motor activations preceded motor activations by subsequent (to-be-classified) visible target words" (Zayas, Greenwald, & Osterhout, 2011). During SSRM Tek test procedure subliminal stimuli inducing motor activations preceded motor activations by subsequently pressing the button action when visible row of random numbers appears on the screen. Therefore able to slow down or speed up the time of the response or have no change to the time of the response to row of random numbers. Our methodological approach to develop defence reaction and test it using subliminal stimuli is supported by Knight, Nguyen, and Bandettini (2003) and Pessiglione et al. (2008).

Results of SSRM Tek. applied research were verified using clinical diagnosis (Ioffe et al., 2007a, 2007b), semantic differential by Osgood (Ioffe & Konobeevsky, 2008; Ioffe & Yesin, 2010, 2011) and Kelly's Personal Construct methodology (Ioffe & Yesin, 2010, 2011), PANSS scores (Tjuvina & Krivtsov, 2006) and intelligence reports (Ioffe, 2011). Additionally, it was shown that probability of false positive was 0.3% and a range of 0.08% to 1% with 95% confidence level. In the study of early diagnostics of relapse of a paranoid schizophrenia (Tjuvina & Krivtsov, 2006), correct forecasting of an aggravation of a psychosis using unconscious stimuli testing methodology was at the 84.6% accuracy level and overall sensitivity of the applied method was at the 78.9% accuracy level, specificity level was 86.9%.

Based on the above discussed we have chosen two methodologies: one as the best representative of the psycho-semantic conscious methodologies (PsyExpert) and another one (SSRM Tek) as a representative of unconscious psycho-semantic methodology for our applied research in the Afghan military personnel.

A current study was performed in two stages:

Stage1—Development and evaluation of the text-based testing in the literate Afghan Army personnel.

Stage 2—Development and evaluation of the picture-based testing for the illiterate Afghan Army personnel.

Materials and Methods

Stage 1: Fifty Afghan Military Intelligence officers were participants of the study, their ages 29 to 54 (43.8 + 6.4). Their identities were fully protected. No information except age and their code number between 1 and 50 assigned to them was collected. The Afghanistan MoD's Ethics Committee approved the research paradigm. Informed consent was obtained from all of the officers for the application of psycho-semantic methods for testing.

Initially the task was to determine if chosen Western-based technologies could be modified to the Afghan culture and its main language, Dari, to provide a rapid, automated, non-invasive, non-intrusive screening tool to identify critical issues relating to personnel security.

Using the guidance from senior MoD Intelligence Officers, the following topics were chosen to be tested: 1) corruption, 2) espionage, 3) "anti-government activities" and 4) drug/ alcohol abuse.

As the psycho-semantic approaches discussed above were to be employed in this study, a survey was designed to capture all semantically relevant terms corresponding to these four topics. The Dari-language survey was administered to 30 Military Intelligence Officers from the Afghan MoD. The results were collected, compiled, and translated from Dari to English, and then analyzed to identify primary terms corresponding to these four major topics. Initially 38 primary Dari words were chosen from the survey conducted for the four topics described above.

Two Technologies Used

The first technology to be tested is called the SSRM Tek and it is based on the measurement of an individual's emotional "reaction" to visual stimuli—words or pictures evoking a strong semantic connotation and subsequently affecting motor-skill response (Ioffe et al., 2007a,b). A word or picture is displayed via a computer screen at a fraction of a second called the "probe"—visual images pass through the retina and are "seen" only at the unconscious level but not at a conscious level; then masked by a row of random 15-digit numbers (for text probes) or a scrambled image (for picture probes) which is the only image the person taking the test registers at the conscious level. The person taking the test is trained to press a button when he sees the random string of numbers or scrambled images. If the unconscious-based probe evokes a strong-enough reaction, the person taking the test presses the button either more slowly or more rapidly as compared to unconscious control stimuli which are random strings of numbers or scrambled images. These unconscious-based probes and controls are shown randomly throughout the testing cycle in word or picture "groups" and the results are statistically calculated and pre-

sented in an easy-to-read format.

The second technology to be tested is called PsyExpert and it is an automated color association test—a standardized psychological exam which was designed to probe the unconscious mind using computer questionnaire-type probes requiring conscious responses. PsyExpert represents a combination of well known methodologies including Semantic differential by Osgood 1959, 1967, 1976, Kelly (1955) construct theory and Lusher color test and theory of the emotions (Kostandov, 1977; Leontiev, 2002) which indirectly associates and evaluates relationships of different tested words with emotions.

In this study, PsyExpert was matching the words selected from the survey with different basic emotions (fear, hope, grief, pleasure, anger, satisfaction, liking, antipathy, etc.).

PsyExpert was meant also to help validate that the primary words identified in the survey were in fact words evoking strong emotional responses.

Each officer was subjected to both of the above described tests concurrently. On average combine testing would take less than 90 minutes.

Initially, the plan was to analyze the data of the first PsyExpert and SSRM Tek testing and further make changes to the list of words initially tested then repeat testing to attempt further improvement of the results.

Stage 2: The 762 Afghan military personnel tested were between ages 18 to 69 with the average age 40.64 + 10.54 and they came from a large cross-section of the Afghan Army. Testing was done at various Afghan Ministry of Defence sites and included the MoD Headquarters in Kabul, and the MoD's Bala Hissar complex. The instructions on how to take the test were given to each of the officers in Dari language.

Testing protocol for stage 2 was to compare a series of semantically significant pictures to the semantically significant Dari words identified in stage 1.

We hypothesized that we might be able to identify a group of semantically significant images/pictures that have a significant correlation with the semantically significant group of words previously shown to be effective during testing and corresponded to anti-government activities. Further, we hypothesized that the picture based stimuli will evoke a higher number of significant emotional responses as compared to the text based stimuli. Once a group of pictures has been identified, a picture-only based psycho-semantic test could be prepared for future use with non-literate personnel. Additionally, if our hypothesis will turn out correctly then pictures could be added to the original four-topic text-based test allowing for a higher fidelity of screening in literate personnel.

A set of images was initially collected by the two Afghan technicians and then filtered down after discussions with senior officers from the Afghan Defence Security Service. A set of 29 pictures were identified for the initial psycho-semantic test, separated into 4 groups, to cover the "anti-government activities" topics. The 29 images were separated into the following image groups:

Armed Insurgents; Insurgent Leaders; Sabotage; Suicide Bombing.

We utilized these 29 pictures in 4 separate groups along with the 20 words matching Armed Insurgents and Suicide Bombing groups from stage 1 study to form the new (initial) psycho-semantic test procedure for anti-government activities. To validate the results of such psycho-semantic testing for all topics described above, we added two more topics: a false positive

"picture" topic consisting of scrambled images; and a false positive "word" topic consisting of rows of random numbers. As both false positive "picture" and "word" topics are meaningless stimuli, any statistically significant positive responses to these topics will represent false positive results of psycho-semantic testing.

Although an initial set of 29 pictures were chosen and prioritized for the picture-based test, we designed a survey for the Afghan Army personnel taking the psycho-semantic testing. This survey was designed to evaluate a conscious emotional response to each picture in relation to other pictures in the same semantic "group". This test took approximately 2 minutes (**Figure 1**).

After a subject took a test of the emotional response to the pictures, the psycho-semantic test was started as described in stage 1 above. In addition, the ability to make the right decision under stress is evaluated based on the four gradations excellent, good, poor and below poor (unacceptable), calculated as a percentile of total number of errors to a permissible number of errors for the procedure of testing. The results of the defense reaction teaching procedure are also evaluated in the subjects being tested.

Statistical analysis, using criteria of Lehmann-Rosenblatt, one way ANOVA, Wilcoxon non parametric and other methodologies were performed.

Results

Stage 1: Only 8% of the officers tested using PsyExpert produced justifiable results. These results suggested that the following words used during testing such as Talib (طالب), Islam Defenders (مدافعین اسلام), Martyr (شهید), Islam's Devotee (فدائی اسلام), Going to heaven (رفتن به بهشت) and Devotee (فدائی) did not represent a single meaning in the mind's semantic space of the officer tested. These words could not belong to the same testing topics and were removed from further testing.

92% of the officers tested using PsyExpert developed a number of different strategies to successfully evade the test (**Figure 2**) and therefore produced no meaningful results:

1) Choosing (21 colors were presented to them) manageable
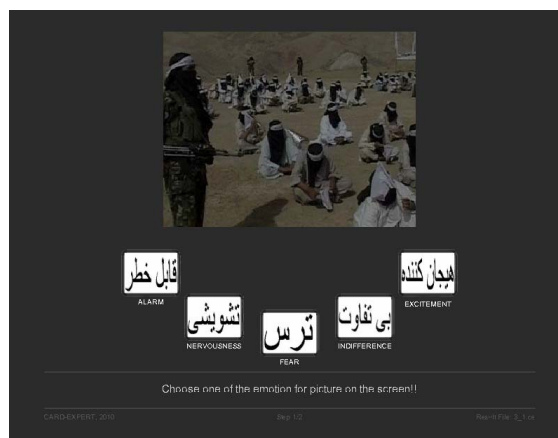
Figure 1.
Test for emotional response to the 29 pictures randomly presented on the screen. Each picture appears with five randomly positioned emotions on the computer screen trestee requires to point and click a mouse on the one of the emotions corresponding to the picture presented on the screen.
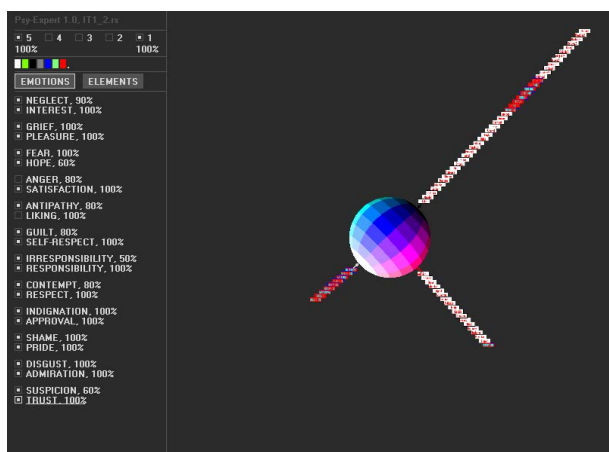
Figure 2.
Results of the PsyExpert test of one of the Afghani officers. Left part of the figure from top to bottom shows spheres, colors from the most likable (white) to the least likable (red), 12 pair of opposite emotions, numbers with the percent represent percent of the association of the emotion to the color chosen by the testee. Right part of the figure is the Runge sphere representing semantic space, white flags represent elements (words) tested, red flags represent emotions named by the testee during testing procedure. Take note that most of the emotions are associate with two colors white and black (sphere Runge) practically all the words tested are associated with two colors Black and Red. These suggest that the officer was employing three colors to categorize 24 emotions and 38 words as strategies to control the test outcome.

number of colors to remember 2 to 6 colors –33%.

2) 50% used the same classification values for 6 to 12 colors.

3) 78% used the same color classification for 25 to 40 words presented to them.

As opposed to the extremely low number of successful tests using PsyExpert, all 50 Military Intelligence officers successfully followed SSRM Tek testing procedures. Results of these tests revealed (**Table 1**) statistically significant responses of 2 officers to Espionage topic, 4 officers to Anti-government activities and corruption topics, and 12 officers to drug/alcohol addiction topics.

To validate these results a "subjective review" was conducted involving 8 senior officers who did not take the SSRM Tek test; 4 senior officers reviewed two separate groups each for a total of 8 reviewers. These eight senior Military Intelligence officers rated each of the 50 officers that took the SSRM Tek test on a scale of 1-4 as follows:
- I know this officer is involved in this activity;
- I've heard this officer is involved in this activity;
- I don't know if this officer is involved in this activity; and
- I'm sure this officer isn't involved in this activity.

It did serve to establish a level of "confidence" comparing the SSRM Tek results to what military intelligence officers had on file. The comparison between the SSRM Tek testing and the subjective reviews was overwhelmingly positive (see **Figure 3**) —approximately 90% agreement for the anti-government activities and espionage topics—with less agreement for corruption and drug/alcohol abuse topics (>83% and 70% respectively).

The data from the first set of SSRM Tek testing were also analyzed in order to determine which words evoked the strongest reaction "range". Some of the Dari language probes had little-to-no range. For example, the Dari word for bribery

Table 1.
Show the number of officers for each of topic which had statistically significant responses. A single officer could have multiple topic responses.

TOPICS	Anti-government activities	Espionage	Corruption	Drug/ alcohol abuse
N (number of officers responded)	4	2	4	12
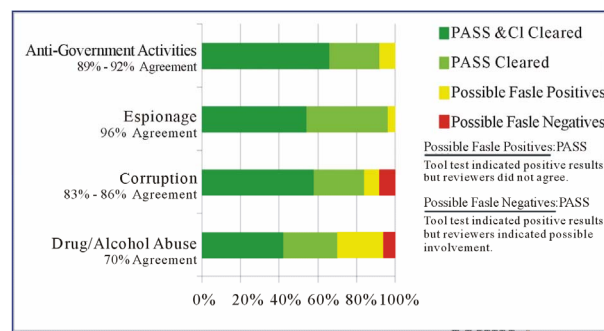
Figure 3.
Comparison of SSRM Tek first set of tests with subjective reviews.

(رشوتخوری) produced a wide range of responses within the testing population whereas a slang word for bribery—sweet (شیرینی)—did not evoke a statistically significant "range" among the 50 officers tested. Of the 38 original words chosen for testing, 14 words were either found to have no statistical difference or had multiple meanings, either positive or negative, and therefore were excluded from further testing after consultation with several senior Afghan military officers.
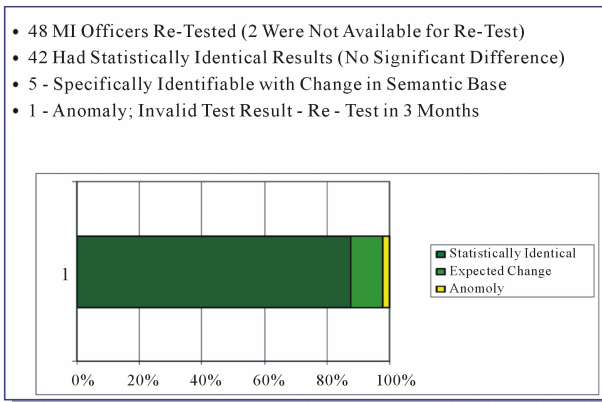
During these consultations, the Afghan military officers suggested several additional words for inclusion in the second sets of testing to attempt further improvement of the results of testing.

Figure 4 represents a comparison of first and second sets of SSRM Tek test results, where an exceptionally high degree of correlation can be observed. Two officers were not available for the second SSRM Tek test and 42 of the 48 Military Intelligence officers that took both the first set of tests and second set of tests had statistically identical results –87.5%. Of the remaining six individuals, five had changes that were directly attributable to the change from the first list to the second list of words tested, and one officer had invalid test results and suggested to be retested after settling back into the local environment after having made a personal trip outside of Afghanistan.
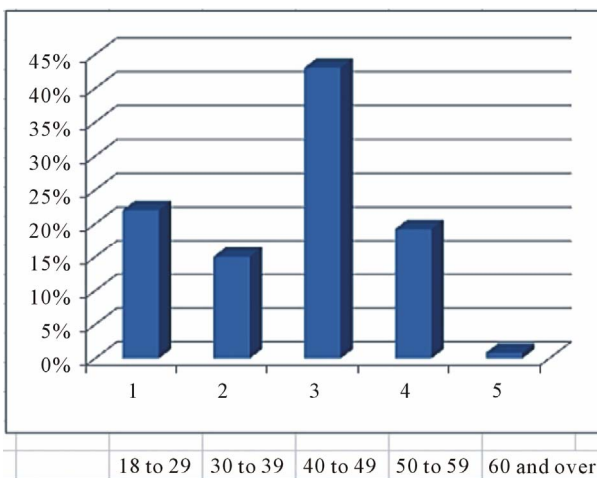
Stage 2: Average ages of military personnel recruited in all known countries around the world are between ages of 18 and 22, 62% of the Afghani military personnel tested in our study were between 40 and 59 (**Figure 5**).

Evaluation of the Picture Chosen Stimuli

We verified experimentally the choice for pictures in the psycho-semantic testing procedure using analysis of the initial data of 160 officers regarding the emotional content of the 29 pictures. This analysis indicated that several pictures (3, 4, 14 and 29) did not statistically correlate with the other pictures within each respective group (**Figure 6**) and were subsequently removed from further testing. Pictures 3, 4, and 14 were from the

- 48 MI Officers Re-Tested (2 Were Not Available for Re-Test)
- 42 Had Statistically Identical Results (No Significant Difference)
- 5 - Specifically Identifiable with Change in Semantic Base
- 1 - Anomaly; Invalid Test Result - Re - Test in 3 Months

Legend: ■ Statistically Identical ■ Expected Change □ Anomoly

Figure 4.
Comparison of SSRM Tek first set of tests with the second set of tests.

| | 18 to 29 | 30 to 39 | 40 to 49 | 50 to 59 | 60 and over |

Figure 5.
Age Distribution Statistics. Horizontal line represent ages, vertical line – percentages. Total number of military personnel tested was 762.

Armed insurgent

	1	2	3	4	5	6	7
1	X	0.861287	0.000000	0.000022	0.405224	0.054108	0.856040
2		X	0.000000	0.000014	0.419134	0.070195	0.895633
3			X	0.056790	0.000000	0.000000	0.000000
4				X	0.000000	0.000000	0.000007
5					X	0.312956	0.276684
6						X	0.039575
7							X

	8	9	10	11	12	13	14
8	X	0.717721	0.615505	0.164570	0.222686	0.727350	0.006064
9		X	0.181696	0.084087	0.114236	0.960276	0.012357
10			X	0.548526	0.729547	0.240839	0.001760
11				X	0.974572	0.106667	0.000102
12					X	0.131411	0.000055
13						X	0.029145
14							X

Suicide

	19	20	21	22	23	24	25
19	X	0.333860	0.826795	0.977566	0.566147	0.392944	0.642504
20		X	0.245191	0.372453	0.933271	0.933271	0.840651
21			X	0.775097	0.287038	0.110274	0.275202
22				X	0.566826	0.265374	0.385963
23					X	0.810883	0.887764
24						X	0.675168
25							X

Insurgents leaders

	15	16	17	18
15	X	0.209600	0.546209	0.632241
16		X	0.031406	0.416227
17			X	0.135025
18				X

Sabotage

	26	27	28	29
26	X	0.165028	0.609513	0.044865
27		X	0.259080	0.143367
28			X	0.015937
29				X

Figure 6.
Two armed insurgent topics and Suicide topic consist of 7 pictures each, Insurgents leaders and Sabotage topics consist of 4 pictures each. The numbers from 1 to 29 represent pictures. All the other numbers represent p values of Wilcoxon signed-rank test, which was used to analyse officers associative emotions evoked to the pictures they observe on the computer screen.
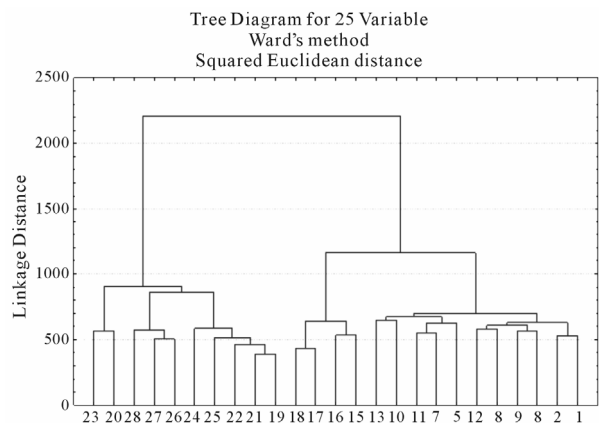
Armed Insurgency Group set, whereas picture 29 was from the Sabotage set. Criterion for picture exclusion from the topic was the distribution of the emotions allocated to the picture by 160 officers which statistically differed from at least two other picture distributions in the topic.

We also performed a cluster analysis using Ward's method (1963) on the 602 officers' responses to the emotional content of the 25 pictures left after four pictures were removed (**Figure 7**). Ward's method uses an analysis of variance approach to evaluate the distances between clusters. In short, this method attempts to minimize the Sum of Squares (SS) of any two (hypothetical) clusters that can be formed at each step and is regarded as very efficient, though tends to create clusters of small size.

Figure 7 shows that such concepts as Insurgents (Pictures 1, 2, 5, 6, 7, 8, 9, 10, 11, 12 and 13) and insurgents' leaders (Pictures 15, 16, 17 and 18) though identified separately are also associated with each other. The same can be seen for the concepts sabotage (Pictures 26, 27, 28) and suicide bombers (Pictures 19, 21, 22, 24, 25). It is interesting to note that pictures 20 and 23, which were tested in the suicide bombing context, clustered separately as belonging to both sabotage and suicide bombing. These pictures show different suicide vests, where all

Figure 7.
Cluster analysis of 602 officers' responses to the emotional content of the 25 pictures. Numbers from 1 to 28 represent different pictures. Concepts Insurgents (Pictures 1, 2, 5, 6, 7, 8, 9, 10, 11, 12 and 13) and insurgents' leaders (Pictures 15, 16, 17 and 18) though identified separately are also associated with each other. The concepts sabotage (Pictures 26, 27, 28) and suicide bombers (Pictures 19, 21, 22, 24, 25). Pictures 20 and 23, which were tested in the suicide bombing context, clustered separately as belonging to both sabotage and suicide bombing.

other suicide bombing pictures depict a suicide bomber using explosive vests and sabotage pictures show different bombing devices. This suggests that consciously and emotionally the officers tested distinguished well each of the corresponding concepts and further showed an emotional separation between suicide/sabotage and insurgents/insurgents' leaders concepts. These provided additional support for the pictures chosen for the testing and their separation into the topics.

Word Groups—Picture Groups Analysis

We wanted to investigate how the changes of the stimuli material (removal of some pictures 3, 4, 14 and 29) affected the outcome of testing. We used the Wilcoxon Matched-Pairs Signed-Ranks Test to compare the frequencies of the responses in word topics to word topics and picture topics to picture topics respectively for both initial set of 160 tests (pictures from 1 to 29) and final set of 602 tests (after we have removed picture 3, 4, 14 and 29). These results showed that there are no differences between initial and final sets of testing in the word topics (**Table 2**) as these topics didn't change per se. The results also showed that the picture topics, as a whole, had no statistical difference between initial and final sets of testing. A paired preference test comparing picture topics in initial and final sets of testing showed statistically significant increase for the Armed Insurgent topics at the 96% confidence level. That is, by removing irrelevant pictures (pictures 3, 4 and 14) from the topic within the "semantic group", we have improved statistically relevant results.

False Positive Response Analysis

Out of the total 762 tests, 5 Afghan Army personnel showed statistically significant responses to the false positive word topic and 4 of the subjects showed statistically significant responses to the false positive picture topics. Statistical analysis demonstrated a 99% confidence level that the test has a 0.6% probability of a false positive response for word topics used in testing and a 0.5% probability of a false positive response for picture topics. Most importantly, out of the 762 tests, no one simultaneously demonstrated a combination of both a word false positive and a picture false positive. Statistically, this data means that if the psycho-semantic test involves both pictures and words for any specific topic, there is a 0% chance of a false positive response. See **Table 3** for a tabular representation of this data.

Analysis of Word and Picture Topics

The major goal of our study was to discover if the responses to word topics will have corresponding responses in the picture topics. We found that 94.6% of the word probes correlated to 84.1% of the picture probes for the armed insurgent group topics (**Figure 8**). Additionally this graphic shows that 5.4% of the positive responses to word groups could indicate possible false negatives if only pictures are used in the psycho-semantic test and 15.9% of the positive responses to pictures could indicate possible false negatives if only words are used in the psycho-semantic test. Combining pictures and word probes will identify a group of officers tested, reducing the potential of false negative results but increasing the potential false positive maximum from 0% to 0.6% for unmatched word and picture topics.

We also found that 91.7% of the word probes correlate to 44% of the picture probes for the suicide bombing topic (**Figure 9**). This graph shows that 8.3% of the positive responses to the word group could indicate possible false negatives if only

Table 2.
The Wilcoxon Matched-Pairs Signed-Ranks Test of the frequencies of the responses in word topics and picture topics for initial set of 160 tests and final set of 602 tests—upper part. Preference test/Paired comparison for the Armed Insurgent topics in initial set of 160 tests and final set of 602 tests—lower part.

	Word Topics		Picture Topics		
	Initial	Final	Initial	Final	
Al-Qaida	6.5	6.3	25	40	Armed Insurgence Insurgence
Armed Insurgence	9.7	7.7	21	18	Insurgence Leaders
Suicide Bombing	6.5	6.3	10	14	Sabotage
Hezb-e-Islami	9.7	7.7	13	15	Suicide Bombing
Taliban	12.9	8.5			

W+ = 15 W− = 0 W+ = 2 W− = 8
N = 5 p ≤ 0.0625 N = 4 p ≤ 0.375

Pictures	Initial		Final		
Armed Insurgence	25	Versa	40	Size	126

T-Score 2.088 is significant at 96% confidence level.

Sum all positive ranks (W+) and all negative ranks (W−), the total number of pairs (N).

Table 3.
Calculations of False-Positives (FP) for lower and upper limits at 99% confidence level.

Num. of tests	Topics	n	Lower limit	Probability of false positives	Upper limit
762	FP word topic	5	0.2%	0.6%	1.9%
762	FP picture topic	4	0.15%	0.5%	1.7%
762	FP word + picture	0	0	0	0
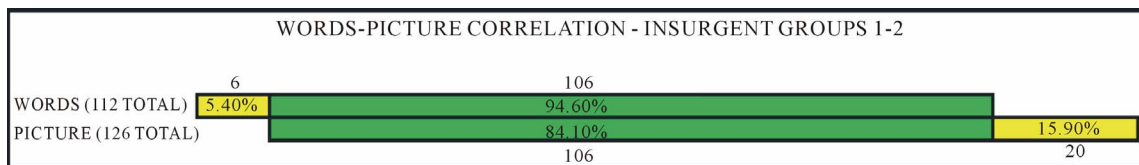
Figure 8.
Word-Picture Correlation for Insurgent Groups (graph not to exact scale). 94.6% of the word probes correlated to 84.1% of the picture probes. 5.4% of the positive responses to word groups are possible false negatives. 15.9% of the positive responses to pictures are possible false negatives. 112 and 126 are number of statistically significant responses to words and pictures of insurgent topics respectively.

WORDS-PICTURE CORRELATION - SUICIDE BOMBINGS

	2	22		
WORDS (24 TOTAL)	8.3%	91.7%		
PICTURE (50 TOTAL)		44%	56%	
		22	28	
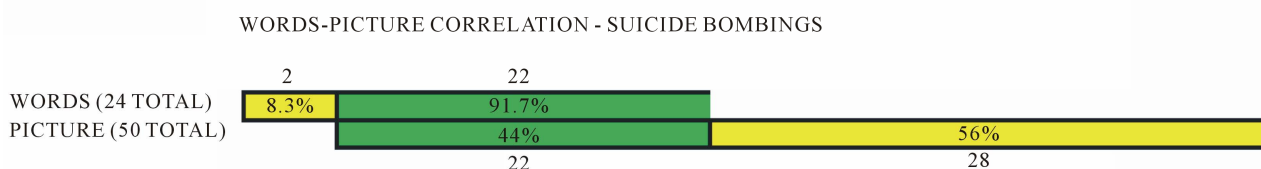
Figure 9.
Word-Picture Correlation for Suicide Bombings (graph not to exact scale). 91.7% of the word probes correlate to 44% of the picture probes. 8.3% of the positive responses to the word group are possible false negatives. 56% of the positive responses to pictures are possible false. 24 and 50 are number of statistically significant responses to words and pictures of suicidal topics respectively.

pictures are used in the psycho-semantic test and 56% of the positive responses to pictures could indicate possible false negatives if only words are used in the psycho-semantic test. Combining pictures and word probes will identify this "total" group, reducing the potential of false negative results but increasing the potential false positive maximum from 0% to 0.6% for unmatched word and picture topics.

Stress Factor Analysis

During testing we were able to obtain calculation of the "stress factor", a measure of a person's ability to learn and make decisions under mental stress. The stress is created by measuring how quickly the person learns from various audio and visual "corrections".

We have rated each testee into the following categories:

Excellent: ≤42 mistakes out of 1850 control probes (≤2.3% errors). 7.5% of the testee scored an "excellent" rating for stress factor.

Good: 43 - 99 mistakes out of 1850 control probes (2.3% to 5.4% errors). 44.4% of the testees scored a "good" rating for stress factor.

Poor: 100 - 141 mistakes out of 1850 control probes (5.4% to 7.6% errors). 28.3% of the testees scored a "poor" rating for stress factor.

Below Poor: ≥142 mistakes out of 1850 control probes (over 7.6% errors). 19.8% of the testees scored a "below poor" rating for stress factor.

52% of the 762 tested Afghan Army personnel scored between "Excellent" and "Good".

Any testee who makes more than 15 consecutive mistakes will trigger the test to stop. This may result from extremely poor cognitive learning abilities or a reluctance to follow directions. 4 of the 762 officers taking this test needed to be retested because of this control and all passed on the second attempt.

We conducted one way ANOVA statistical analysis to find out if and how the stress factors were influenced by age. For example, if younger officers will cope with the tasks better or will make less errors than older officers. The results of Analysis of Variance (ANOVA) showed no significant affect of the testee's age on the stress factor (**Table 4**, **Figure 10**).

We also divided the 762 testees into two populations: those who passed the test or had not shown statistically significant responses to any of the topics tested; and those who had statistically significant responses to one or more of the tested topics. Each of these two populations was then divided into the four stress factor groups as above. Results of ANOVA analysis showed that the stress factor was not affected by age, for either the officers who passed the test or those who failed it (**Table 5**). The probability of this result, assuming the null hypothesis, is 0.70.

Figure 11 represents only Afghan Army personnel exhibiting an "Excellent" stress factor during psycho-semantic testing. We wanted to point out a number of the testees between ages

Table 4.
ANOVA one way analysis of the stress factors versa age. Probability of this result, assuming the null hypothesis, is equal to 0.65.

Source of Variation	Sum of Squares	d.f.	Mean Squares	F
Between	184.7	3	61.57	0.5456
Error	8.1707E+04	724	112.9	
Total	8.1892E+04	727		

Between—numerator, error—denominator, d.f.—degrees of freedom, F—ratio.
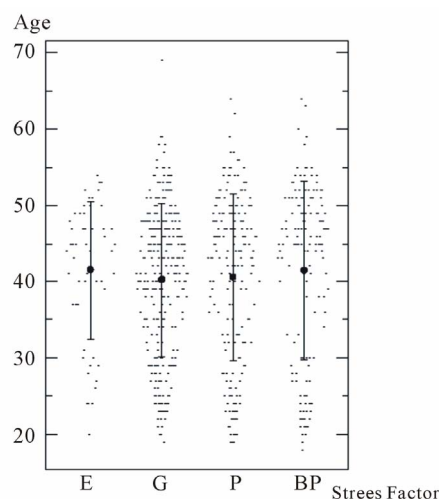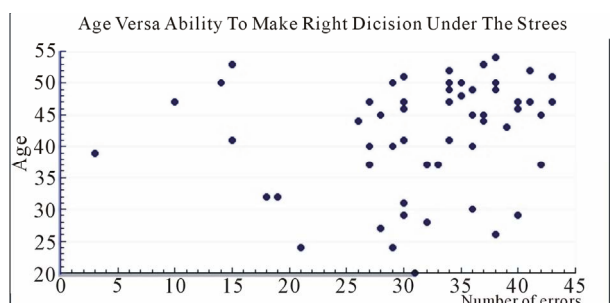

Figure 10.
Age distribution versa Stress factor, mean and standard deviations are shown. E—excellent, G—good, P—poor, BP—below poor. Numbers on the left represent age.

Table 5.
ANOVA one way analysis of the stress factors and age versa officers who passed or failed the SSRM Tek test. Probability of this result, assuming the null hypothesis, is equal to 0.70.

Source of Variation	Sum of Squares	d.f.	Mean Squares	F
Between	527.2	7	75.31	0.6665
Error	8.1365E+04	720	113.0	
Total	8.1892E+04	727		

Between—numerator, error—denominator, d.f.—degrees of freedom, F—ratio.

Figure 11.
Scattergram of age versa number of errors for stress factor "Excellent" rating.

39 and 53 made between 3 and 15 mistakes out of the 1850 test probes**.**

Analysis of the Results of the Defence Reaction Development Procedure

Defence reaction development procedure is words flashing across the computer screen and someone, by trial and errors, is required to establish for which words one needs to press the button and for which not. The general tendency would be that someone would try to slow down response to such words when compared to the response to meaningless stimuli. When Afghan military personnel were tested, 40.2% of the officers showed statistically significant increase of the time of the response. 54.5% had no changes of the response time when compared to control/meaningless stimuli response time and 5.3% of the officers showed a statistically significant decrease of the response time. Considering that the age of the personnel tested was skewed towards 40 to 49 years, we did an ANOVA one way test in the hope of elucidating the age differences (**Table 6**, **Figure 12**) of the three groups of officers who responded by increase, decrease or no changes to the defence reaction development procedure. Assuming the null hypothesis, the probability of the age differences for the above discussed three groups is very high p < 0.0001.

We also analysed stress factor distribution (number of errors during this procedure) according to increase, decrease or no change in the response to the defence reaction development procedure using a one way ANOVA test (**Table 7** and **Figure 13**). The probability of this result, assuming the null hypothesis, is less than p < 0001.

Discussion

Though psycho-semantic methods are free from many negative issues of the traditional investigational methods of observing the human psyche-suggestive or projective methods, we can see from this study that they are not without their own limitations:

For example, the direct methods of psycho-diagnostics based on the self-report as it is presented in PsyExpert, reveals only consciously realised and not actually operating motives. Even adequately realised motives can be distorted during testing because of their various social desirabilities and therefore socially undesirable motives are masked and socially desirable motives are demonstrated. Administrating the PsyExpert test presented an array of evading strategies employed by most of the officers even by those who were cleared by both the uncon-

Table 6.
ANOVA one way analysis of the age differences for three groups of officers who responded by increase, decrease or no changes to the defence reaction development procedure. The probability of the age differences for above three groups is p < 0.0001.

Source of Variation	Sum of Squares	d.f.	Mean Squares	F
Between	27.45	2	13.73	17.75
Error	585.5	757	0.7734	
Total	612.9	759		

Between—numerator, error—denominator, d.f.—degrees of freedom, F—ratio.

Table 7.
One way ANOVA analysis for stress factor distribution of three groups of officers, those who increased, decreased or had no changes of time of response to the defence reaction teaching procedure. p < 0.0001.

| Source of Variation	Sum of Squares	d.f.	Mean Squares	F
Between	9.2324E+04	2	4.6162E+04	14.15
Error	2.4769E+06	759	3263.	
Total	2.5693E+06	761		

Between—numerator, error—denominator, d.f.—degrees of freedom, F—ratio.
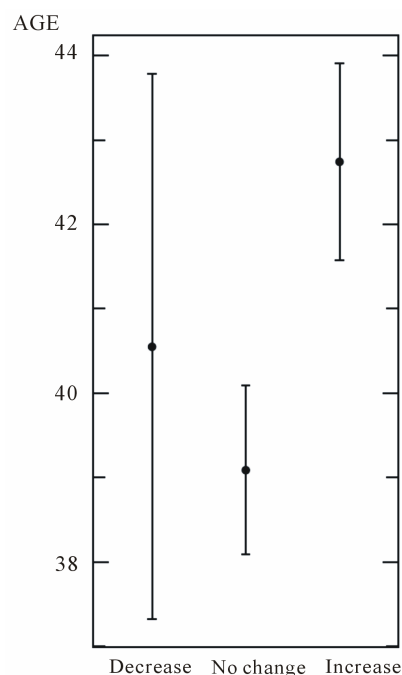
Figure 12.
Ages of the officers tested according to the results of their responses to the defence reaction teaching process. Decrease is statistically significant decrease of the time of the response to teaching procedure. Increase is statistically significant increase of the time of the response to teaching procedure. No change is no statistically significant changes of the time of the response to teaching procedure.

scious SSRM Tek testing and expert opinion.

Based on PsyExpert data analysis one might conclude that neither written nor computer based question and answer tests will be successful in Afghan culture, though PsyExpert data in western culture or with the patient interested in their health issues showed excellent results (Ioffe, Yesin, 2010, 2011).
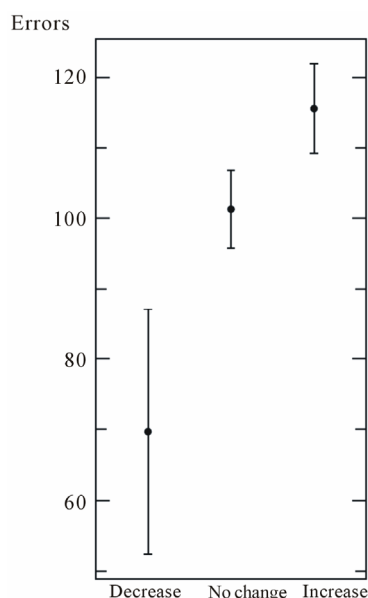
Errors

Figure 13.
Officers with a decreased response to the defence reaction teaching procedure (mean number of errors 69.7); officers with no change response to the defence reaction teaching procedure (mean number of errors 101.3); officers with an increased response to the defence reaction teaching procedure (mean number of errors 115.6).

The SSRM Tek applied on an unconscious level, as a psycho-semantic method, provided diagnostically significant structurally quantitative information for the organization of individual systems of values and attitudes of the officers tested. In this unconsciously applied psycho-semantic procedure, the statistics were collected not within the limits of groups of examinees but within the limits of repeating probes during testing procedures in a single examinee. The obtained SSRM Tek reports were well corroborated with expert ratings and repeated application. These reports can then be used as the basis of recommending further investigation as to why the person demonstrated a significant reaction to any of the image groups. There may be a justly appropriate cause for why a person demonstrates a strong emotional response to a specific or group of words/images. For example, a Human Intelligence (HUMINT) "case officer" might be expected to demonstrate a strong emotional response to the espionage word group if he is hiding his intelligence profession from family or friends. Additionally, a person may display a strong emotional response to drug or alcohol abuse if they are witness to a significant family member or friend with a problem.

For the cases of the discrepancies between the expert ratings and SSRM Tek results for the drug/alcohol dependencies topic we strongly suspect human emotional error comes more into play for issues like corruption and drug/alcohol abuse where moral and religious factors play a more important role than for issues related to insurgency and espionage topics. SSRM Tek data and this understanding is well corroborated with a study of military personnel in a different culture (Costrica, Tkachenko, Malcev, 1998).

The unconsciously applied psycho-semantic method (SSRM Tek) appears indirectly, presented to the examinee in the form of a "verbal game", appealing, seemingly, only to linguistic competence, meanwhile actually opening the subjective content of language symbols that is embodied in the structural formation work of real motives and goals of the subject tested.

A statistically significant response to any semantic-based probe does not constitute guilt, but rather, is a manifestation based on a strong emotional reaction to these stimuli. Thus, the unconscious testing (SSRM Tek) has been identified in the Afghan environment as an excellent screening technology that rapidly "passes" individuals that do not display a measurable reaction to chosen stimuli and points out the individuals who require further investigation.

In 762 officers tested, we identified 0.5% false positives for picture topic, 0.6% false positives for word topic and for simultaneously occurring picture and word topics zero false positives. If we can assume that false positive responses to word topics and picture topics are two independent variables, than using the probability of 4 instances of picture topics and 5 instances of word topics in 762 tests, it is possible to estimate the probability of false positives of simultaneous appearance of picture and word topic events as 3 out of 100,000 tests. Such a false positive rate seems to be infinitely low considering 10% to 30% false positive rates of current technologies in use, polygraphs and stress voice analysers. In the Afghan military population, where 16.5% of tested personnel had word and picture topics correlation, 16,500 officers, out of 100,000 officers tested, would not pass a test against 3 possible false positives.

Our data has shown a significant correlation for word and picture topics, but not a 100% correlation. This implies that in the human psyche different stimuli modalities, for example words and pictures, though they overlap each other, never exactly correspond with each other. One likely explanation for this possible false negative data is no semantic space one-for-one direct match between every word topic and every picture topic used. For example, we tested some pictures that represent insurgent leaders and sabotage in which there was no direct match with one of the previously chosen words. In this case, some individuals responded to these picture probes (62 positive responses for insurgent leaders and 41 positive responses for sabotage) but there were no correlating word probes. In these cases, it is possible these "unmatched" pictures resulted in some positive responses whereas there were no corresponding words in which to form the same positive semantic response.

We demonstrated that internal controls of psycho-semantic technology provide a powerful metric in which to assess one's mental agility or ability to react and learn under stress. Individuals who achieved Excellent stress factor status are highly likely to succeed in most tasks requiring decision making skills or analytical judgements; achieving Good stress factor status indicates that these individuals can likely be trained for a variety of different positions requiring decision making skills; Poor stress factor indicates that these individuals can possibly be trained for a variety of different positions not requiring decision making skills; Below Poor stress factor status indicates that these personnel will have great difficulties accomplishing tasks requiring mental agility or learning.

Officers who made less than 15 errors during the test deserve special attention as they are at the very top of the "Excellent" Stress Factor group and this represents an extremely high ability to make decisions and learn under mental stress.

We did not find meaningful correlation between the age and ability to make decision under stress.

Our testing and analysis has shown high correlation between previously evaluated word topics and corresponding picture

topics representing anti-government activities considered national threats to the Afghan Government. Therefore, it is possible to test illiterate Afghan personnel using picture based testing to identify those with motivations and experiences relating to these anti-government activities. In addition, because semantic space of the word and pictures topics, though they are largely overlapping, together provided additional inferences and therefore, the psycho-semantic test for literate personnel should include both word and picture topics.

There is no information in scientific literature of the impact of 30 years of war in Afghanistan on the dynamics of psychological makeup changes in the public. Our research was not specifically directed to the area of evaluation of the psychological makeup of the public, but the Afghani military represents one of the largest employers for men ages 18 to 60 in the region. Therefore, we will make an effort to use our data as a glimpse into the issues describing the psychological state of the tested population. 40.2% of the officers tested, based on their responses to conscious and unconscious stimuli, represent a group of average skilled population with average ability to learn, generally declaring to conform to social standards, but looking only for their own needs, easily manipulated into societal congruency with incentives. 54.5% of the officers tested can be characterised as having low perceptive accuracy, inability to differentiate semantic stimuli, unable to effectively act in complex situations requiring the need to make fast decisions. Generally, such subjects pursue not an optimal decision pattern, based on escapism from the problem. Their basic psychological defence is denial. 5.3% of the officers can be characterised as having high perceptive accuracy, high speed of cognitive processes and high accuracy of semantic analysis. In general, such subjects have well developed intellectual qualities which are the necessary requirements for leadership position placements. It can be assumed that in leadership positions such persons, especially those who showed the smallest number of errors during testing, will act in any complicated situation competently, responsibly and choose optimal decisions. The age differences between the above groups did not provide valuable insights into the issue at hand.

This study provides analysis of the operational test conducted during 2009-2010 involving 812 Afghan Army personnel. It was discovered that the psycho-semantic approach is a very unique, relatively quick, easy to learn, highly "fieldable" tool that can be used in the austere Afghan environment to reduce human bias in assessing dangerous and hidden traits, tendencies, and motivations in support of the Afghan Personnel Security Program. The data from these efforts suggests that individuals who "pass" this test can be reasonably assessed to be free of personal experiences, motivations, and predilections to each of the tested topics. Additionally, if administered as part of a periodic Personnel Security background check program, this system allows for large-scale screening operations to identify unknown threats to national security while serving as a deterrent to undesirable or illegal behaviours and helps to set high standards in personal conduct.

Will there ever be a right time to re evaluate, widely used in security but poorly understood and philosophically underdeveloped concepts of truth verification and lie detection? We are using great financial and human resources to plug in newly developed measurement techniques, such as fMRI or thermal tracking, into truth verification and lie detection programs; where unconscious psycho-semantic methodologies are vali-

dated and a new field of unsurpassed enquiries and knowledge for the organization of individual systems of values and attitudes within peoples' experiential memories is opened.

Conclusion

The unconscious-based SSRM Tek is an innovative solution to high-throughput personnel security screening requirements providing a highly unique, real-time reporting capability indicating potential serious problems which require subsequent investigation. Although the austere Afghan environment demands such out-of-the-box solutions, this tool is equally valuable in solving some of the other security challenges such as access to sensitive programs (surety programs, restricted areas, etc.), security clearance programs; screening for post-traumatic stress disorders; routine inprocessing protocols; border crossing sites, and visa applications.

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